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„Arctic Change: An Ethnography of Entangled Climatic and Societal Transformations in Longyearbyen, Svalbard“

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1 Introduction

The Arctic is changing. In step with the great global transformations of our time, the Arctic is melting. It is being explored, extracted and protected, becoming interconnected, some places get crowded, while others are deserted. It is at the same time a showcase for climate change, and a utopia for imaginaries of green futures and undisturbed wilderness. The Arctic is also home for many people, both Indigenous communities and newcomers. How one such place that many people call home—Longyearbyen on Svalbard—is experiencing and responding to these entangled changes, is the subject of this thesis.

The main focus of the research is climate change, which is approached in its various entanglements with other processes currently transforming Longyearbyen, including economic restructuring, demographic shifts, transforming state politics and the Covid-19 pandemic. These multiple and entwined developments on various scales result in specific challenges and frictions locally in which it becomes impossible to separate concerns with "natural" processes from "social" change, the "local" converges with the "global", and in which climate change impacts simultaneously as a physical process and as a discourse.

Anthropological studies of climate change tend to focus on "frontline communities" (Rudiak-Gould, 2013, Orlove et al., 2019): communities at the forefront of climate change. This emphasis is based on the assumption that "local people are acute observers of change" (Orlove et al., 2019: 1295), which also guided this research. Since the Arctic is warming twice as fast as the rest of the planet (Serreze & Barry, 2011), it "has been seen as a 'canary in the coal mine' in relation to global climate change and its impacts, as the region is first to be affected" (Stepien, 2014: 1). There has thus been considerable interest in Arctic communities in the anthropology of climate change (see, for instance, Crate, 2008; Nuttall, 2008; Henshaw, 2009; Krupnik & Jolly, 2002; Hovelsrud & Smit, 2010; Hastrup, 2012; Marino, 2015; Sejersen, 2015 for early contributions, and Ulturgasheva & Bodenhorn, 2022; Bradley & Stein, 2022 for more recent studies). As pointed out by Adam Stepien, "Arctic communities are seen as the first to 'take the heat' and the first who would need to adapt to changing environment" (Stepien, 2014: 1). In anthropology, this research has tended to focus on small-scale, Indigenous societies with deep historical ties to their natural environment, who are highly dependent on their local environments for subsistence.

This dissertation aims to contribute to the anthropology of (Arctic) (climate) change by focusing on a different and certainly far less studied locale and context. The case of

Longyearbyen is both typical and atypical in the Arctic. It is a profoundly globalized climate change hotspot, but its societal conditions distinguish it from other hitherto studied Arctic locales. Longyearbyen consists of a non-Indigenous, extremely transient, and international population, with high levels of income and formal education, and it lies at the center of Norway's strategic interests in the north and is regulated by an international treaty. These particularities make Longyearbyen hard to compare with other Arctic societies, but they also make for specific contributions to the anthropology of climate change, as I argue throughout the research. With this study, I thus hope to contribute to our knowledge about how a community far removed from a local, traditional and place-based community in the classical anthropological sense (Sokolíčková, 2022b) is experiencing and responding to entwined multi-scalar climatic, social, economic and political change. When I began this research in 2018, the case of Svalbard—a textbook example of Arctic change—had received little attention from social scientists. This has changed drastically in the past few years. My research contributes to this growing body of literature on human life in Svalbard in times of change, with a distinctive focus on the entanglement of multiple changes, the material and discursive dimensions of climate change, as well as on adaptation and permafrost thaw.

1.1 Research questions and aims

The overarching questions that guide this research read as follows:

> *How to conceptualize the multiple transformation processes currently occurring in Longyearbyen, Svalbard?*
>
> *How are multi-scalar and entangled socio-natural changes impacting, being experienced and responded to in Longyearbyen, Svalbard?*

These main questions are supplemented by sub-questions, which address the different but interrelated topics explored in the individual publications:

> *What are the societal and cultural conditions relevant for understanding the effects of interrelated change in Longyearbyen today?*
>
> *Which processes are currently transforming Longyearbyen, how are they entangled, and which challenges and frictions result?*
>
> *What are the perceived societal impacts and related challenges of climate change in Longyearbyen? How is the town adapting to climate change, and how is the dominant climate change discourse received/rejected/reproduced locally?*

To address the research questions, a range of related thematic foci were explored, which are reflected in the articles. The overarching topic are the intertwined environmental, economic, social and political changes altering the Arctic and the world at present, and how these are experienced and responded to in Longyearbyen. Although the main focus is on climate change, the topic is approached in its various entanglements with other processes currently transforming Longyearbyen. The emphasis lies on the challenges and frictions that result from these interacting changes, as well as on the related politics that shape experiences and responses.

The history of Longyearbyen and its (geo)political role in maintaining Norwegian presence on Svalbard constitute one essential context for understanding current transformations. In addition, simultaneously to experiencing unprecedented climatic changes, Longyearbyen is at the tail end of a major economic restructuring with far-reaching societal consequences. Both its economy and population have become profoundly globalized, and the Covid-19 pandemic had major impacts. This research studies change holistically and explores the specific challenges that result from entangled socio-natural changes, while considering the specific political, societal and historical contexts that shape how change is experienced and responded to in Longyearbyen.

The research furthermore focuses on whether and how climate change is observed locally, how these changes are experienced, and which related impacts people identify. A specific emphasis is here placed on permafrost thaw. This segment of the research is part "observation study"—i.e., how people become aware of climate change through the observation of local impacts, and part "reception study"—i.e., how the scientific climate change discourse is interpreted, understood, adopted/rejected/utilized locally (Rudiak-Gould, 2011). The latter includes the study of diverging perceptions and narratives of climate change. A related thematic focus is how experienced and projected climate change impacts are dealt with locally. This aspect of the research revolves around the concept of adaptation, and explores local adaptation practices, meanings and related challenges.

1.2 Longyearbyen at 78° North

This study focuses on a single locale, Longyearbyen on Svalbard, so a bit of background to situate the research is needed. Svalbard is an archipelago located between 74° and 81° North, 500 kilometers from the Norwegian mainland, and never had an Indigenous population. Since its discovery by the Dutch explorer Willem Barents in 1595, Svalbard has played an important

role in polar history, as different nations have pursued economic and political interests on the archipelago (Avango et al., 2011). From the seventeenth century, Svalbard was an important destination for Dutch and English whalers, followed by Pomor and Norwegian hunters in the eighteenth century (ibid.). Throughout the following century, tourists, scientists and adventurers explored the archipelago. Among them was the American businessman John Munroe Longyear, who founded Longyear City in 1905, later Norwegianized into Longyearbyen (Arlov, 2003). The town was founded on a coal mining camp, extracting the coal deposits in the mountains above a fjord west on the island of Spitsbergen. The turn of the last century saw the establishment of several international mining settlements in this high-Arctic resource frontier (Hacquebord & Avango, 2009), a no-man's land until the Spitsbergen Treaty entered into force in 1925. The treaty grants Norway sovereignty over the archipelago and ensures all citizens of the signatory states equal access to and the right to engage in commercial activities on the islands. The archipelago is thus today outside of the Schengen area and visa-requirements do not apply, and the treaty furthermore states that the archipelago is a demilitarized zone.

Until the 1970s, Longyearbyen was a "company town" (Garner, 1992). It was built around and operated by the coal mining enterprise Store Norske Spitsbergen Kulkompani AS and primarily inhabited by Norwegian male miners working mostly seasonally on Svalbard (Evjen, 1996). Throughout the 1960s and 1970s, due to Russian presence on Svalbard in a cold-war context, the Norwegian state saw the need to legitimize and reinforce its sovereignty through presence, and invested heavily in coal mining and community development in Longyearbyen (Arlov, 2003: 374–379; 2008). The same rationale drove the state-driven transformation in the 1970s to "normalize" Longyearbyen by expanding social infrastructure and enabling families to live there (ibid.: 361). In the 1990s, the economy was diversified, as tourism, research and higher education were introduced as additional economic pillars to ensure continued Norwegian presence on Svalbard (ibid.; Ministry of Industry, 1990–1991).

Today, the town is again undergoing major structural changes. With its approx. 2500 inhabitants, Longyearbyen is the largest settlement on Svalbard, and its administrative center. The town is a highly modern, "urban village", with an increasingly international population. The Norwegian state has decided to phase out coal mining, with the last operating Norwegian coal mine scheduled to close in 2024. The local and central governments, as well as scientists and private actors, are currently focusing on the "green transition" and the vision is to turn Longyearbyen into a showcase of "sustainable living" in the Arctic. Tourism and the related

service industry are growing rapidly, and together with research and higher education they constitute the main economic pillars of what has become a post-industrial town. As a result of this transition, Longyearbyen's population is changing (Middleton, 2023; Pedersen, 2017; Statistics Norway, 2023a, 2023b). The downturn in the coal mining industry and the growth in tourism and research and higher education have resulted in an increasingly international population, facilitated by the lack of visa-requirements due to the treaty. Today, a third of Longyearbyen's population is from outside Norway (Statistics Norway, 2023a). The biggest minorities are from Thailand, Sweden and the Philippines. That most social services must be consumed on the Norwegian mainland is reflected in the age structure of Longyearbyen, which has a clear predominance of the age group 20-66 years (80%). The annual turnover in the population is extremely high, around 25%, meaning that approx. one in five inhabitants moves from Longyearbyen every year (ibid.).

To Norway, Svalbard is of great (geo)political importance and, in the words of one of my conversation partners, "everything here is big politics". Svalbard is Norway's presence in the Polar Sea, and a potential future hub along the maritime transportation routes between Europe and Asia. The increasing military tensions due to the war in Ukraine strengthens Svalbard's strategic position in the Arctic. In this context, the economic and demographic developments in Longyearbyen apparently trouble the Norwegian state. There are multiple recent signals locally that the Norwegian state is attempting to increase its control over Svalbard. This includes attempts to control the population in Longyearbyen, with non-Norwegian individuals being "misinterpreted as political acts threatening Norwegian sovereignty" (Sokolíčková, forthcoming), to limit local democracy through changes in the voting system, and to restrict locals' and tourists' access to nature (Salem, Meyer & Ødegaard, forthcoming).

Simultaneously to these economic, demographic and political processes currently changing Longyearbyen, temperatures on Svalbard are rising at an alarming rate. From 1971 to 2017 a warming of 3° to 5°C has been observed (Hanssen-Bauer et al., 2019). In Longyearbyen, related environmental changes include permafrost thaw, increased events with strong precipitation, and more rain in winter (Hanssen-Bauer et al., 2019; Norsk Klimaservicesenter, 2019). Increased precipitation and snow- and glacier melt will result in more flooding, and river and coastal erosion are expected. There will be an increase in snow and slush avalanches. A deepening active permafrost layer in combination with more rain results in unstable slopes, increasing the risk for landslides and debris flows. While climate

change is viewed as a challenge for the Svalbard environment and urban development in Longyearbyen, to some it also presents opportunities in terms of transport routes and new industry, such as fisheries.

Longyearbyen is thus changing on multiple levels, and the local experiences of and responses to these transformations are—with a focus on climate change—the subject of this thesis.

1.3 Outline and description of the thesis

This synthesis contains an overview over the foundations of my research, as well as a description and discussion of its results. In chapter 2, I present the state of the art and discuss relevant bodies of research that this thesis engages with and contributes to. In chapter 3, I move on to discuss the chosen research approach. This includes ontological considerations, the theoretical framework and applied concepts, and methodology. Chapter 4 contains a summary of the main results in the form of descriptions of the individual publications. In chapter 5, I discuss cross-cutting results in relation to the theoretical framework and existing literature, highlighting the thesis' central contributions to research debates in anthropology. In the conclusion in chapter 6, I reflect on my readings and findings and the implications of this research.

The publications that constitute this thesis are individual pieces of the puzzle of a changing Longyearbyen. Each article considers a different aspect, and together they form a whole, although they do not cover the issue in its entirety. Recent studies, published during and towards the end of this research, cover complementary aspects of the topic, as I discuss in chapter 2, and there are still important gaps to fill. The first article (Sokolíčková, Meyer & Vlakhov, 2022) outlines the multiple and entangled economic, demographic and environmental changes currently transforming Longyearbyen, with an emphasis on how these are experienced locally. The second article (Meyer, 2022b) sets the scene and examines the development of Longyearbyen's built environment, and shows how entwined climatic and socio-economic changes create specific challenges for urban development. In the third article, my co-authors and I (Ramage, Jungsberg, Meyer & Gartler, 2022) zoom in on one particular aspect of climate change, namely permafrost thaw. We analyze perceptions of thawing ground in Longyearbyen, Qeqertarsuaq (Greenland) and Aklavik, Canada, and identify what challenges people perceive in relation. The fourth article (Meyer, 2022a) describes which climate-change related changes people locally observe and how people see these changes affecting Longyearbyen, and analyzes adaptation and its embeddedness in state politics. Moving from observations and responses to

perceptions and discourses, the fifth article (Meyer & Sokolíčková, 2023) examines the multiple narratives about climate change in Longyearbyen. Through the lens of reception studies in anthropology (De Wit & Haines, 2021; Rudiak-Gould, 2011), we analyze how dominant climate-change narratives are contested and resisted locally, thereby exposing over-simplification and uncovering the politics underlying dominant discourses. A major argument of my thesis is that climate change is best studied holistically, entangled with other changes, and it is one of ethnography's main premises that research must do justice to the circumstances in the field. The final article is thus about another major rupture that profoundly transformed life in Longyearbyen during the time of my fieldwork. In collaboration with my co-authors (Brode-Roger, Yhang, Meyer & Sokolíčková, 2022), we examine the impacts of the Covid-19 pandemic on Longyearbyen, exposing inequalities and systemic vulnerabilities resulting from the tension between Norwegian Svalbard politics and the globalization of Longyearbyen's economy and demography.

As the articles demonstrate, this research is strongly empirical, aiming to analyze different aspects of entangled climatic, socio-economic and political changes. I draw heavily on my ethnographic material, which also means that I have explored topics that I did not intend to examine at the outset. As I describe in the methodology chapter, during the time of this research I was engaged locally in building connections and collaborations within the growing field of social sciences on Svalbard, as well as between science and society. These engagements shaped both the development of the project and its results.

2 State of the art: research fields of relevance for this dissertation

2.1 Social science research in Svalbard and Longyearbyen

A colleague once remarked that when you search for "community" in RiS, the electronic data base for all Svalbard-related research, more entries pop up on fox and reindeer communities than on human communities. When I started my research in 2018, people told me that "there is no social science research on Svalbard". This turned out to not be true, but the literature on Svalbard human communities was still scarce, with the notable exceptions of history and political sciences. In the past few years, this has changed.

Svalbard has no indigenous population and is often portrayed as an untouched wilderness. Yet, it has been a peopled place for more than 400 years (Kruse, 2016). The early history of Svalbard and its exploration has been studied through the lens of history and archeology, for instance in the works of Frigga Kruse (ibid.; 2013), Louwrens Hacquebord and Dag Avango (2009), Avango et al. (2011), and Vadim Starkov (1998). The history of Longyearbyen has been studied by Norwegian historians Thor Bjørn Arlov (2003; 2008), Per Kyrre Reymert (2013), Bjørg Evjen (1996; 2006), and Arlov & Holm (2001). These works provide an essential basis for this research and for understanding Longyearbyen today.

Svalbard has furthermore been researched extensively through the lens of (geo)politics and law, with research focusing for instance on the Svalbard treaty and Norwegian sovereignty (Ulfstein, 1995; Jensen, 2020), or on potential conflicts associated with the Svalbard maritime zone (Østhagen, 2018). Thorbjørn Pedersen (2017) explores the importance of Longyearbyen for Norwegian sovereignty over Svalbard, demonstrating how the maintenance of the settlement is of paramount importance for the Norwegian state and its "politics of presence" in Svalbard. Another exploration of the (geo)politics surrounding Svalbard and its settlements, but from a more localized view and with a focus on community development, is provided in the works by Adam Grydehøj (2014; 2020) and Grydehøj, Grydehøj and Akrén (2012). The role of research and education on Svalbard not only for local communities, but as policy tools, is explored by Misund (2017) and Pedersen (2021). In a similar vein, Misund et al. (2017) trace the development of the University Centre in Svalbard (UNIS) and its role for maintaining a Norwegian settlement on Svalbard. Another take on science and its role in the "construction of Svalbard as a Norwegian space" is provided by Roberts and Paglia (2016).

In addition to the historical literature mentioned above, Svalbard has also been treated in the humanities, including cultural studies, literary, and visual studies (see the special issue of Nordlit on "Svalbard Studies", edited by Chekin and Rogatchevski in 2020, as well as their introduction to the collection (Chekin and Rogatchevski 2020)). Until the recent increase of social science research on Svalbard, the "view from below" on life in Longyearbyen has been explored in an edited volume in Norwegian by Jensen et al. (2008), by Arvid Viken (2008) who explored the turnover of Longyearbyen's population, as well as in a master thesis (also in Norwegian) by Heiene (2009), who provides an anthropological perspective on local identity and life in Longyearbyen.

Transitions and change are topics of particular interest to this research, and the literature on change in Svalbard settlements is growing. Based on long-term in-depth ethnographic fieldwork, Zdenka Sokolíčková just published her book *The Paradox of Svalbard. Climate Change and Globalisation in the Arctic* (2023), analyzing change in Longyearbyen ethnographically. The main motivation behind the collection of articles *Changing Svalbard* in the journal Polar Record that I co-edited with Zdenka Sokolíčková between 2020 and 2023 was to provide a venue for recent publications addressing the multi-layered economic, environmental, social and political changes that are currently transforming life on Svalbard[1]. In addition to the co-authored introduction to the collection of articles (Sokolíčková et al., 2022b), Saville et al. (2020) provide an overview over different approaches to study the human dimensions of life on Svalbard. As a concluding commentary to the special issue "Changing Svalbard", Mathias Albert (2023) discusses the recent "trend of an increasing number of social science contributions in 'Svalbard Studies'" (ibid: 1). Hovelsrud et al. (2020) address the cross-scale changes affecting Longyearbyen, including economic restructuring with an increase in tourism and climate change, and analyze how these impact on the local level and which adaptation dilemmas emerge for local actors as they navigate between national policies and local challenges. Kaltenborn, Østreng and Hovelsrud (2019) analyze challenges and dilemmas that arise for Svalbard policies and environmental management as Svalbard is undergoing social and environmental change, and Roger Norum (2016) discusses the industries of coal mining, research and tourism in Svalbard's settlements in the context of broader geopolitical changes in the Arctic. Comparing Barentsburg and Longyearbyen, Alexandra Middleton (2022) reviews available statistical sources and analyses current demographic and socio-economic trends in the two settlements. Comparing the same two settlements, Olsen, Vlakhov

[1] https://www.cambridge.org/core/journals/polar-record/collections/changing-svalbard

and Wigger (2022) explore residents' perceptions of the current socio-economic transition with a focus on community viability.

Several recent publications zoom in on different aspects of these various processes of change on Svalbard. The out-phasing of the coal mining industry is explored by Cecilie Vindal Ødegaard (2022), who analyzes the closing of the fly-in-fly-out coal mining settlement of Svea and shows how the elimination of most mining infrastructure in the area and its return to its "natural state" is deeply entangled in environmental narratives and Norwegian Svalbard policies. This "returning to nature" (ibid.) in Svea is also analyzed by architects Ingvild Sæbu Vatn and Lilli Wickström (2022), who were also professionally involved in the process. Treating also tourism and science as extractivist industries, Sokolíčková and Eriksen (2022) explore "extraction cultures" on Svalbard and its resulting tensions locally.

The accelerated growth in tourism on Svalbard has attracted much scholarly attention recently, but research in this field is not new (see, among many others, Viken, 2011; Viken & Jørgensen, 1998). Focusing on values, Samantha Saville (2022) explores tourism transitions in Svalbard, including the pre-pandemic boom and the associated controversies and challenges that come with mass tourism. The emergence and increase of Chinese tourism to Svalbard since the 2010s is explored by Sokolíčková (2021). The delicate "balancing act" in which the Svalbard tourist industry must navigate between economic growth and environmental concerns is analyzed by Hovelsrud et al. (2021). The environmental dilemmas associated with Svalbard tourism are furthermore explored by Trine Andersen (2022), from the point of views of guides. Also drawing on ethnographic fieldworks with guides, Eva LaCour (2023) examines the figure of the guide and the guiding practice itself. Fieldwork among guides also informs Eva Kotašková's (2022) analysis of another facet of Svalbard's current transition, namely coal mining remnants as they turn into tourist attractions and cultural heritage.

Local impacts of and adaptation to Arctic shipping on Longyearbyen are explored by Olsen, Hovelsrud and Kaltenborn (2020). Brode-Roger (2022b) examines the implications of the Svalbard Treaty for life on Svalbard from the point of view of Longyearbyen residents, showing how Svalbard's special territorial status inhibits a fully functioning local democracy in Longyearbyen. Also addressing the tensions that "big politics" result in locally, Sokolíčková (2022b) demonstrates how Norwegian Svalbard politics create barriers for "communitification" and hinders the development of a local "community" in Longyearbyen. In another article, she explores migration to Svalbard from Thailand and the Philippines (Sokolíčková 2022a). Other topics recently explored by social scientists and humanities

scholars include disaster risk perceptions in Barentsburg (Duda et al., 2022), and different forms of (un)inhabiting Svalbard (Zhang et al., 2021).

Socio-economic and demographic change has also been studied in other settlements on Svalbard. The transformation of the settlement Ny-Ålesund from a coal mining town to an international research station is examined by Paglia (2019). Comparable to Longyearbyen, Ny-Ålesund is supposed to "sustain Norway's effective occupation of Svalbard" by "facilitating a permanent Norwegian presence" (ibid.: 1). Also the Russian settlement of Barentsburg is interesting to compare to the current developments in Longyearbyen, as it remains a coal mining company town while developing tourism and research as alternative economic pillars. Current developments and community dynamics in Barentsburg are explored ethnographically by Andrian Vlakhov (2019 and 2020). Schennerlein (2021) discusses recent socio-economic developments in Svalbard's Russian settlements and presents a survey on Barentsburg residents' perspectives on the community. Jan Kavan and Barbora Halašková (2022) discuss the "rise and fall" of the now abandoned settlement of Pyramiden and how its development is linked to the broader political context.

Svalbard's cultural heritage is another topic that is receiving increasing scholarly attention. Susan Barr's seminal work in this area (Barr, 2004; 2019) is being complemented by current research focusing for instance on the multiple impacts on heritage structures posed by climate change and human influences, including tourism (Holmgaard, Thuestad & Barlindhaug, 2019; Nicu et al., 2020), and discussions evolve around preservation and adaptation of heritage sites (Martens & Krangnes, 2022). The materiality and memories of mining infrastructures, exemplified by Longyearbyen's old power plant, are analyzed by Brode-Roger (2022a).

Furthermore, the societal and cultural dimensions of climate change on Svalbard are addressed by a few very recent studies. Sokolíčková's (2023) book mentioned above is an ethnography of a changing Longyearbyen due to climate change and globalization. The already mentioned study by Hovelsrud et al. (2020) addresses local climate change impacts and discusses the adaptation dilemma that local planners are confronted with as environmental policies limit their action space. Dannevig et al. (2023) analyze climate change impacts on Svalbard tourism and related challenges and opportunities. Emphasizing experiential knowledge and a dwelling perspective, Sokolíčková et al. (2022) explore how people living and regularly visiting Svalbard perceive environmental change and how this comes to matter. Another essential, though non-academic, contribution to this literature is Longyearbyen local

Line Nagell Ylvisåker's book *My world is melting. Living with climate change on Svalbard* (2022).

Finally, a series of official reports and documents are crucial for understanding the current developments on Svalbard and contextualizing local receptions and responses. Statistics Norway regularly publishes statistics about demographic and economic developments in Svalbard settlements (Statistics Norway, 2023a). The official state strategy for Svalbard is published by the national government in so-called *Stortingsmeldinger*, of which the last was published in 2016 (Ministry of Justice and Public Security, (2015-2016)) and the next one is expected to release in spring 2024. In addition, governmental strategies like the strategy for innovation and business development (Departementene, 2019) provide crucial insights on the government's strategies and political directions for Svalbard. On the local level, reports and plans from Longyearbyen Lokalstyre (the Longyearbyen equivalent to a municipality), such as the local community plan (*Lokalsamfunnsplan*), or the strategic plan of Visit Svalbard, the umbrella organization for Svalbard tourism (Visit Svalbard, 2022), are of high relevance. In addition, scientific reports about the local environmental impacts of climate change (Hanssen-Bauer et al., 2019; Norsk Klimaservicesenter, 2019), constitute important sources of information.

2.2 Climate change and globalization: the study of Arctic change

As we argue in Sokolíčková et al. (2022b), current change on Svalbard is profound and multi-layered. The archipelago is considered as a climate change "hotspot" (Vidal, 2017), and its settlements are undergoing socio-economic change, transitioning from coal mining to tourism, research, education and innovative technology development (Arlov, 2003; Hovelsrud et al., 2020; Norum, 2016; Viken, 2011; Misund, 2017; Pedersen, 2021). These changes present a valuable opportunity to examine Arctic change (Paglia, 2019).

Change has become an essential characteristic of the contemporary Arctic and an expanding field of study within the social sciences. "Few other places on Earth are experiencing the magnitude and rate of natural change seen in the Arctic" (Evengård, Paasche & Larsen, 2015: 2), it is often argued. In addition, "rapid social and economic developments, such as migration, tourism, resource extraction, shifting political relations, geopolitics, and more generally the forces of globalisation, have far-reaching impacts on the Arctic's social, ecological, and socio-ecological systems" (Stephen, 2018: 224). The transformations in the region have attracted significant scholarly attention, resulting in a plethora of anthologies and

articles being published on the topic in recent years. The literature identifies globalization and climate change as "the ultimate drivers of arctic change" (ibid.). These drivers in combination create "aggregated impacts" (Evengård, Paasche & Larsen, 2015: 3), resulting in profound social and environmental transformations: "[t]he Arctic has become a highly dynamic socio-ecological system due largely to the interacting forces of climate change and a suite of factors that we commonly group together under the rubric of globalization" (Young, 2010: 164). While the Arctic has always been a dynamic region, the magnitude and speed of current socio-economic and biophysical change result in an "unprecedented combination of rapid changes" (Larsen & Fondahl, 2015: 29), which is considered a key characteristic of what has been termed the "New Arctic" (Anderson, 2009; Evengård et al., 2015; Young, 2010). As argued by Young (2010), the "New Arctic" represents the transformative or "state change" resulting from the convergence of biophysical developments and socio-economic occurrences. The former, driven by climate change, include melting sea ice, thawing permafrost and receding snow covers, while the latter include migration, tourism, resource extraction and power transitions in the global order (Stephen, 2018; Young, 2010: 164). "Taken together, these developments are opening the Arctic to global concerns, like the extraction of raw materials to meet the needs of industrialized societies and the development of commercial shipping on a scale designed to meet global needs" (Young, 2010: 168-169), which generates new needs for Arctic governance and policymaking. Arctic change is increasingly analyzed using the image of "the Global Arctic", "highlighting the inextricable linkages between Arctic and global processes and systems and thus the entangled fate of the North and the entire globe" (Stephen, 2018: 229). Change in the region is thus driven by "global forces over which small Arctic communities and national governments have limited control" (Ford, 2009: 105), and power and agency emerge as crucial research topics.

The literature on the "New Arctic" initially emphasized the potential economic opportunities related to the opening of new shipping routes, access to natural resources and increased tourism. Today, this extractivist narrative is increasingly being questioned. In the postscript to the book *Resource Extraction and Arctic Communities. The New Extractivist Paradigm*, Sverker Sörlin (2022) reflects on the current literature on the changing Arctic:

> Much of what the speculations were based on, such as massive extraction of fossil fuel resources, is now surrounded by deep uncertainty related to the decarbonizing agenda that followed the 2015 Paris agreement and the UN Sustainable Development Goals (SDGs) from the same year, the former reinforced by the Glasgow COP meeting in 2021. Nor do the previous chapters of this book really offer much cause to

> support the rosier futures that were in circulation. It seems that the expansionist, resource hype version of the twenty-first century Arctic is losing some of its relevance as world and regional developments have taken new turns. (ibid.: 266)

A similar tone is found in much of what has been termed the "human dimensions" (Castree, 2016) or "societal impacts" literature (for a comprehensive review of this literature, see Stephen, 2018). This strand of research focuses on community impacts of the combined effects of bio-physical and socio-economic changes that have "immediate and significant consequences for Arctic populations and local communities" (Evengård, Paasche & Larsen, 2015: 3). The Arctic Human Development Reports (AHDR, 2004; Larsen & Fondahl, 2015) are benchmark studies in this field that have been followed up by numerous case studies from across the Arctic. This literature focuses on impacts on specific societal sectors, often from an opportunities-and-risks perspective, as noted by Stephen (2018: 229), "which tends to blur the boundary to more policy-oriented work". Another focus is on impacts on peoples and communities, including topics such as community and urban viability, well-being, migration, urbanization, health, and impacts of infrastructure change (ibid.: 224-228; Larsen & Fondahl, 2015), as well as impacts on culture (e.g. Crate, 2008; see also below). In this context, vulnerability, adaptation and resilience on the community level are salient topics (see e.g. Keskitalo, 2008; Hovelsrud & Smit, 2010), that have inspired my research (see also chapter 3). A main argument brought forward in this literature is that "not only climate change but also the concurrent trend of globalization impact actors simultaneously" (Keskitalo, 2008: 2), and that globalization, economic and political change are crucial in shaping communities' adaptive capacity to climate change, and thus have to be considered in vulnerability assessments (ibid.).

Research thus clearly indicates that climate change is but one of the multiple factors of current transformations in Arctic communities and sectors, and often not the dominant stressor (Hovelsrud et al., 2011; McCarthy et al., 2005; Nuttall et al., 2005; Stepien et al., 2014). Due to globalization, industrialization and political transformations, Arctic communities are confronted with a range of cultural and socio-economic changes in addition to climate change. Hence, there is a consensus that research on the impacts on climate change on Arctic communities cannot consider climate change in isolation, but needs to take into account multiple climatic and non-climatic drivers of change and their interactions (Ford, McDowell & Pearce, 2015; Hovelsrud et al., 2011; Hovelsrud & Smit, 2010; McCarthy et al., 2005). Climate change is in this literature often approached from a "multiple stressors" perspective (McCarthy et al., 2005; for a recent review of the literature on multiple stressors, see Räsänen et al., 2016)

or in a "double-exposure" framework (O'Brien & Leichenko, 2000), as will be elaborated in more detail below. This approach considers multiple climatic and non-climatic drivers of change and their interactions, and has been influential in anthropological literature on this field (Crate & Nuttall, 2009: 16f; see also below).

The literature on societal impacts of climate change has found that there are both threats and opportunities associated with climate change in the Arctic, depending on the sector and community affected (Larsen et al., 2014). Indigenous communities are found to be particularly vulnerable, due to their "strong dependence on the environment for food, culture, and way of life" (ibid.: 1581) and relatively narrow resource bases (Aslaksen et al., 2009), in combination with underlying structural determinants of vulnerability, including colonialization and political disempowerment (Ford et al., 2015; Hovelsrud & Smit, 2010). However, as emphasized by several scholars, Arctic communities are diverse and it is crucial not to essentialize the region: "[d]ifferent geographic realities, demographic structures, political and legal systems, and images of the Arctic as a region make for varying impacts of and responses to global change processes like climate change and globalisation in different Arctic areas" (Stephen, 2018: 223). Longyearbyen provides an interesting perspective to this literature. How does climate change impact in a non-Indigenous, transient and international community, with an economy partly based on natural resources, and a community firmly upheld by the Norwegian state?

2.3 Anthropology of multi-layered change

In anthropology, the combined effects of climate change and globalization are being studied within and beyond the Arctic. As formulated by Thomas Hylland Eriksen and Astrid Stensrud (2019), environmental and economic changes and the resulting experiences of crisis "happen at an increasingly accelerated speed in a world which can be described as being overheated" (ibid.: 2; see also Eriksen, 2016). It is a crucial task for anthropologists to study these "various interfaces of 'environmental change' and 'economic change'" (Stensrud & Eriksen, 2019: 1).

In the Arctic, anthropological studies of climate change in the context of multi-faceted transformations have focused mainly on Indigenous contexts. Susan Crate's ethnography on the Viliui Sakha (2014) demonstrates how their contemporary challenges includes adapting to a "complexity of changes", which extend beyond climate-related issues and encompasses the local impacts of global climate change, the economic influences of globalization and demographic shifts, as more young people migrate away from rural areas (ibid.: 42). Focusing on intersections between climate change and globalization in Qaanaaq, Greenland, Andersen

and Flora (2019) analyze situations in which practices connected to globalization intersect with climate change, arguing for detailed attention to particular challenges in specific contexts in order to understand the impacts of climate change. Also drawing on fieldwork among Inuit communities in northern Greenland, Mark Nuttall (2009) describes how social, economic and political factors, in interplay with climate change, lead to cultural change and make the Inuit "strangers in their own lands" (ibid.: 300). Emphasizing that "[c]limate change must be understood in its broader context" (ibid.), he argues that climate change impacts on the community level depend on culture and especially on cultural conceptions of change, as well as on social, political, historical and economic factors. Adverse climate change impacts and the inability to respond appropriately is thus not determined by environmental changes alone, but "has much more to do with institutional, political, and social changes that provide no room to move freely in a changing world and to navigate it with reference to the experience of an intimate relationship with one's local environment" (ibid.: 298). This echoes similar findings from other places in the Arctic. Anthropological literature on climate change impacts on Saami reindeer herding in the Nordic Arctic, for instance, emphasizes that climate change is only one among several transformations currently affecting arctic reindeer pastoralism, including e.g. the integration of reindeer husbandry into a market economy, competition over land use, and industrialization and infrastructural development in herding areas, factors that in combination create vulnerabilities in reindeer herding systems (see e.g. Forbes et al., 2009; Heikkinen et al., 2012; Rees et al., 2008; Rattenbury et al., 2009). Turning east and drawing on fieldwork in Northern Sakha, Povoroznyuk and Schweitzer (2023) examine local perceptions of environmental change, finding that ignorance works as "a strategy of ensuring individual and community security vis-a-vis multiple socio-economic and environmental stressors" (ibid.: 1219).

In a similar vein, the CAVIAR-project (Community Adaptation and Vulnerability in Arctic Regions) (Hovelsrud & Smit 2010) examines the community impacts of and vulnerability to climate-related changes that "occur in the context of ongoing social, cultural, economic, and political transformations in northern communities" (Smit et al., 2010: 2). Acknowledging that vulnerability "is shaped by various forces or drivers across scales from global to local" (ibid.: 3), the editors conclude that "[c]limate change alone is not viewed as the most salient factor causing vulnerability in the communities, but as a force that is exacerbating risks and stresses related to resource use and overall wellbeing" (Hovelsrud et al., 2010: 340). Focusing on coastal fisheries in Lebesby in northern Norway, West and Hovelsrud

(2010) examine the social factors that shape the flexibility and thus the adaptive capacity of coastal fisheries, and argue that more attention should be paid to "cross-scale adaptation challenges", referring to adaptation at various of temporal, geographic, behavioral, institutional, and decision-making scales.

Also in the Svalbard context, anthropological research uncovers the complex multitude of environmental, socio-economic and political changes impacting locally. How people in Longyearbyen live with and experience the multiple and combined effects of globalization and climate change is examined in detail in the recently published anthropological monograph by Zdenka Sokolíčková (2023). Hovelsrud, Kaltenborn & Olsen (2020) demonstrate how key stakeholders in Longyearbyen adapt to "multiple layers of change", including climate change, national policy and increasing tourism, and how the national policy context creates adaptation dilemmas locally. Making a case for how "events and processes at larger spatial scales have strongly influenced particular Arctic locations", Eric Paglia (2019) traces the *glocal* history of Ny-Ålesund and shows how it both encompasses and is deeply intertwined with the socio-ecological and geopolitical state changes described by Young (2010). In our co-authored article, Zdenka Sokolíčková, Andrian Vlakhov and I (2022) describe the current changes in climate, demography and economy in Svalbard settlements from the local perspective, uncovering the related tensions these interrelated changes create.

2.4 The anthropology of climate change

Anthropology has a longstanding tradition of examining human-environment relations. The growing field of climate change anthropology may be viewed as a subfield of ecological anthropology or environmental anthropology (Baer & Singer, 2014: 63), although anthropologists from very different thematic backgrounds are now studying climate. Theories on the relationships between nature and culture, environment and society have been central to the development of the discipline, and a prominent focal point has been the connections between climate and culture (Dove, 2014; Hastrup, 2013). Alongside the broader social science literature on the "human dimensions" and the "societal impacts" of climate change, the anthropology of climate change or climate change anthropology has become a booming field of research in recent years (for overviews and reviews, see Baer & Singer, 2014; Barnes et al., 2013; Crate, 2011; Crate & Nuttall, 2009; Fiske et al., 2014; Hastrup, 2013; Moore, 2015; O'Reilly et al., 2020; Roncoli, Crane & Orlove, 2009; Strauss & Orlove, 2003, Sillitoe, 2021). As argued by Barnes et al. (2013), anthropology can add to the study of climate change both

methodologically and theoretically, through the in-depth fieldwork methodology that characterized the discipline and a holistic view of society, which contextualizes climate change among other factors of change. Through ethnographic insights, anthropology draws attention to "the cultural values and political relations that shape climate-related knowledge creation and interpretation and that form the basis of responses to continuing environmental changes" (ibid.: 541). Another contribution of anthropology, as pointed out by Stensrud & Eriksen (2019b: 3), is the ability to connect "small places" to "large issues" (Eriksen, 2015): "[a]nthropological perspectives and ethnographic methods doubtless have much to contribute to research on global questions by connecting the small scale to global processes."

Baer and Singer (2018) identify three theoretical perspectives in the anthropology of climate change: (1) the cultural ecological; (2) the cultural interpretive, and (3) the critical anthropological perspective, which will be discussed in more detail in chapter 3. Although these approaches are often described as separate, they are not mutually exclusive. Several studies combine different approaches to address different questions (see, for instance, Baer & Singer's (2018: 71) discussion of Susan Crate's study on the Viliui Sakha (Crate, 2008)).

Shaped by these theoretical perspectives and the fieldwork methodology which is central to the discipline (Barnes et al., 2013: 541), the anthropology of climate change encompasses various approaches to climate change. Most of these share the tenet of the "advantages of situating discussion of climate change ethnographically with respect to cultural context in order to better comprehend and accommodate different peoples' experiences, understandings and responses to ensuing environmental issues" (Sillitoe, 2022: 3). A main approach has been "the documentation of how place-based peoples observe, perceive, and respond to the local effects of global climate change", or so-called "place-based community research" (Crate, 2011: 179-182). Termed "observation studies" by Rudiak-Gould (2011), this line of research examines local observations of climate change and its impacts. Focusing on place-based knowledge, anthropologists "recognize that these communities are not homogenous, isolated, static or all-knowing. But they argue that local observations of changes in the climate and local mechanisms developed to deal with those changes can lead to contextualized understandings of climate change impacts and thereby inform adaptation policy" (Barnes et al., 2013: 541). As noted by de Wit and Haines (2021: 4), this research is often characterized by a "crisis narrative", and "[a]nthropologists were tasked with bringing vulnerabilities into view through the discipline's distinctive ethnographic method."

Closely related to this research are anthropological perspectives on climate vulnerability, adaptation, and resilience (Crate, 2008; Hastrup, 2009; see also chapter 3). As pointed out by Crate & Nuttall (2009: 16): "[t]hrough the investigation of local capacities for adaptation and resilience in the face of climate change, anthropology can tease out how larger-scale processes including industrial development, resource use regulations, global economic flows, and related human activities affect local environments and tend to magnify the impacts of weather and climate variations on indigenous and local livelihoods." Anthropologists add to this research useful perspectives on how culture and society create vulnerabilities and shape adaptative responses (Crate, 2008: 570), as well as critical perspectives on the concepts themselves (Orlove, 2009). Another main strand of research focuses on global negotiations and discourses related to the "idea of climate change" (Hulme, 2009) itself (Crate, 2011: 182-183). Anthropologists study the production of the climate change discourse and the negotiation of related policies (see, for instance Fiske, 2009), as well as the reception of the discourse on the local scale (e.g. Rudiak-Gould, 2011; 2013), including ignorance (Povoroznyuk & Schweitzer, 2023) and denial (Norgaard, 2011), and rejection (De Wit, 2020).

Since Rudiak-Gould's (2011) call for further engagement with reception studies, anthropologists increasingly treat climate change as a "scientific narrative, discourse, or idea" (de Wit & Haines, 2021: 2), and there is growing ethnographic interest in how this narrative is interpreted and received/rejected/reproduced locally, asking "how, why, and when climate change does come to matter" (Callison, 2014:10, in de Wit & Haines, 2021). There is evidence that the climate change discourse heavily impacts and shapes local environmental observations and perceptions (Rudiak-Gould, 2013), and recently there has been a call in anthropology to move beyond the more classical studies of localized impacts, adaptations and perceptions. Arguing for the need to study environmental and economic crises in combination, Stensrud and Eriksen (2019) advance an approach that moves beyond "the uniqueness and unscalability of the local" and begins to address "global questions about inequality, capitalism and environmental damage with a basis in ethnography" (ibid.: 5).

2.5 Anthropology and the built environment

This research draws inspiration from another field related to environmental anthropology, namely the growing field of anthropology of the built environment. Anthropology has a long history of engaging with the built environment (Lawrence & Low, 1990). The past years, with the discipline's (re)discovery of the material and materiality (Ingold, 2012), there has been a

renewed interest in infrastructure and the built environment (e.g., Carse, 2016; Larkin, 2013; Schweitzer, Povoroznyuk & Schiesser, 2017). The anthropology of the built environment continues the research agenda of environmental anthropology and the anthropology of space and place (Low & Lawerence-Zúñiga, 2003), by seeking to understand the ways in which people shape and are shaped by their physical surroundings. Yet it can be said to represent "something fresh" (Carse, 2016):

> This work promises to deepen our understanding of the spatial, temporal, and lived dimensions of environmental problems, to focus our attention on how controversies emerge around infrastructures, and to elucidate how communities can organize *along* infrastructures (that is, translocally) to make associated problems more tractable and to craft responses. (ibid.)

Treating the built environment not merely as a backdrop of human activity, but as actively involved in shaping cultural practices and beliefs, the field has grown to encompass a wide range of topics, including the social and cultural dimensions of architecture, urban design and the social production of built form. One prominent focus is on "the social, political, and economic forces that produce the built environment, and conversely, the impact of the socially produced built environment on social action" (Lawrence & Low, 1990: 482). A basic question addressed by this literature is thus "what social processes give rise to built form?" (ibid.), a question that guided the article Meyer (2022b). Longyearbyen is a prime example of how political interests produce and maintain built form, due to its function to "produce Norwegian presence" on Svalbard, as one of the research participants expressed it.

The built environment is furthermore a well-suited entry point for studying the societal impacts of climate change. Human-environment relations are mediated by technology and infrastructure, a problem that has been central to environmental anthropology (Carse, 2016). Buildings and infrastructures "materially mediate much of the human relation to the nonhuman world" (Moore, 2015: 36), and are critical links between humans and the natural environment. In times of climate change, the various entanglements of the built and natural environment (Schweitzer et al., 2017: 79) are increasingly brought to the fore. In this project the built environment is thus one main entry point to study the materiality and the sociality of climate change impacts and adaptation.

3 Research approach: theory and methodology

Climate change can be a slippery research subject. At its heart is the relationship between nature and culture, which has been a central problem of anthropology since the development of the discipline. Anthropology contributes to the study of climate change with its long-standing theoretical discussions about the relationship between nature and culture, environment and society: whether they can be considered two different spheres, to what extent they determine each other, and what practices, meanings and technologies arise at their interfaces. Theoretical debates about these issues have led to various paradigm shifts and contributed greatly to the development of the discipline as a whole (Dove & Carpenter, 2009). The anthropology of climate change grapples with the same fundamental questions, but also offers new ways to think about human-environment relations. Thus, not only does anthropology have a lot to contribute to the study of climate change, but climate change has also driven recent theoretical developments within the discipline. The subject thus dovetails with "some of the most pressing questions of contemporary philosophy and social theory– in particular, those concerning the status of long-standing and contested separations between matter and life, the biological and the symbolic, passivity and agency, affectivity and rationality" (Rosa, Henning & Bueno, 2021: 2).

In this chapter, I will first outline current theoretical discussions about nature-culture relations that are relevant for climate change anthropology. I will then introduce the theoretical approaches on which I base my research, before describing the concrete concepts that reflect the specific thematic foci of the individual publications.

3.1 On (overcoming) the nature-culture dualism in the Anthropocene

Today, a discussion about climate change cannot avoid the notion of the *Anthropocene*. Current theoretical debates over the nature-culture nexus are particularly fruitful in relation to this concept, in a field that some have come to call "Anthropocene anthropology" (for reviews, see Gibson & Venkateswar, 2015; Mathews, 2020; Moore 2015; Sanders & Hall, 2015). The term Anthropocene denotes that humans have become a geological force that is altering the world fundamentally (Crutzen & Stoermer, 2000). It refers to "the planetary scale of anthropogenic influences on the composition and function of the Earth's ecosystems and all life forms" (Gibson & Venkateswar, 2015: 5-6). Anthropologists are not in agreement over the usefulness of the term. Bruno Latour (2014: 1) has called it a "poisonous gift" to anthropology, due to its potential for rethinking the human in the Earth system (and thereby increasing the relevance of

the discipline), while running the risk of overemphasizing human agency. The term has been criticized for not differentiating between different forms of human agency, and thereby ignoring that specific socio-economic configurations, such as industrial capitalism, have brought about the crises we are witnessing (see, for instance, Malm, 2017). The aspect of the debate surrounding the Anthropocene that I want to draw attention to here, however, concerns the dualism between nature and culture.

On the one hand, the Anthropocene can be seen as reproducing the modernist ontology "in which humans are separate *from* and doing things *to* nature" (Benson, 2019: 252). The term places *anthropos* on center stage as the dominant geological force. By "emphasizing the 'anthropos' and etymologically ignoring other species," the Anthropocene thus "portrays itself as the result of a human species act" (Haraway et al., 2016: 539). It places the human outside of nature, and as acting "upon" it. The result is anthropocentrism and human exceptionalism, in which the role of other species in the shaping of the Earth is downplayed (ibid.). Furthermore, the idea of the human as the destroying force goes hand in hand with the problematic "man as steward of nature" narrative (Pellizzoni, 2016).

On the other hand, "the Anthropocene challenges us all to radically rethink what nature, humans as well as the political and historical relationship between them might be" (Haraway et al., 2016: 535). By considering humans as a "geological" force, the entanglement of the natural and the cultural is inherent in the idea of the Anthropocene. Humans are no longer "an outside force perturbing an otherwise natural system but rather an integral and interacting part of the Earth System itself" (Steffen et al. 2007: 615). Hence, in the words of Gibson and Venkateswar (2015: 6), "to engage with the Anthropocene is also an invitation to dismantle the rifts that separate humans from other life forms." With the Anthropocene then, the anthropological insight that the separation of nature and culture is a Western and modernist construct (Descola & Pálsson, 1996; Latour, 1993), has arrived in Western science. While some take this as an invitation to study coupled human and natural systems, others see the Anthropocene as offering "an opportunity to embrace a new ontology" (Benson, 2019: 252), an ontology which dissolves the separation of humans from nature.

Such an ontology has been developed in recent years in the growing fields of research with various labels such as post-humanism, Actor-Network Theory or agential realism, which can be subsumed under the umbrella of new materialism (ibid.). "Collectively," these approaches "represent a move away from the centrality of the human and toward a more complex and relational perspective of art, literature, politics and other elements of lived

experience" (ibid.: 252). By de-centering the human, new materialists turn to matter, extending agency to non-human entities, interacting with humans in networks or assemblages. New materialism attempts to overcome both biological determinism and postmodern social constructivism (Skiveren, 2023: 182), proposing instead:

> A poststructural version of materialism that recognized the contingent and unpredictable entanglement of all sorts of material and cultural forces. Rather than relegating these forces to dichotomous poles in an ontological hierarchy, new materialists recast matter and discourse as mutually interdependent, or intra-active, as it were, constantly unfolding and coevolving in complex and multifaceted ways. (ibid.: 182)

A monist ontology is thus proposed that objects the opposition between the material and the ideal. This implicates a collapse of ontology and epistemology, which mirrors recent developments in quantum physics: "knowledge is seen by new materialism as a dynamic reflection of the particular arrangements of matter" (Benson, 2019: 258), rendering reality relational (ibid.).

The usefulness of this new ontology for social science and humanities research on the "big crises" of our time, including climate change, is subject of much debate. On the one hand it is argued that climate change—the "epitome of the Anthropocene" (Rudiak-Gould, 2015: 48-49)—is itself such an entangled natural-cultural phenomenon that the nature-culture dualism defining the Modernist worldview cannot be sustained (Hulme, 2010). In the words of Mike Hulme (ibid.): "[c]limate change is reminding us—in case we had imagined otherwise—that we are intimate co-workers with the non-human in the mutual shaping of our present and future worlds, rather than being lords of all we can see" (ibid.: 274). A non-dualist ontology thus allows us to view climate change as an entangled natural-cultural phenomenon:

> By changing so substantially the composition of the world's atmosphere, humans have not simply brought a new category of weather into being –'human weather', for example, as distinct from 'natural weather'. Rather, the planetary system which yields distinct weather at distinct times in distinct places is now a changed system; it is a hybrid system yielding hybrid weather. (ibid.: 269)

Furthermore, a non-dualistic ontology allows for viewing climate change "as a multiple object with overlapping and divergent dimensions" (Esbjörn-Hargens, 2010: 143), composed of both material *and* discursive dimensions (Moore, 2016: 34).

On the other hand, new materialism's monist ontology has been criticized for being unable to adequately address the climate crisis due to its abandoning of distinctions and rejection of categories. Perhaps the sharpest critique to the new materialist project comes from eco-Marxist thinking (see, for instance Hornborg, 2014; Lettow, 2017; Malm, 2017; for an

illuminating take on this polemic, see Skiveren, 2023). In its most radical forms, it is argued, post-humanist approaches imbue the material with agency and thereby neglect politics:

> The critique of anthropocentrism in many cases results in a strong posthumanism that equates all forms of material agency – be it the agency of worms, bacteria, bicycles, humans or matter itself. As a consequence, relations of domination, power and difference within and among human societies are ignored. (Lettow, 2017: 107)

These scholars hold that a radical monism that allegedly denies all kinds of oppositions is unable to recognize the specific configurations of human agency responsible for the current environmental crises (in particular global capitalism), and thus argue for maintaining the distinctions that non-dualist approaches aim to overcome: "[o]nly by acknowledging such distinctions [between subject and object, society and nature, and human and non-human] and applying a realist ontology can exploitative and unsustainable global power relations be exposed" (Hornborg, 2017: 95). A similar position is voiced by Andreas Malm (2017), who argues for a "climate realism" that addresses the reality of a climate-changed world and the role of human agency that drives this change. Analyzing the underlying ontological principles of this scholarship, Skiveren (2023) summarizes:

> They all converge in their commitment to dialectic models and in that sense ultimately recognize both the interdependency of nature and culture and the respective autonomy of these categories. As ontologies, their views acknowledge that nature is not wholly untouched by culture, while at the same time emphasizing nature as the hotbed of processes and activities that unfold beyond the realm of culture. (ibid.: 183)

Interestingly, Skiveren (ibid.) observes, eco-Marxist theories are not all that incompatible with new materialism. It is their diverging attitudes towards critical methodologies that really sets them apart (with the former committed to social critique and the latter emphasizing affect), not their ontological differences. Both approaches are committed to this "balancing act of respecting the ontological status of nature without eradicating the significance of culture", and "[i]n both cases, nature and culture are related, yet not conflated; they affect each other without determining one another" (ibid.: 183).

The ontological position underlying this thesis is inspired by these outlined debates. It is based on a non-dualist ontology that recognizes the "entanglement of all sorts of material and cultural forces" (ibid.: 182), yet without conflating either. Concurrently, I view climate change as such an entwined phenomenon, recognizing the "infusion of the natural by the cultural in the realm of climate" (Hulme, 2010: 169). The human is profoundly influencing and is being influenced by the earth system, "simply by being part of it" (Benson, 2019: 260). The

research thus recognizes climate change as a phenomenon caused by humans—and as such, indeed a hybrid socio-natural phenomenon—, with real environmental effects that impact societies. Nevertheless, I agree with critics of new materialism that a monist ontology runs the risk of blurring categories and distinctions to the extent that it becomes difficult to do research. In the words of Gunnarson (2013: 14): "if we see distinctions as such as the problem, we rid ourselves of the possibility of examining the relation between the two terms and one will inevitably subsume the other". This is problematic, and I concur with Flatschart (2021: 194) that "language, speaking about some-thing, requires us to distinguish different levels". Recognizing "both the interdependency of nature and culture and the respective autonomy of these categories" (Skiveren, 2023: 183), I thus distinguish conceptually between, for instance, the environmental process of permafrost thaw and the society of Longyearbyen, while acknowledging that thawing permafrost itself is a result of anthropogenic climate change. This also implies that I acknowledge the features that distinguish the human from the non-human, first and foremost intentionality (Malm, 2018: 149).

A non-dualist approach maintains the mutual interdependency of matter and discourse (Skiveren, 2023: 182), and opens for considering climate change in both its discursive and material dimensions. In this vein, I view climate change as a multiple object, or, in the jargon of integral philosophy, an "integral object": it is an (inter)objective phenomenon (that is real), but it is also a (cultural) discourse (which does not make it less real; the point is to not reduce climate change to mere discourse) (Esbjörn-Hargens, 2010: 144). Here the ontic and the epistemic dimensions of climate change merge: what people understand as climate change, and whether they perceive it or not, is influenced by climate science, a phenomenon that can be examined through the lens of reception studies (see chapter 3.5). Also in this regard I find it useful to conceptually distinguish between the categories of the "discursive" and the "material" as heuristic tools that allow me to write and speak about processes that "in reality" are entangled.

My research questions and the associated approach are doubtless influenced by my collaboration in an interdisciplinary project throughout my dissertation project (see chapter 3.6.2). In the project, great effort was put into integrating the different disciplines, but the "Great Divide" (Latour, 1993: 99) between nature and culture was nevertheless reproduced in work package structures, research questions and analyses, with a lack of conceptual models that could truly overcome the separation. The guiding research questions of the project, related to impacts of and responses to climate change and permafrost thaw, heavily influenced my own

questions as well as the concepts applied (such as *adaptation* and *impacts,* see critical discussion of these terms in chapters 3.4 and 5.3.2). Arguably, this focus runs the risk of reinforcing the nature-culture divide, if "impact" is understood as a an external (natural) force acting upon a social system[2], and if "adaptation" is taken to be a mechanical reaction to certain physical processes, deprived of intention or agency. As I show below, I attempt to overcome these limitations by understanding adaptation as a set of complex, creative, often diverging processes obviously shaped not only by the biophysical, but also the cultural, social, economic and political contexts in which they are embedded, and criticize an unreflected use of the term "impact" (see chapter 3.4).

The integral or hybrid nature of climate change means that there are multiple perspectives using a multitude of techniques to examine the subject. In the following, I describe the specific theoretical approaches that I draw on, as well as the different, but related, research foci.

3.2 Integrating cultural ecological, interpretive and critical perspectives

Castree et al. (2016) point out that there is not one single approach that could possibly cover the entirety of the "human dimensions" of climate change, and that this field must necessarily be "philosophically, theoretically, topically and methodologically plural" (ibid.: 731). The anthropology of climate change is equally theoretically diverse, which reflects the plurality of the discipline at large:

> Anthropology, especially the subfield of cultural anthropology, lacks an overarching and unifying theory on the order of Darwinian evolution and natural selection in biology and related sciences. Instead, the field has tended to construct often contested alternative explanatory frameworks that draw attention to certain issues, focus work on answering particular questions, and assist anthropologists in explaining or interpreting their research findings. (Baer & Singer, 2018: 63)

The anthropology of climate change can be said to encompass three broad theoretical perspectives to the study of climate change: 1) the cultural ecological, 2) the cultural interpretive, and 3) the critical anthropological perspectives of climate change (Baer & Singer 2018: 63-86). As emphasized by Baer and Singer (ibid.), these approaches address different questions, but they are not mutually exclusive: "[i]n practice, anthropologists do not necessarily

[2] Lesley Head (2008) puts forward this argument in relation to "human impact", a "metaphor", he writes, that "positions humans as 'outside' the system under analysis, as outside nature" (ibid.: 374) and thereby reproduces the "explanatory divide between humans and nature [that] requires us to conflate bundles of variable processes under the headings 'human', 'climate' and 'nature'" (ibid.). The same critique can be applied to "environmental impact", as the term might imply an external (natural) stressor that impacts a closed (social) system.

draw immutable theoretical boundaries, but may draw on different theoretical perspectives to address different problems" (ibid.: 71). My research draws on all three approaches to address different but related aspects of climate change.

Dating back to Julian Steward (1955), cultural ecology is "the study of the ways in which culture is used by people to adapt to their environment" (Sutton & Anderson, 2010: 3-4). It is the study of how societies adapt to specific environments and how changes in these environments (that comprise both natural and social elements) lead to societal changes. Current cultural ecology builds on the work of Julian Steward (see, for instance Steward, 1955), who emphasized the interaction between society and nature, especially through the concept of the culture core. This approach acknowledges the mutual constitution of humans and the environment they are part of, recognizing "that humans and their cultures are an integral part of the environment. Human activity affects the environment, which is then altered, in turn affecting human activities" (ibid.: 2). In climate change anthropology, cultural ecological approaches are interested in the way changes in the natural environment affect societies and how they respond to these changes:

> Overall, the cultural ecological perspective in the anthropology of climate change makes its mark in studies designed to answer questions about sociocultural responses to the challenges presented by the climatic chaos of a warming planet. The perspective draws attention to the ways people collectively react and use their cultural system to cope with new threats and develop new options in the face of climate change adversity. (Baer & Singer, 2018: 69-70)

Such research typically falls under the category of "place-based community research" (Crate, 2011: 179), examining "how place-based peoples observe, perceive, and respond to the local effects of global climate change" (ibid.). Climate change is examined as an external stressor affecting human societies, which in turn adapt to these changes through a variety of practices and beliefs. The approach is thus prominent in the theorization of concepts such as vulnerability, adaptation, risk, and resilience (ibid.: 65-70), which "have been deployed to understand the effects of climate change and to inform the development of strategies and practices to reduce both the risks and impacts of climate change" (Oliver-Smith, 2017: 206). Acknowledging the "capacity for local peoples to develop and practice adaptations to local variance" (Crate, 2011: 179), anthropologists working in this tradition examine how climate change impacts societies, the various societal and environmental factors that determine their ability to adapt, as well as specific adaptive capacities and adaptive practices. However, while emphasizing people's resilience to environmental change, they also draw attention to the ways that "the local effects of global climate change undermine a people's capacity not only to

inhabit their homelands, but also to maintain their cultural orientations and symbolic frameworks that ground their specific adaptations" (ibid., referring to Crate, 2008b and Crate & Nuttall, 2009).

As Baer and Singer (2018: 64) point out, the cultural ecological framework is not best suited for the examination of how knowledge, beliefs, attitudes and values shape human interactions with the environment. Rather, these are better studied through a cultural interpretive framework. In climate anthropology this includes phenomenological approaches focusing on experiences, perceptions, meanings and knowledge related to environmental change. The basic premise is that "[p]eople's perceptions and knowledge systems are framed by cultural contexts with which they ascribe meaning and value to what they see and know" (Roncoli, Crane & Orlove, 2009: 96). Although the cultural interpretive approach acknowledges that how climate change comes to matter in specific locales is culturally constructed, it does not deny the physical reality of climate change. This approach sees culture as the "systems of meanings and relationships that mediate human engagements with natural phenomena and processes", and it focuses on "description and analysis of these mediating layers of cultural meaning and social practice" (Roncoli, Crane & Orlove, 2009: 87). Culture is in this approach viewed as a set of "perceptions as well as interpretations" (Milton, 1996: 63, cited in Baer & Singer, 2018: 70). Research in the interpretive tradition thus examines *emic* perspectives, i.e., peoples' views, experiences and knowledge (Baer & Singer, 2018: 70), raising questions concerning "how people culturally construct a meaningful world of nature and society, including their perceptions and understandings of the changing environment around them" (ibid.: 75). It asks what climate change *means* to people, and how it is experienced from the local point of view. Another important strand of research in this tradition examines local, traditional, and ecological knowledge, and its relation to climate phenomena (Roncoli, Crane & Orlove, 2009: 95-96).

The critical approach adds a crucial dimension by drawing attention to the "politicized nature of human interaction with the environment" (Baer & Singer, 2018: 75). It draws on political ecology and addresses issues of justice and power related to climate change, such as the unequal distribution of the effects of climate change, but also critically scrutinizes the capitalist system that produces anthropogenic climate change (Baer & Singer, 2018: 75-86).

While critical approaches draw attention to issues of scale, both cultural ecological and interpretive approaches have been criticized for a bounded and static concept of culture. A main criticism to early ecological anthropology is the exclusive focus on local populations as

the unit of analysis, considering them as isolated and self-sufficient, thus ignoring external processes (Orlove, 1980: 261). Anthropologists working in this tradition have been criticized for reproducing this notion of bounded and isolated cultures (Hastrup, 2013; Sanders & Hall, 2015). In particular, work on traditional ecological knowledge, adaptation and vulnerability, with its focus on allegedly "local" and "place-based" people, often returns to a form of "cultural closure" (Hastrup, 2013: 276). Similarly, cultural interpretive research tends to focus on *locally specific* perceptions and meanings, thereby "downplaying the macroscopic forces driving anthropogenic climate change in the modern era" (ibid.: 75). This notion might reproduce the idea of a static (local) culture. As pointed out by Sarah Strauss (2012), in particular the argument that climate change might lead to culture loss (see, for instance Crate, 2008) implies that cultures are "static entities, bound by traditions, […] rather than dynamic interactive systems that are always in motion" (ibid.: 6).

In this research, I combine the outlined approaches to address different, but related, questions, which allows me to understand and address climate change holistically. A focus on impacts and adaptations is complemented by the study of perceptions and narratives, while bringing attention to the politics at work in both discourses and practices. This integrated perspective addresses the dual nature of climate change described in the previous chapter, encompassing both the "discursive and material realities of global anthropogenic change" (Moore, 2016: 34; see also Brüggemann & Rödder, 2020: 3). In the words of sociologist Simona-Nicoleta Vulpe (2020): "[b]eyond its physical nature, climate change is also a social artifact manufactured through discourses that organize social reality by the meanings and practices they entail" (ibid.:1). As argued in the previous chapter, I distinguish conceptually between these discursive and material aspects of climate change. This research is based on an understanding of climate change as a real, physical phenomenon with material and immaterial impacts, to which societies respond, *and* as socially constructed. As anthropologists have emphasized, how the phenomenon is perceived and how a society responds to it is mediated by culture, and impacts are determined by the societal context of the affected community. As noted by Barnes et al. (2013: 541) "cultural values and political relations […] shape climate-related knowledge creation and interpretation and […] form the basis of responses to continuing environmental changes". While in the cultural ecological perspective the impacts of and responses to the physical dimensions of climate change are in the foreground, the interpretive perspective is well suited to examine the social construction of climate change, addressing the "idea of climate change" (De Wit et al., 2018; Hulme, 2009).

My research is furthermore based on a conception of culture and society as dynamic (as opposed to static), and as influenced by supra-local processes (as opposed to bound and isolated). Kirsten Hastrup (2013) emphasizes that "cultural models and values are always in the making, and that (global) historical processes originating elsewhere and going nowhere in particular cannot be extricated from 'local' cultural values" (ibid.: 275). According to Sarah Strauss (2012), this dynamism and flexibility of culture—indeed its adaptive capacity—is what makes it so resilient to different kinds of changes, including changes in the environment (ibid.: 4). In a globalized world, "people's knowledge about climate change is not simply situated in their local setting, but draws upon information they derive from the larger world" (Baer & Singer, 2018: 74). Relatedly, the notion of bounded cultures has been criticized on the base that climate change itself is a cross-scale phenomenon. As "global climate and local weather have become mutually embedded categories" (Hulme, 2010: 269), climate change dissolves the global-local dichotomy. In the words of Kirsten Hastrup (2013):

> Climate change has also set humanity in motion, and thus in many ways contributed to a delocalization of anthropological research. […] [A]nthropology itself stands at a watershed, where new global connections through climate challenge the 20th century constitutive holistic object in ways that go beyond previous post-modernist critique. (ibid.: 277-278).

In my research, I study how climate change plays out in a highly globalized Arctic locale, thus recognizing how "the local" is embedded in multiple socio-natural processes on multiple scales. My research further acknowledges that the various experiences and perceptions of climate change locally in Longyearbyen are influenced by the "emergent global imaginary" (ibid.) of climate change (see also De Wit, Pascht & Haug, 2018), an aspect that I explore through the lens of reception studies (see chapter 3.5). Yet, recognizing the permeability of local perceptions and experiences of climate change by global discourses, does not, in my view, forfeit the value of studying these experiences in local places. Rather, attention to the local can be a valuable avenue for studying the entangled scales of climate change. I agree with Hastrup (2013) that since:

> people obviously continue to live and act in particular places, it becomes urgent to develop new modes of understanding the human and social implications of natural entanglement. The notion of entanglement does not preclude ethnographic fieldwork; it rather adds to both its necessity and its theoretical potential. (ibid.: 277)

My research is based on place-based fieldwork in a single locale (Longyearbyen), which I see as an entry point for studying the global phenomenon of climate change in the context of globalization. Acknowledging that many of my research participants are "global citizens", who

are often elsewhere, both physically and virtually, I am interested in the ways they perceive climate change in that specific locale, how they see it impacting and how they respond. This focus on supra-local processes in a specific locale necessitates the societal contextualization of climate change, which I will discuss in the following.

3.3 Contextualizing climate change: multiple stressors and vulnerability

The next theoretical premise is simple but not trivial: climate change must be considered in its societal context(s). The impacts of climate change are determined by the conditions of the affected society; hence climate change must not be considered in isolation, but in the context of other societal processes. Anthropology has been argued to be particularly well suited for studying climate change in its societal context and in combination with other changes, because of its

> broad, holistic view of human and natural systems, which highlights the multiple cultural, social, political and economic changes that take place in our societies. Societal dynamics, as drivers of change, always interact with, and often outweigh, climate change — an issue that needs recognition for the success of public policies. (Barnes et al., 2013: 541)

The "multiple stressors" approach (see, for instance, McCarthy et al., 2005; Räsänen et al., 2016) contextualizes climate change within "multiple drivers of cultural transformation" (Strauss, 2012). Climate change cannot always be separated from other challenges human societies face, and sometimes it acts as an intensifier of other problems. In the words of Moerlein & Carothers (2012: 1): "it is ultimately insufficient to try to understand how Arctic communities are experiencing and responding to climate change in isolation from other stressors."

An influential approach for addressing the societal contextualization of climate change impacts is the vulnerability approach, which is closely related to the concept of adaptation outlined below. Vulnerability describes the extent to which a system is susceptible to harm from environmental change. Vulnerability is thus shaped by social factors (Marino, 2015; Oliver-Smith, 2017), it is "produced in and by society" (Ribot, 2014: 667). Instead of considering simply the physical stressor such as climate change acting upon a society, a "contextual" vulnerability approach (O'Brien et al., 2007) regards vulnerability as "part of multidimensional, context-specific climate-society interactions" (Räsänen et al., 2016: 2292). It considers both the economic, political, social and cultural conditions of the affected society and the broader social context in which the society is embedded. The related "double exposure"

approach (Leichenko & O'Brien, 2008; O'Brien & Leichenko, 2000) refers to two processes or stressors, such as climate change and globalization that jointly affect communities, causing vulnerabilities. In a similar vein, the concept of *Overheating*, coined by Thomas Hylland Eriksen (2016), represents a framework for studying change holistically. It refers to the accelerating pace of social, economic and environmental change in contemporary societies, leading to heightened pressures and tensions and highlights the interconnectedness of various global challenges and the urgent need for transformative responses to address the complexities and risks associated with these rapid changes.

As I describe below, like many anthropologists before me, I too came to the field looking for climate change, only to realize that other processes of change in the community often were of greater concern to the people I spoke to. Even in times of extreme climate change, social cultural and economic change often has more immediate effects (Crate & Nuttal, 2009b: 16; Nuttall et al. 2005). The multiple stressors and double exposure framework allow me to consider the impacts of and responses to climate change in relation to the economic restructuring currently transforming Longyearbyen.

3.4 The concept of adaptation

I furthermore approach impacts of and responses to climate change through the concept of adaptation. Adaptation is both a powerful buzzword in climate change policies and an analytical concept to study human-environment relations (Thornton & Manasfi, 2010). It generally refers to "the processes by which individuals and groups of people adjust their behavior and organization in response to changes in their environment" (ibid.: 134). The concept of adaptation has a long history in anthropology and has been central in evolutionary theory and cultural ecology. In the latter, adaptation refers to the ways that humans relate to the natural environment through culture: to the slow process by which human cultures diversify and change in relation to an ever-changing environment: "Adaptation has come to be understood as the *process of development* by which a community chooses to embrace a particular culture, subsistence system, pattern of resource use, etc. as one of several possible paths to be taken in its particular environment" (Krupnik, 1993: 18). Cultural change and development in this sense mut not be confused with progress or be valued: "Change over time is not 'good' or 'bad'; it simply happens" (Sutton & Anderson, 2010: 12). In addition to biological adaptation, humans adapt to the environment through culture: "[c]ulture is a way in which groups of people can adapt to the environment, through collective behavior and/or

technology" (ibid.: 12), thus, "culture itself is an adaptive mechanism" (ibid.: 131). Even though the focus of much cultural ecological work has been on the role of subsistence and technology, adaptation also takes place at less material levels, such as social organization, values, and worldviews (ibid.: 101): "[c]ultures contain a number of elements, such as social and political systems, settlement patterns, and technology and storage that are adaptive in their form and evolve as environments change" (ibid.: 131). Furthermore, adaptations develop in response to changes in both the social and the natural environment: "[o]f course, any adaptive strategy is shaped, not only by the nature of the environment, but also by social values, cultural traditions, technological development, external influences, and a plethora of other factors" (Krupnik, 1993: 18). Environmental stressors such as climate change thus need to be considered in their societal contexts, which is a central premise of anthropological approaches to climate change adaptation.

Anthropologists are currently revisiting the anthropological concept of adaptation to be applied in climate change research (see, for instance, Crate, 2008; Fiske et al., 2014; Head, 2010; Nelson, West & Finan, 2009; Oliver-Smith, 2017; Thornton & Manasfi, 2010). Acknowledging adaptation as a social process in response to both environmental and social, political, cultural and economic changes is essential in the anthropological understanding of adaptation (ibid.). Anthropologists have thus criticized mainstream climate change literature and the way the concept is used in climate change policies for ignoring the complex nature of human adaptation in favor of an "analytical bias toward technological interventions and narrow behavioral responses to specific risks" (Nelson et al., 2009: 272). Much of the mainstream adaptation literature considers climate change in isolation from other processes and is "focused on technologies and the elusive search for large-scale, cookie-cutter solutions, leaving aside the important role that individuals, cultures, and societies play in constructing and living out an adaptation dynamic" (ibid.: 272). In contrast, anthropologists call for a holistic definition of adaptation, including both material and cultural, objective and subjective aspects of adaptation (Oliver-Smith, 2017), and constituted through diverse, intersecting processes, taking place on multiple scales in response to multiple climatic and non-climatic stressors (Thornton & Manasfi, 2010):

> Human adaptation to the natural environment is neither a biological nor a technical response of an undifferentiated population to physical or material conditions. It is always internally complex, involving the diverse interests, knowledge, and meanings of a differentiated population, interacting within both the material processes of a complex and dynamic physical setting and a set of social, political, economic, and ideological institutions and practices. (Oliver-Smith 2017: 206)

A central contribution of anthropological work on climate change in the Arctic concerns the integration of values and culture into the analysis of vulnerability and adaptation. This shift can be seen as a response to the critique of the "technological discourse" (Adger et al., 2009: 337) and the narrow focus on biology/ecology, economics and technology in much adaptation and vulnerability research. A central argument of this critique is that vulnerability and adaptation are driven by social and cultural mechanisms and hence must be understood within particular social and cultural contexts (Barnes et al., 2013: 541; Crate, 2011; Ford et al. 2015): "communities' adaptation to climate variation and change is not a simple function of technical solutions. On the contrary, human adaptation more often is determined by sociocultural relationships manifest in a web of reciprocities, obligations, and assets" (Crate, 2011: 180). Anthropologists have thus argued for the need to attend to both the material and organizational factors that determine vulnerability and adaptation as well as specific worldviews and emic perceptions of change (ibid.; Nuttall, 2009: 299). Importantly, cultural values, meanings and perceptions shape adaptation practices, as well as the ways in which the "idea of climate change" itself (Hulme, 2009) is understood. Whether and how individuals and groups respond to climate change thus depends on "what the effects of climate change mean to those affected" (O'Brien & Wolf, 2010: 232).

The expanding body of social science literature on climate change has identified various categories of adaptation which are useful in the analysis of adaptive processes. There is an important distinction between planned adaptation, i.e., "what humans must rationally do in order to reduce risk and vulnerability" (Thornton & Manasfi, 2010: 133), and autonomous adaptation, i.e., adaptations by individuals, households and businesses on the local level, which are "usually unnoticed, uncoordinated, and unaided by national governments, development agencies, or international agencies" (Christoplos et al. 2009: 3, cited in Thornton & Manasfi, 2010: 133). In a similar vein, authors distinguish between centralized, top-down adaptation and bottom-up efforts that "stress engagement with community building and multi-level politics" (Oliver-Smith, 2017: 213). A related distinction concerns the different scales at which adaptations occur, including adaptations on the individual or household level, on the community level (Hovelsrud et al., 2010), adaptations that require larger-scale interactions and change within a broader governance network (Keskitalo et al., 2009), institutional adaptation (Ghorbani et al., 2023), and collective adaptation (Wannewitz & Garschagen, 2023). Other ways of categorizing adaptations would be by form (technological, behavioral, institutional, etc.), and timing (anticipatory, reactive) (Thornton & Manasfi, 2010: 136). Regarding the latter,

reactive adaptation has been identified as "insufficient as a long-term strategy to meet many of the effects of cryospheric changes" and it has been argued that "proactive adaptation and strategies are urgently needed" (Hovelsrud, Poppel et al., 2011: 101).

An important related concept is that of adaptive capacity, which refers to "the potential or ability of a system, region, or community to adapt by adjusting to, moderating the potential damages of, taking advantage of the opportunities created by, or coping with the effects of global climate change" (Crate, 2008: 571). Different factors have been identified as contributing and determining adaptive capacity, such as economic resources, technology, information, skills, infrastructure, institutions and levels of inequality (Smit & Pilisofova, 2001). However, case studies reveal that these categories are often too broad to capture local specificities, which in the Arctic are often determined by degree of market integration and type of governance system (Keskitalo et al., 2011). Cultural factors such as acknowledgement of uncertainty and unpredictability, flexibility in resource use, and social capital have furthermore been identified as determining adaptability (Ford et al., 2015: 1046). Importantly, local, traditional ecological, and place-based knowledge have been found to crucially determine adaptive capacity in the Arctic and elsewhere (ibid; Nakashima et al., 2012; Naess, 2013).

In the scientific literature, as well as in public discourse and policies, adaptation has lately taken on an additional meaning to its original definition and is often used to describe the green transition as a response to the climate crisis. In Norwegian, *tilpasning* (adaptation) and *omstilling* (transition) are often used interchangeably when referring to the reduction of greenhouse gases and environmentally sustainable energy transitions. Adaptation as *omstilling* implies adaptation in a more transformative (Agard et al., 2014) or transformational (Fedele et al., 2019) sense, and is closer to the word "mitigation" in English. Also in Longyearbyen, the envisioned "sustainable" and "green" transition of the town is often understood and referred to as climate change adaptation. A common narrative repeated by local and central politicians as well as in the media is that Longyearbyen is a place where climate change is most visible and impacting greatly, hence the need for action is greater here than elsewhere. A representative from the liberal-conservative party *Høyre* in government told *Svalbardposten* in September 2020: "[t]here is no place in Norway that has been hit harder [by climate change], therefore the government should invest more here than elsewhere" (Bårdseth 2020). This argument forms part of a larger narrative on sustainability in Longyearbyen, where a common sentiment is that the town is not environmentally sustainable, on several levels. The energy provision of Longyearbyen is a central topic in this regard and closely related to the different local climate

change discourses (Meyer & Sokolíčková, 2023). At the heart of this discourse lies the apparent paradox that Longyearbyen is at the same time the town in Norway most impacted by climate change and the only town in the country that draws its energy from a coal mining plant (until October 2023). Being already a showcase for climate change, there are now diverse efforts from local and central governments, as well as from public and private actors, to make Longyearbyen a showcase for green solutions.

To examine the diverse physical impacts, perceptions, and discourses about climate change and "green transitions", as well as their entanglement, I combine "observation studies" and "reception studies", to which I now turn.

3.5 Combining observation and reception studies

The term "observation studies" was coined by anthropologist Rudiak-Gould (2011) to refer to the examination of local observations of climate impacts (ibid.: 10). This line of research, prominent in climate change anthropology, focuses on the "vivid experience of physical impacts" (ibid.: 12) and examines "how frontline and indigenous communities become aware of global warming through first-hand observation of local impacts" (ibid.: 9) on the local level. In the introduction to the seminal edited book *Anthropology and Climate Change. From Encounters to Actions*, Susan Crate and Mark Nuttall (2009) write:

> Everywhere, from high-latitude taiga and tundra regions, to high-altitude mountain ecosystems, from tropical rain forests to near sea-level coastlines, there are compelling similarities in the narratives, accounts, and experiences of indigenous and local peoples who are already seeing and experiencing the effects of climate change. For them, climate change is not something that may happen in the near or far future but is an immediate, lived reality that they struggle to apprehend, negotiate, and respond to. (Crate & Nuttall 2009b: 9)

A main contribution of anthropology to the study of climate change is, in the words of Barnes et al. (2013), to bring to light through ethnographic fieldwork, "how various communities […] observe changes in the weather, climate and landscapes, and respond to these changes" (ibid.: 541). In other words, observation studies are important for understanding how climate change affects humans and their societies, through "the native's point of view" (Geertz, 1974). Part of my research can be seen as in this tradition, where the main focus lies on how people in Longyearbyen see climate change impacting.

However, as argued by Rudiak-Gould (2013), interpreting local observations as visible signs of global climate change is not unproblematic and even "an ideological bombshell in disguise" (ibid.: 125). The "deceptively simple question" of whether climate change is visible

with the "naked senses" is "far from straightforward" (ibid.: 120), but nevertheless a crucial question, especially in a field like Longyearbyen where scientists and non-scientists alike observe a changing environment. Just as the idea of climate change itself is contested as it is related to meanings, values and politics, the question whether climate change is visible or not "ventures beyond the empirical and touches key commitments and loyalties" (ibid.: 120). While "invisibilism" implies that climate change is a global phenomenon only detectable through scientific observations, "visibilism" holds that climate change is visible to the lay observer. Whereas the former endows science an undisputable authority regarding the observation and hence the definition of climate change, the latter indicates that every affected "local" is potentially an observer of climate change, vindicating place attachment and local/traditional/Indigenous knowledge. Both invisibilism and visibilism are typically adopted by certain "ideational communities" (ibid.): physical scientists tend to embrace the former, while anthropologists and Indigenous advocates tend to embrace the latter. A similar point is made by Brüggemann & Rödder (2020: 5): "[e]xposure to extreme weather or changes in vegetation or seasons can, of course, be experienced, yet it is an act of interpretation to link them to climate change". In my view, climate change is a real-world phenomenon that "exists and will proceed regardless of what we think about it" (Brüggemann & Rödder 2020: 3). Its local impacts can in some cases be observed by the "naked eye", but whether these observations are interpreted as climate change or not, depends on a variety of factors, including world view, values and the idea of climate change and related discourses. In my research, I therefore write about "perceived impacts" and explore to what extent certain environmental changes are interpreted locally as a consequence of climate change or not, and what frictions might arise between divergent narratives (Meyer & Sokolíčková, 2023).

"Reception studies" offer a lens through which to study how these perceived impacts are shaped by climate change discourses:

> In an increasingly interconnected world, understandings of weather and climate also come from indirect, or second-order information, 'mediated by science' (Rayner, 2003, p. 280) and received via communicators, brokers and translators including scientists, journalists, non-governmental organisations (NGOs), consultants, churches, governments, and activists. (De Wit & Haynes, 2021: 2)

This approach thus addresses the discursive dimensions of climate change. The term was coined by anthropologist Peter Rudiak-Gould (2011) and refers to the "analysis of the uptake of climate change discourse" (De Wit & Haynes, 2021: 1). Rudiak-Gould (2011) argues that, in addition to observations of local impacts, there is another source for climate-change

information for local communities, namely the scientific discourse of anthropogenic climate change. Alongside observation studies, anthropologists should examine "how societies receive, interpret, understand, adopt, reject and utilize this latter discourse" (ibid.: 9). As pointed out above, focusing on the discursive dimension of climate change does not imply that its material dimension is dismissed. As emphasized by De Wit et al. (2018):

> When we use the concept 'idea of climate change', we refer to a set of various concepts, models and representations […] we hasten to add that our intention here is certainly not to depreciate the 'real' or material effects of climate change on communities across the globe. Rather, we argue that the emancipatory potential of the anthropology of climate change can be enhanced by treating climate change as an idea that travels, which is well on its way to becoming an emergent global planetary imaginary and thus deserves appraisal as a force and powerful resource in its own right. (ibid.: 3)

Reception studies include the examination of "why locals choose to trust or distrust the scientific discourse of global warming" that they receive through different channels, including the media (ibid.). This approach addresses the discursive dimension of climate change and considers climate change as an idea that is constructed, originating in specific scientific, cultural and historical contexts. This idea is deployed in politics and scientific discourse, influencing the way people think, feel and act in relation to environmental changes (Hulme, 2009). Anthropologists increasingly treat climate change as a "scientific narrative, discourse, or idea" (de Wit & Haines 2021: 2), and there is growing ethnographic interest in how this narrative is interpreted and received/rejected/reproduced locally, asking "how, why, and when climate change does come to matter" (Callison, 2014: 10, in de Wit & Haines, 2021). There is evidence that the climate change discourse heavily impacts and shapes local environmental observations and perceptions (Rudiak-Gould, 2013), and reception spans from belief to skepticism, incredulity and ignorance (Rudiak-Gould, 2011: 11). Reception studies thus entail to listen also for counternarratives (O'Reilly et al., 2020: 14), something that we pursue in Meyer & Sokolíčková (2023).

Observation studies and reception studies thus offer two complementary lenses for how to study local perceptions and observations of climate change. In my research I combine them: I examine local perceptions of climate change, as well as how these are shaped by the idea of climate change itself and related discourses.

3.6 Methodology

This focus of this research is how climate change, entangled with socio-economic transformations, are perceived and experienced locally in Longyearbyen. The study thus

employs a qualitative methodology, seeking to contextualize and interpret (Ellen, 2010: 399). It is first and foremost an empirical work with an inductive approach, but including deductive elements. The emphasis of the analysis is to understand and contextualize what I found in the field with regards to the research questions, which touch upon issues of a more general nature. The research thus operates in between two scales of anthropological theory (ibid.). It is based on "thick description" (Geertz, 1973), or what Ellen (2010) calls the "lowest level" of theory-building. These are theories that "claim to shed light on particular cultural situations. Here the very specificity, density, interrelational complexity, and localness of the data usually exclude the application of tests using statistical methods, but enhance the value of qualitative approaches and Geertzian 'thick description'" (ibid.: 394). The study also addresses processes that are relevant far beyond the specific locale of Longyearbyen, and the aim is to contribute to our understanding of these through the detailed understanding of local occurrences. Abstracting from the locally particular, "specific or middle-range theories [claim] to explain co-variation in the properties of different kinds of social, cultural, or biocultural system", and are "more concerned with immediate or proximate causes" (ibid.). The findings and identified research gaps that I present in this discussion thus move between the particular and the more abstract. The aim is to understand the particularities of Longyearbyen and thereby being able to say something more general about the human dimensions of the great changes of our time.

3.6.1 Ethnographic fieldwork methodology, methods and analysis

For some years already, anthropologists have argued that our discipline is well suited for the study of climate change (Barnes et al., 2013; Crate & Nuttall, 2009; Hastrup, 2013; see also above). That anthropologists are increasingly involved in interdisciplinary research projects on environmental change, including in the Arctic, indicates that anthropological contributions to this field of study is starting to be recognized also outside of the discipline (Elixhauser et al., 2023). In addition to anthropology's theoretical contributions to the study of climate change addressed above, the discipline has much to offer the study of climate change due to its in-depth fieldwork methodology, that very much defines the discipline (Barnes et al., 2013). The Anthropocene is patchy (Tsing, Mathews & Bubandt, 2019), its changes are multi-scalar and unevenly dispersed. Like globalization, climate change is a "large issue" that impacts on "small places" (Eriksen, 2015). Taking these small places as its point of departure, anthropology contributes to our understanding of global change through its focus on local perspectives on global phenomena. Considering the "power and relevance of ethnography for local understandings of today's pressing world issues" (Crate, 2014: 67), long-term ethnographic

fieldwork in the course of which I combined several methods constitutes the main methodological approach of this research.

Anthropologists have an ambiguous relationship to "the field", and some have deconstructed the very notion on which their central methodology rests. Ethnographic fieldwork per definition requires a "field", but the knowledge derived from such fieldwork proves that most fields are hard to define and hardly locally bound (Amit, 2000), just as "cultures" are not static nor delimited. This debate has re-emerged in climate change anthropology. As anthropologists have travelled to typically small and Indigenous "frontline" communities to study how they observe and are impacted by climate change (Rudiak-Gould, 2011), critics have noticed the tendency of returning to the idea of place-based "cultures", invoking a "(theoretical) nostalgic mode, insisting on the need to bound and protect local 'cultures'" (Hastrup, 2013: 278; see also Sanders & Hall, 2015). Acknowledging this critique does not necessarily mean that fieldwork becomes impossible, rather, the multiple scales and connections in which a "field" is embedded must be recognized and put to work in analysis. In many ways, this thesis is what can be called a "place-based community research" (Crate, 2011: 179). It focuses on a specific community, Longyearbyen, and its inhabitants, however while recognizing the multiple scales in which this place is embedded. The very topic of this research, the local impacts of entangled global change, reveals the "elusiveness of place" (Hastrup, 2013: 278), and calls for considering Longyearbyen as embedded in global-local entanglements. This field is neither isolated, static, nor bound. On the contrary: in many ways, Longyearbyen is a prime example of merging scales. It is simultaneously extremely remote and hyper-connected, its local environment is altered by global climate change, it is both globalized and defined by Norway's political and strategic interests in the North, which again develop in relation to geopolitical, military, industrial and climatic trends in the Arctic and beyond. As I show in the publications, these diverse processes on different scales way beyond the local strongly influence life in Longyearbyen. The high turnover of Longyearbyen's population furthermore challenges notions of a stable and bounded field site. Many of the people that I interviewed in 2018 and 2019, including people who were central and influential actors and personalities in town, no longer live there today.

My fieldwork spanned over 20 months between spring 2018 and summer 2022. I gradually built relations to people in Longyearbyen, closely observed and participated in everyday life. During most of this time, Longyearbyen was my primary home. In 2020 and 2021 I spent respectively 6 and 7 consecutive months in Longyearbyen, during and beyond the

lockdowns caused by the Covid-19 pandemic. I established close personal relationships with people in town and became personally involved and engaged in life in Longyearbyen. That I was given the opportunity to become a guest-PhD student at the Arctic Technology Department at the University Centre in Svalbard gave me access to student housing throughout much of my fieldwork.

I will not delve into the discussion whether or not my research can be classified as "anthropology at home" (e.g. Peirano, 1998), however, it is relevant to note that I grew up in Norway and speak Norwegian as my mother tongue. I was thus familiar with much of the way life in Longyearbyen runs and is organized, and with the cultural backdrop of the Svalbard society. However, I agree with Vike (2018) that the metaphor of "doing anthropology at home" can be misleading. As he notes: "[h]ow is it possible that people so well trained in contextualizing other people actually consider a whole territory called a country or a nation their "home"?" (ibid.: 32). Although coming to Svalbard was not a "radical encounter with alterity" (Peirano, 1998: 105), it was a completely new and very different societal context than what I knew from mainland Norway. Furthermore, Longyearbyen differs substantially from municipalities on the Norwegian mainland due to its remoteness, history, organizational structure, strategic role and population. And, in a town where more than a third of the population come from over 50 countries, implicit knowledge about Norwegian culture and Norwegian language skills are not the key to understanding the society at large.

A main method of data collection was participant observation. Participant observation is as a strategy for gathering data but is also characterized by the personal involvement of the researcher, and the method thus oscillates between personal closeness and analytical distance to the field (DeWalt & DeWalt, 2011). The method gave me access to the emic perspective of people in Longyearbyen (ibid.: 103), paying attention to the "human elements of change" (Crate, 2014: 44). Participant observation included the recording of all steps of the research process as well as observations, conversations and reflections in a field dairy (Emerson et al. 2007). One of the strengths of this method is that it creates a context and starting point for applying other methods of data gathering (DeWalt & DeWalt, 2011). Informal conversations in the field, or "ethnographic interviews" (Spradley, 1979), were essential in my fieldwork. They spanned from talks with a certain focus on my research topics, to completely random and spontaneous conversations, and I tried my best to document what I considered to be relevant and interesting information in my fieldnotes. I was always open about my role as a researcher to people I met and talked to.

In addition to spontaneous and informal interviews, I conducted a series of more formal unstructured and semi-structured interviews (Bernard, 2006: 210-250). The former were mainly narrative (Mattingly & Lawlor, 2000), while the latter were mostly problem-centered (Witzel, 2000). Interviews with "experts" and officials were usually of the latter sort. I conducted around 130 semi-structured qualitative interviews with different inhabitants of Longyearbyen, spanning from 20 minutes to several hours, including audio-recorded interviews and interviews that were documented in field notes. These encompass interviews with specific foci that emerged from different projects I was and am involved in, that I describe below. The interview guidelines were semi-structured, and evolved over time as I broadened my knowledge about the field. I asked the interviewees about their background, their everyday life and their relationship to Longyearbyen and Svalbard. I asked them to describe the Longyearbyen society, and what they like about the place and which challenges and problems they see. We talked about observed, perceived and experienced changes in general, and about environmental changes in particular. I asked about how people see these changes impact their personal lives and how they impact the community, and whether and how these changes can, should and are being dealt with. I asked about how they think that Longyearbyen will develop in the future, and how they would like to see it develop. Finally, I invited them to talk about anything else they found relevant, and asked if there are important topics that I did not address. About 50 of the recorded interviews were transcribed word by word, and the rest I listened to while taking notes. For a collaborative project on urban development, which I describe below, I furthermore conducted three recorded focus groups with between 3 and 6 participants each, which also have informed the research findings.

At the beginning of my fieldwork, I contacted key respondents from different institutions (Visit Svalbard, Store Norske, the church, the chamber of commerce, The University Centre in Svalbard (UNIS), the Arctic Safety Center, the gymnastics organization Svalbard Turn, the Svalbard Guide Association, the student council, the hunting and fishing association, as well as the governmental authorities Longyearbyen Lokalstyre and Sysselmesteren (the Governor of Svalbard)). Relying on suggestions of the interviewees to contact new potential interview partners, I gradually started interviewing other inhabitants of Longyearbyen. Initially, the majority of my interview partners were representatives of institutions or people that I would socialize with. As the fieldwork proceeded, I reached out to different parts of the population that are often not considered as typical "stakeholders" (a popular but problematic buzzword in Arctic science, see Stephen, 2018). This snowball-

sampling procedure did not result in a statistically representative sample of the population, and there are segments that are indeed underrepresented, especially the Thai population (which nevertheless is the main minority group in Longyearbyen). The interviews were conducted in peoples' offices, in their homes, in cafés, bars, restaurants, at the local library, or while walking. The majority of the interviews were conducted in Norwegian and English, and some in German and Spanish, depending on the interviewees' preferences.

The qualitative interviews were supplemented by a quantitative survey on the perceived social impacts of permafrost thaw conducted in the course of the Nunataryuk project (see Ramage et al., 2022). The survey was developed in collaboration with my colleagues in the project and consisted of 42 closed and open questions. The survey addresses perceived impacts of permafrost thaw, perspectives on adaptation, as well as questions related to self-rated health and well-being (Timlin et al., 2022), in addition to surveying basic demographic data. A total of 84 responses to the survey were gathered between August 2019 and January 2020. More than 70 of the answers were collected using a printed paper version, the rest were answered online. I either interviewed the respondents directly, or they filled out the survey which was later collected. The respondents were contacted by going from door to door, whereby the streets were chosen randomly, and through personal contacts. The face-to-face survey collection often resulted in qualitative interviews that added context and depth. Different parts of the survey were analyzed individually by my colleagues who are experienced in working with quantitative data and skilled in statistical analysis (Ramage et al., 2022; Timlin et al., 2022).

As became increasingly clear throughout my fieldwork, state policies are essential in defining Longyearbyen's development. Relevant planning and strategic documents, as well as diverse reports, public hearings and approved white papers, necessarily complemented my collected data, and were crucial for their interpretation. Throughout fieldwork I regularly read the local newspaper Svalbardposten and other media publishing on Svalbard-related issues (especially High North News and The Barents Observer, as well as the national public broadcaster NRK). I furthermore engaged in and observed various Facebook groups, most importantly the group Ros og Info Longyearbyen ("Praise and information Longyearbyen"). The social media platform plays an extremely important role for information exchange in Longyearbyen, to the point that the former editor of Svalbardposten called the town "The Facebook society" (Haugli, 2021). During my time in Longyearbyen, I became an active user of Facebook, both as a resident with a need to follow what is going on in town, and as an

anthropologist observing the field, contacting and communicating with people, and for spreading information about outreach events.

Ethnographic fieldwork involves remaining open to unexpected situations and letting the field influence the research design and questions (DeWalt & DeWalt, 2011). During the long-term fieldwork I experienced important changes in the community, which also heavily influenced my research and its expanding foci. While I came to Longyearbyen searching for stories about climate change, I soon realized that the socio-economic changes that I had envisioned would be an important context for the "main act", often overshadowed it and, as I argue throughout this thesis, are indeed entwined with climate change. As a close friend of mine put it: "[w]hat's going on in the community is just much more immediate, and these changes are occurring much faster than climate change." The societal changes she was referring to are multiple: the increasing focus of the Norwegian state on the Norwegianness of Longyearbyen; the pandemic that shut down Svalbard and the tourism boom that occurred when the world opened up again; the increasing environmental regulations limiting both locals' and tourists' ability to roam the islands; and the governmental decision to close Mine 7 and phase-out coal as the local source of energy. Ethnographic research is as dynamic as the societies it is designed to study, and "going with the flow" of the field expanded my original research interest to include these other changes accompanying and intersecting with climate change. In addition to separate forthcoming publications, several of these topics are addressed in the publications of this thesis, described below.

The research design contains both inductive and deductive elements. The research questions guiding the project and the individual articles are informed by the theoretical debates and assumptions described above. However, the research questions evolved as the project progressed, and new topics that were not foreseen or indicated by existing literature are now part of the project. The research process was circular, with the different stages of research often overlapping. The fieldwork was divided into several periods, and in the field and in between fieldwork periods I began analyzing the data and allowed my findings to influence the further data collection.

The data was analyzed in chunks and informed by the overall research questions and those guiding the individual articles. The interviews were transcribed and listened through bit by bit, and the most relevant ones as well as key passages of the fieldnotes were analyzed in detail using qualitative content analysis as developed by Mayring (2014). The method allows for a theory-based analysis, which is firmly based in the empirical data. In particular, I applied

what Mayring describes as "inductive category formation" (ibid.: 79), analyzing the data "bottom up" and developing codes that emerge from the data instead of applying predefined analytical categories.

3.6.2 Collaborations, positions and engagements

This project is very much the result of different collaborations, both planned and spontaneously evolving in the field. Even though only part of this work is published in the articles that make up this thesis, it has been fundamental for contextualizing my findings and understanding the complex field I am working in. As becomes apparent in the sections above, my positions in the field are multiple, sometimes overlapping, and sometimes contradictory: I was an inhabitant of Longyearbyen, I am a visitor, I am a researcher and a friend. The collaborations with my social science/humanities colleagues, in particular Zdenka Sokolíčková and Dina Brode-Roger, as well as with Ingvild Sæbu Vatn and Lilli Wickström from the local architectural office LPO arkitekter, inspired and motivated me to see my research not only as a scientific endeavor, but also to get engaged locally, and use my skills to shed light on and publicly discuss challenges the community experiences.

The project was funded by the EU Horizon project Nunataryuk – Permafrost thaw and the changing arctic coast: science for socio-economic adaptation, studying permafrost thaw and its implications for Arctic coastal environments and communities[3]. I was working as a researcher in work package 9, entitled "Adaptation and Mitigation". My involvement in Nunataryuk influenced the research design, with its focus on climate change impacts, perceptions and adaptation. Two of my articles (Meyer, 2022a; Ramage, 2022) are direct outcomes of my involvement in this project. Furthermore, I was involved in one co-authored journal article about a framework for studying risks from climate change, with a focus on permafrost thaw (Larsen et al., 2021), and one article on wellbeing and permafrost thaw (Timlin et al., 2022), both connected to the Nunataryuk project.

When I started researching Svalbard and Longyearbyen before embarking on fieldwork in 2018, I heard everywhere that "there is no social science research on Svalbard". My literature review had reached the same conclusion: the research that addressed human societies on Svalbard was mostly from the fields of history, political science, or commissioned research looking at demographics and economic development, with a few notable exceptions. Furthermore, there was no institution dedicated to Svalbard social science. Like every

[3] https://nunataryuk.org/

researcher doing research on Svalbard, when I first arrived in Longyearbyen in April 2018, I contacted the Svalbard Science Forum (SSF). They could inform me that there were indeed other social scientists that had just started, were about to begin, or had just finished their fieldwork in town, and put us in contact with each other. We got in touch and realized that there was a burgeoning boom of social science research on Svalbard and several long-term and short-term projects about to start, and that there was a pressing need to exchange, coordinate and collaborate, both among us, and between us and the local community. With great support from the SSF we established the Svalbard Social Science Initiative (SSSI), which today has over 35 active members and has become a known and established institution in the Svalbard science landscape[4]. I was one of the funding members and have been a board member since the establishment of the initiative.

An important strategy of the SSSI to avoid research fatigue in Longyearbyen is to collaborate in research, writing and dissemination. Over the years, I have collaborated in several publications resulting from the networking and sharing activities of the SSSI, some of which form part of this thesis. In an article entitled *Social Sciences and Beyond in the Arctic* (Saville et al. 2020), written by several SSSI members in collaboration and published in the ECO Magazine in 2020, we mapped the emerging field of social science and humanities research focusing on the human dimensions of change in Svalbard. In 2021, I collaborated in another joint publication with SSSI colleagues on various forms of (un)inhabiting Svalbard and the interconnectedness of economic, geopolitical, scientific, sociocultural and environmental concerns (Zhang et al., 2021). With several social science research projects being advanced enough to produce publications, in 2019 my SSSI colleague Zdenka Sokolíčková and I began editing a collection of articles in the journal Polar Record with the title *Changing Svalbard*[5]. The aim was to provide a forum for publishing results from the various completed and ongoing social science and humanities projects focusing on Svalbard, by SSSI members and others. The collection traces the various interrelated changes that the archipelago is currently undergoing, and provides an overview over the growing field of Svalbard social science and humanities. The introduction article to the collection (Sokolíčková et al. 2022b) forms part of this thesis and is described below.

The stimulating exchange with the SSSI colleagues also resulted in an applied research project in collaboration with the architectural office LPO arkitekter. For a project on circular

[4] https://svalbardsocialscience.com/
[5] https://www.cambridge.org/core/journals/polar-record/collections/changing-svalbard

economy, LPO decided to do a needs assessment in Longyearbyen and asked the SSSI for assistance. Together, we developed the project entitled Folk om Longyearbyen[6] ("People about Longyearbyen"). In a series of focus groups, we examined how people perceive and use the town, and how they would like to see it develop in the future, with the aim to spark engagement and dialogue about Longyearbyen's development. The project was co-created from the outset, with project design, data gathering, analysis and dissemination carried out in collaboration. The data was published in the form of booklets (ibid.), and disseminated in a public exhibition in Longyearbyen in March 2021 as well as in a series of presentations to local stakeholders and at scientific conferences. A scientific publication, co-authored by the five SSSI and LPO members behind the project, is in in progress. This applied work was awarded the second prize of the Annual Apply Awards of the EASA Applied Anthropology Network in 2021[7].

During the pandemic, several SSSI members were living in Longyearbyen, and in the face of the rapid changes and great challenges the community was facing we launched the Longyearbyen community dialogues in collaboration with the architectural office LPO arkitekter, and other stakeholders such as Longyearbyen Lokalstyre and Visit Svalbard joining in. The aim of the community dialogues was to create a forum where pressing topics are discussed either publicly or in a larger group. Between May 2020 and May 2021, we arranged several such dialogues, on topics such as "Longyearbyen post-Corona – what now?", tourism, nature protection and conservation, and the new education and kindergarten act. Another collaboration with SSSI colleagues developing during the pandemic, was the project on the local impacts of the Covid-19 described below and published in Brode-Roger et al. (2022).

From 2020 to 2022, I was involved in a collaborative project with social anthropologist Tomas Salem, entitled Happiness in times of change: 'friluftsliv' and climate change on Svalbard", supported by the Svalbard Environmental Protection Fund[8]. In interviews and participant observation we examined the values and practices related to outdoor life on Svalbard, and how peoples' relationship to the natural environment is challenged by climate change, nature conservation and tourism (Salem, Meyer & Ødegaard, forthcoming). Since 2022, I am a project collaborator in the project Polar Climate and Cultural Heritage (PCCH Arctic[9]). The project examines how cultural heritage on Svalbard is impacted by climate change and human pressures, and aims to be applicable by providing guidelines for sustainable

[6] https://www.lpo.no/prosjekter/folk-om-longyearbyen
[7] https://www.applied-anthropology.com/wwna-apply-awards/
[8] https://prosjektbanken.forskningsradet.no/project/FORISS/333190
[9] https://www.sintef.no/prosjekter/2021/pcch-arctic/

cultural heritage management in the context of climate and societal change. My task in the project is to map and examine different uses of and values connected to cultural heritage on Svalbard, through interviews and participant observation. Although these two projects do not explicitly form part of this thesis, the knowledge I have obtained through the PhD work is influencing my work in them, and vice-versa.

I consider the dissemination of research plans and results as both a scientific responsibility and an ethical obligation. Outreach, in the form of public seminars, presentations and meetings in Longyearbyen, in addition to participation in conferences and workshops, has been an important part of this project. Many of these activities were co-organized together with colleagues from the SSSI and thus served to fulfill an important role of the network: communicating ongoing and planned research to local stakeholders, people in Longyearbyen and the scientific community. Longyearbyen is a small community and thus prone to research fatigue, and within the SSSI we strive to collaborate in public outreach and research activities to reduce the pressure on the community. My research findings were furthermore presented at various scientific conferences.

These diverse collaborations that could be labelled as "engaged anthropology" or "co-created" or "participatory" research were not part of the initial research design, but evolved through my immersion in the field. Much of this work did not translate into classical academic output like the publications of this thesis. But they were a meaningful way to interact with the community, and maybe give something back in return for the generosity of the people participating in my research and welcoming me in Longyearbyen.

3.6.3 Ethical considerations

Researchers coming from non-Norwegian institutions and doing fieldwork in Norway are not required to acquire an ethics approval from the Norsk Senter for Forskningsdata (NFD), which applies only to researchers from Norwegian institutions that have an agreement with NFD. The fieldwork conducted in Longyearbyen did, however, comply with the guidelines provided by NFD, as well as the ethical principles for research by the University of Vienna. Furthermore, it followed the *Principles and Guidelines for Conducting Ethical Research in the Arctic*, developed by the International Arctic Social Sciences Association (IASSA, 2020). As is required for all research conducted in Svalbard, I registered the project in the Research in Svalbard database (RiS) of the Svalbard Science Forum prior to fieldwork. I then sent emails to central stakeholders such as the Governor of Svalbard, Longyearbyen Lokalstyre, Svalbard

Science Forum and the University Centre in Svalbard (UNIS) informing about my research plans. This resulted in a series of consultation meetings, which were also part of the Nunataryuk project approach. Within the SSSI we developed a set of ethical guidelines for social science and humanities research on Svalbard, tailored to the specific context and institutional landscape, and based on our experiences. The aim was to provide researchers with a set of guidelines they can consult before starting their work, and they have been guiding also for this research. They are based on the IASSA guidelines and were sent to the Svalbard Science Forum as well as to Longyearbyen Lokalstyre for feedback.

All interviews were conducted based on informed consent. Prior to the interviews, I provided comprehensive information to the interview partners, including details about the project's purpose, the intended use of the interviews, the potential risks and benefits of participation, data storage protocols, and the participants' rights to terminate the interview or withdraw from the project at any time. Interviews were recorded only with explicit permission from the research partner. For most of the recorded interviews, I obtained written informed consent from the participants using a consent form that included a clear description of the research objectives. A few interviews were conducted and recorded with oral consent only. All interview partners were given the choice to be anonymized, but some chose not to. In cases where I draw on specific peoples' stories in the writing, I sent a draft of the text to person it concerned and asked for input and the permission to publish the text.

4 Description of publications and summary of results

My thesis consists of six peer-reviewed publications: five journal articles, of which four are co-authored, and one single-authored book chapter. Of the pieces, five are published, and the last one is still in peer review, but has been accepted with minor revisions. As described in the introduction, each publication addresses a different aspect of the research questions. In the following, I present each piece in a short summary, whereas in the next chapter, I discuss the main findings across the articles and reflect upon them in relation to current debates in anthropology.

4.1 Changing Svalbard

Sokolíčková, Z., Meyer, A., & Vlakhov, A. (2022). Changing Svalbard: Tracing interrelated socio-economic and environmental change in remote Arctic settlements. *Polar Record*, 58(e23). https://doi.org/10.1017/S0032247422000213

Arguing that Svalbard serves as a prime example for studying Arctic change, my co-authors and I here outline the multiple environmental and socio-economic transformations the settlements on the archipelago are currently undergoing. Its comprehensive approach, including both Russian and Norwegian settlements on Svalbard, as well as addressing change holistically in different spheres and with a bottom-up approach, fills a gap in the social science literature on Svalbard. The article serves as the introduction to the collection of articles *Changing Svalbard* in the journal Polar Record, co-edited by Zdenka Sokolíčková and myself. Our study of current change in Svalbard is based on our ethnographic fieldwork in Longyearbyen (Sokolíčková and I) and Barentsburg (Vlakhov), highlighting how the multi-layered changes are perceived and experienced locally. The analysis is framed within both the geo-political context of Svalbard, defined by Norwegian and Russian "politics of presence" (Pedersen, 2017), and the recent history of change in Svalbard settlements. The latter includes what we call "the three great ruptures"—the 2015 avalanche in Longyearbyen, the gradual phasing-out of the mining industry and the Covid-19 pandemic—events that, as we argue, profoundly impacted life on Svalbard and highlighted and accelerated vulnerabilities.

We describe changes in three domains: economy, demography and environment. In the economic realm, we describe the profound economic restructuring in Longyearbyen from an industrial coal mining economy to a post-industrial economy based on tourism, a related service industry, and research and education. We discuss the closure of the coal mines in Svea and the announced closure of Mine 7 in Longyearbyen, and how this politically motivated

decision taken by the national government is strongly contested locally and criticized as green "symbol politics", and the recent introduction of tourism in Barentsburg. We then move on to discuss the changing demography and social structures that accompany these economic shifts, which in Longyearbyen resulted in an increased share of non-Norwegian inhabitants and high transience. We explore the various tensions that arise alongside this changing demographic (exacerbated by the Covid-19 pandemic (see also Brode-Roger et al., 2022)), as the objective of the Norwegian state to maintain a "robust, Norwegian family society" (Ministry of Trade, Industry and Fisheries, 2019: 18) in Longyearbyen does not reflect reality. In Barentsburg, the population corresponds to the requirements of the coal mining industry, but statistical demographic data are scarce (Middleton, 2022). Similar to Longyearbyen, the demographic composition of Barentsburg does not reflect its intended "Russianness", as the majority of the residents are Ukrainian citizens. Finally, we discuss changing human-environment relations on Svalbard. Svalbard itself represents several environmental paradoxes, with coal mining and tourism being main economic pillars in an increasingly vulnerable natural environment as the climate is changing. We discuss how climate change is impacting locally and how these changes are perceived differently within the Norwegian and Russian settlements, and how the climate change discourse is entangled with the post-mining politics of the Norwegian government. Another political response to climate change and increasing tourism is the revision and tightening of environmental regulations on Svalbard, deeply intertwined with Norwegian sovereignty politics (see Salem et al., forthcoming) and spurring controversy locally. Svalbard is, we conclude, "a 'small place' where the 'large issues' (Eriksen, 2015) of globalisation and climate change are particularly pronounced (and co-produced)" (Sokolíčková et al., 2022b: 10). The study of these changes, how they impact and are experienced locally, as well as the tensions and frictions they create, remains a task for the social sciences and humanities in the years to come if we are to shape and adapt to these grand transformations of our time in a desirable way.

4.2 Urban development in Longyearbyen, Svalbard

Meyer, A. (2022). Urban Development in Longyearbyen, Svalbard. Dealing with Local Challenges in a Town that Serves as a Tool for Svalbard Policies. In S. Bauer, D. Friedrich, & M. Hirnsperger (Eds.), *More than 'Nature': Research on Infrastructure and Settlements in the North* (pp. 85-103). Wien: New Academic Press.

This book chapter explores the evolution of Longyearbyen's built environment and discusses challenges to urban planning and development due to the combined impacts of globalization and climate change. The article is inspired by anthropological literature on architecture,

infrastructure and the built environment, highlighting the social production of built form. Departing from the question "what social processes give rise to built form?" (Lawrence & Low, 1990: 482), it traces the economic and political forces that determined the development of Longyearbyen and examines the environmental, economic and political changes that shape challenges and processes in urban development today. The article draws on existing literature, policy and planning documents, as well as ethnographic fieldwork, including participant observation and interviews with planners and other employees of the Longyearbyen Lokalstyre. Additionally, the article incorporates data from focus groups conducted in 2020 as part of the collaborative project with LPO arkitekter described above.

As I argue throughout the article alongside with other scholars, the development and maintenance of Longyearbyen have been driven by Norwegian political interests in maintaining a permanent Norwegian presence on Svalbard to assert sovereignty over the archipelago. While economic interests were instrumental in the founding of Longyearbyen, the town's growth and upkeep are primarily influenced by Norway's (geo)political objectives. For the majority of the twentieth century, this approach led to governmental support of the mining sector to ensure the viability of Longyearbyen. In the context of the current state-led out-phasing of the mining industry, the Norwegian government supports tourism and allocates significant resources to research and higher education on Svalbard, motivated by the same political considerations.

In the context of rapid environmental, economic and social changes in Longyearbyen, the article addresses the main issues in urban development and planning, including the profound impacts of climate change and the changing identity of the town in times of socio-economic transition. It examines the frameworks for urban planning and development, considering the balance between national Svalbard policies and local needs and participation. In particular, I explore three interrelated challenges to urban development in Longyearbyen, that can all be seen as resulting from combined economic, social and environmental changes. I describe how different environmental pressures resulting from climate change impact the built environment of Longyearbyen and how the town is adapting to these through planning and security measures. Next, I analyze the current housing crisis in town and show how housing in Longyearbyen is an important instrument for Norwegian politics of presence. I show how housing and infrastructure development in Longyearbyen are political instruments of Svalbard policies, and argue that the housing crisis is a result of the combined effects of climate change, economic diversification and the growth in tourism. Finally, I describe how the socio-economic

and environmental changes are altering Longyearbyen's identity and how these changes are perceived locally and handled in planning. I conclude that the town's special situatedness between national Svalbard policies and local needs creates specific challenges for community development in Longyearbyen, and that the frameworks defining the town's future must consider that it is a place that people call a home and not just a policy tool.

4.3 'No longer solid'

Ramage, J., Jungsberg, L., Meyer, A., & Gartler, S. (2022). 'No longer solid': perceived impacts of permafrost thaw in three Arctic communities. *Polar Geography*, 45(3). https://doi.org/10.1080/1088937X.2022.2105973

This article examines perceptions of permafrost thaw in three Arctic communities: Aklavik in Northwest Territories, Canada; Longyearbyen in Svalbard, Norway; and Qeqertarsuaq in Qeqertalik Municipality, Greenland. A community survey was conducted to analyze and compare perceptions of impacts related to permafrost thaw. As the first of its kind, the survey addresses local awareness of permafrost thaw and related perceived challenges in a comparative perspective. The survey consisted of 42 questions and was adjusted to accommodate the specific characteristics of each community. The first section focused on perceptions of permafrost thaw impacts, while the second section examined the role of subsistence activities in participants' lives. The survey was translated into three languages and implemented using a snowball sampling approach, resulting in a total of 237 participants. The survey achieved a relatively even distribution across gender and age groups, representing a significant portion of the adult population in each community. I collected and processed the data for Longyearbyen between February 2019 and October 2020. The statistical data analysis was done by Justine Ramage, whereas the interpretation of the results, the comparison, as well as the writing was done conjointly.

The findings reveal that participants in the three communities are well aware of the consequences of permafrost thaw on the physical environment and its connection to increased air temperatures. While permafrost thaw is generally perceived as having a negative impact on the participants' lives, the challenges it presents vary across different life domains, as well as across the field sites. For instance, while permafrost thaw is considered creating challenges for subsistence practices and cultural vitality in Aklavik and Qeqertarsuaq, in Longyearbyen these two domains are perceived as being relatively unaffected by permafrost thaw. Subsistence activities are here defined as not primarily market-related hunting, fishing, and gathering practices, whether for provision or recreation. Challenges to infrastructure and to the physical

environment are perceived as important or very important across the field sites, while impacts on health and economic activities are considered less negatively affected.

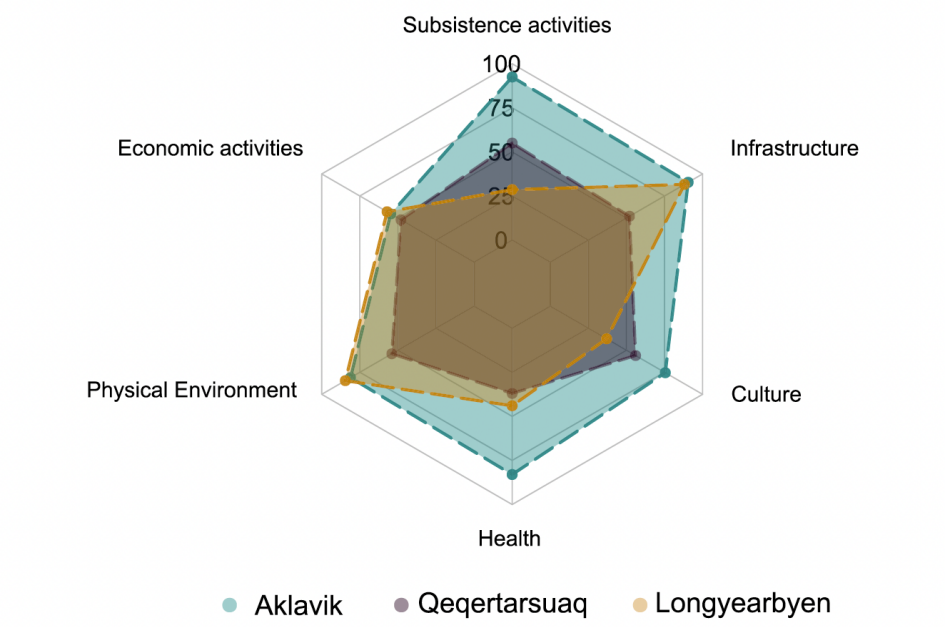

Figure 1: Communities' perceptions of challenges related to permafrost thaw in six domains. Respondents answered the question 'How important is frozen ground thaw in explaining each of the following challenges?' Results show the percentage of respondents who answered important and very important. Graph by Justine Ramage (Ramage et al., 2022).

As we argue in the article, perceptions of permafrost thaw are not solely determined by physical changes but are also influenced by societal factors such as climate change discourses, cultural backgrounds and land use, which explains divergent perceptions across the field sites. The study suggests that accounting for these contextual factors is crucial for designing tailored adaptation strategies at the community level and underscores the importance of considering community perceptions when designing adaptation measures.

4.4 Physical and feasible

Meyer, A. (2022). Physical and feasible: Climate change adaptation in Longyearbyen, Svalbard. *Polar Record*, 58(e29). https://doi.org/10.1017/S0032247422000079

This article has two connected aims: 1) to describe observed changes and perceived societal impacts of climate change, and 2) to discuss adaptation measures and related understandings of adaptation in Longyearbyen. It draws on ethnographic fieldwork including a selected sample of interviews with people involved in climate change adaptation in Longyearbyen: urban

planners, engineers and administrative staff in the local government; elsewhere employed engineers, architects and consultants; workers and administrative staff in the building and construction sector; scientists, and local politicians. The article engages with the anthropological literature on climate change adaptation and vulnerability in the context of multiple stressors, while acknowledging climate change as a material and a discursive phenomenon.

As described in the article, the interviewees observe different, interrelated environmental processes, such as permafrost thaw and various kinds of avalanches and landslides, which they relate to climate change. The societal impacts of climate change of most concern are physical impacts on the built environment, as well as the uncertainty and unpredictability caused by climate change, which create challenges for urban planning and development. Drawing on the concept of vulnerability, I show that these impacts are very much influenced by Longyearbyen's past as coal mining company town: its location—determined by the coal reserves—makes it susceptible to landslides, avalanches and flooding, and the built environment was constructed for short-term use, resulting in a low resilience to environmental changes.

The awareness and "issue salience" (Dannevig & Hovelsrud, 2016) of climate change is high in Longyearbyen, and the avalanches that hit town in 2015 and 2017 have put climate change adaptation on the local and state political agenda. Adaptation measures include the securitization and modification of the built environment, as well as monitoring. The interviewees agree that adaptation is necessary, and that it is possible. There is a broad knowledge base for adaptation in Longyearbyen, and scientific knowledge and formal expertise are considered crucial for climate change adaptation, implying considerable adaptive capacity for knowledge-based, rational and planned adaptation. While the technological solutions to deal with the challenges of climate change exist, provided it is prioritized and sufficient resources are allocated, challenges to adaptation are social and economic, including turnover, institutional discontinuity, limited resources and limited space for urban development due to state non-growth politics. Adaptation is considered a public responsibility, to be managed by the local government in collaboration with experts and supported by the Norwegian state.

Analyzing local understandings of adaptation, I argue that a specific Western, modern worldview shapes how my interview partners approach adaptation. Climate change is generally considered a physical problem to be dealt with by scientific and technological means, and there is a strong focus on physical securitization measures, as well as the consideration of climate

projections and the development of monitoring systems. Adaptation is thus understood as a technical response to physical risks, implying a "techno-fix optimist" (Thornton & Mahli, 2016; Thornton & Manasfi, 2010) approach to adaptation, which reflects a worldview in which the human is separated from and managing nature by the means of science and technology (Ingold, 2008; Latour, 1993). The adaptation discourse is in Longyearbyen accompanied by a discourse of safety and fear, working to legitimize extensive measures to protect the built environment from natural hazards. I conclude that a narrow approach to adaptation, focusing on technical solutions to physical challenges, runs the risk of not addressing the far more challenging task of transforming society as a whole in the face of the climate crisis.

4.5 'Melting Worlds' and 'Climate Myths'

Meyer, A., & Sokolíčková, Z. (2023). 'Melting Worlds' and 'Climate Myths': Diverging Stories of Climate Change in Longyearbyen, an Arctic 'Frontline Community'. *Ethnos*, (forthcoming).

In this article, we examine multiple stories about climate change and adaptation in Longyearbyen. Drawing on theoretical perspectives that consider climate change not only as a physical phenomenon but also as a socially constructed discourse, we approach climate change in its discursive dimension. In particular, we build on and wish to contribute to "reception studies" in anthropology (De Wit & Haines, 2021; Rudiak-Gould, 2011; see above), which focus on how the idea of climate change is received, rejected, or reproduced at the local level. The aim is to deepen the understanding of climate change narratives and perceptions, that often vary within communities.

The article is based on Zdenka Sokolíčková's and my own individual ethnographic fieldwork on similar topics in the same place, during the same time. We draw on numerous formal and informal interviews, as well as participant observation, to explore different stories about two main "characters" of climate change on Svalbard—avalanches and glaciers. Our data show that there are divergent stories about climate change and adaptation in Longyearbyen. While the dominant climate discourse portrays Longyearbyen either as a victim of climate change or as a showcase for technological solutions, local accounts are far more complex and multifaceted. The dominant climate change and adaptation discourses are challenged by counter-stories or "minor" (Katz, 1996) stories, which point to the over-simplification, sensationalism and misuse of the dominant climate discourse for other purposes. By connecting reception stories with anthropological literature on climate change denial, resistance and ignorance, we argue that the minor stories express a rejection of the official climate change

discourse, and that this rejection is rooted in socio-political circumstances. We contextualize the counter-stories within the larger picture of the multi-layered changes currently transforming Longyearbyen, and show how climate change and adaptation is deeply intertwined with the structural changes from a mining to a service economy, as well as Norwegian authorities' efforts to maintain state control and a Norwegian settlement on Svalbard. These broader social, economic and political dynamics must be considered if we are to fully understand the societal impacts of climate change in Longyearbyen and beyond.

We conclude that reproducing one-sided narratives that neglect the diversity of voices and lived experiences in the face of climate change may ultimately lead to skepticism and a rejection of the climate discourse altogether. We thus emphasize the importance of listening to the multiplicity of stories about climate change to understand and ultimately move in the direction of fair and transparent climate change politics.

4.6 Caught in between and in transit

Brode-Roger, D., Zhang, J. J., Meyer, A., & Sokolíčková, Z. (2022). Caught in between and in transit: forced and encouraged (im)mobilities during the Covid-19 pandemic in Longyearbyen, Svalbard. *Geografiska Annaler: Series B, Human Geography*. https://doi.org/10.1080/04353684.2022.2097937

The Covid-19 pandemic brought unprecedented disruptions and uncertainties worldwide, including in Longyearbyen. As the town was transitioning from a coal-based economy to one based on science and tourism, the remote and isolated location of Svalbard made it both a secure haven and a vulnerable community. This article explores the impact of forced and encouraged mobilities on individual lived experiences during the pandemic. When the world went into lockdown in March 2020, Dina Brode-Roger, Zdenka Sokolíčková and I were in the middle of our respective fieldworks, and all decided to stay in Longyearbyen. Crises can teach us a lot about society, and we decided to do a collaborative project on the local implications of the pandemic and its impacts on peoples' lives.

The article engages with the theoretical framework of politics of mobility (Cresswell, 2010; 2021) and minor theory (Katz, 1996) to shed light on how mobilities are productive of and produced by social relations that are shaped by power, and how peoples' experienced (im)mobilities during the pandemic exposed underlying systemic issues that are inherent to the unique context of Longyearbyen. With this we contribute to the field of mobilities studies by highlighting the role of emotions and affects in understanding mobilities, as well as to the

literature on the societal impacts of the pandemic, providing a nuanced understanding of the High Arctic context.

Longyearbyen is characterized by extreme mobilities due to its highly international and transient population, and high population turnover. In the article we show how the pandemic triggered government-imposed travel restrictions, lockdown measures and the establishment of a "travel home" grant for non-EU/EEA inhabitants, undermining their feeling of belonging in Longyearbyen and challenging the previously mobile nature of the town. Drawing on our interview partners' accounts of their personal experiences, we show how these encouraged and forced (im)mobilities, in combination with a lack of social benefits and security schemes, created a deep sense of uncertainty and insecurity of living in Longyearbyen. We argue that the pandemic led to an increased focus on "Norwegianness" in Longyearbyen, and that the pandemic revealed and heightened structural inequalities, creating a hostile environment. We show that this must be seen in relation to the ongoing socio-economic restructuring of Longyearbyen from a state-controlled, Norwegian company town to a diversified economy based on tourism and research, resulting in an international community. We interpret the focus on Norwegianness as an effort of the state to regain control and strengthen the Norwegian profile of Longyearbyen, both in terms of businesses and population. Overall, the study sheds light on the systemic inequalities resulting from the globalization of the Longyearbyen economy and demography, and underscores the importance of understanding the interconnections between emotions, mobilities and the socio-economic and political changes the town is undergoing.

5 Discussion of central research findings and their contributions

In this chapter I discuss central findings of my research in relation to the theoretical framework presented above and current debates in anthropology. I analyze cross-cutting themes that extend across the articles, highlighting their contributions to discourses within the field of anthropology and related disciplines. The aim is to create a synthesis of my research findings that goes beyond the individual articles.

5.1 Advancing our understanding of changing Svalbard

This research contributes to the rapidly expanding social science and humanities literature about Svalbard (see chapter 2) in general, and in particular to the literature about the multitude of changes underway on the archipelago. As we note in Sokolíčková et al. (2022b), studies about human life on Svalbard have often treated its societies from a distance: either from afar and above, focusing on extra-local processes and logics, or by going back in time. Together with several recent publications in the field outlined above, this research adds to the existing literature an ethnographic "view from below", focusing on contemporary perspectives from within.

In addition to exploring important general aspects and dynamics of the contemporary Longyearbyen society, this research contributes to "Svalbard studies" (Chekin & Rogatchevski, 2020) with a specific focus on the human dimensions of climate change in Longyearbyen. First, the research explores the societal impacts of climate change in Longyearbyen with a focus on the built environment and on permafrost thaw (Meyer, 2022a, 2022b; Ramage et al., 2022), which have been explored only marginally to date. Second, the research adds to the literature on climate change adaptation (Meyer, 2022a). It complements the study of adaptation to multi-scalar changes on Svalbard posed by a complex institutional and policy context by Hovelsrud et al. (2020) by zooming in on adaptation practices, understandings and challenges, from a local point of view. Third, with the article *Changing Svalbard* (Sokolíčková et al. 2022b), we provide an overview over and discuss the different social, economic and environmental changes the Russian and Norwegian settlements of archipelago are currently undergoing, changes that have hitherto been studied largely in isolation or by focusing on individual settlements. Fourth, the research brings to the discussion a specific focus on permafrost thaw (Ramage et al., 2022), a topic that has thus far been studied on Svalbard merely from natural sciences and engineering perspectives, and has been largely been overlooked by the social sciences in general (for notable exceptions, see Crate, 2012;

Dolosio & Vanderlinden, 2020; Larsen et al., 2021). Fifth, the research adds to the growing literature on local perceptions of climate change (Sokolíčková, 2022a), by examining divergent climate change discourses in Longyearbyen (Meyer & Sokolíčková, 2023). Finally, throughout the different articles, the other transformations that are currently altering life in Longyearbyen in addition to climate change, are explored, a point I return to below. I argue that, despite my initial preoccupation with climate change, the socio-economic and political changes that are impacting the community, such as the out-phasing of coal mining, the economic change and the demographic changes accompanying it, stricter environmental policies, the Covid-19 pandemic, and the increasing focus on Norwegianness in Longyearbyen, turned out to be perceived as more pressing and immediate than climate change. Furthermore, these different processes are deeply entangled with climate change. The ethnographic approach allowed me to follow the leads from my conversation partners and to explore these other issues, in their own right as well as in relation to climate change. With this research I contribute to a better understanding of how entangled socio-natural change on Svalbard affects people's lives in various ways, how people perceive these changes and how the community adapts to them.

5.2 Climate and multilayered change

During one of my first interviews with a miner in Longyearbyen, in May 2019, I asked "Kevin" whether he feels that his life is being impacted by environmental change. Kevin was 32 years old at the time and had been working in Mine 7, located outside of Longyearbyen and delivering coal to the town's power plant, since 2014. Before we started talking about environmental change, he had told me that his workplace would likely be closed within the next 10 years, and that most miners would then leave the island, except for those who would remain to work as tourist guides in the mines.

> People talk about it a lot, that the glaciers melt here and on Greenland… And yes, I think, they do melt, right, but I don't think that we can do so much about it […] The world continues to spin, we have had ice ages and warmer periods […] and nothing of this has been man made. And yes, it is a fact that the Arctic is melting. So maybe Svalbard will be a completely different place in the future. […] But I don't think it's worth spending so much time on.
>
> *Alexandra: So do you feel that you are impacted in your everyday life, living here on Svalbard?*
>
> No. No. They say "Travel to Svalbard to see climate change with your own eyes!", and then you don't see anything. [laughs] But of course, it does something to society. But we should just accept that it is happening.
>
> *Alexandra: So what does it do to society?*

> [pause] It does something to society. Because they are shutting down the mines. Because of climate change, you could say. Because it is not environmentally friendly and so on. So instead of making a lot of money with non-environmentally friendly coal, they invest a lot of money on non-environmentally friendly tourism instead. […] But closing Svea also makes sense to them [the Norwegian state] because then they can keep the Chinese out. (Interview with "Kevin", 18.05.2019)

Instead of giving me the answer I would have been expecting after reading up on how thawing and melting disrupts Arctic lifeways, Kevin saw the closing of the coal mine he was working in as the biggest impact of climate change on his own life on Svalbard and on society. The out-phasing of the coal mining industry is often officially presented and locally interpreted as an environmentally motivated "symbol politics" (Sokolíčková et al., 2022b): coal mining in Svalbard, the climate-change showcase, does not fit with Norway's image of being an environmentally sustainable "climate nation" (Kielland Haug, 2010). As Kevin points out, the closure of Norwegian mines on the archipelago is furthermore often read as geopolitical move to increase state control over Svalbard through environmental regulations (Sokolíčková et al., 2022b: 5; see also Salem et al., forthcoming; Ødegaard, 2022). Kevin goes on to address tourism. In his view, it is hypocritical that the state closes the mines but supports tourism, which he does not consider environmentally friendly.

This and many similar conversations point to how climate change is experienced and perceived locally in combination with other changes that are profoundly transforming the community: climate, economy, demography and policies are changing at once (Sokolíčková et al., 2022b; see also Sokolíčková, 2023; Hovelsrud et al., 2020), and climate change is often not considered the most important issue. It furthermore shows how the perception of climate change in Longyearbyen is deeply enmeshed in environmental narratives about "green" transitions, post-carbon futures (Ødegaard, 2022) and the controversial role of tourism (Andersen, 2022; Dannevig et al. 2023; Löf et al. 2023; Saville, 2022). My research aims to improve our understanding about the complex entanglements of climate change with other societal changes, and argues for the benefit of studying climate change impacts, perceptions and adaptations in relation to other changes and the broader societal context.

This research thus contributes to the literature on the societal impacts of Arctic change, that addresses environmental and societal changes in combination (Stephen, 2018). As elaborated in chapter 3, concepts such as "multiple stressors" (see, for instance, McCarthy et al., 2005; Räsänen et al., 2016) or "double exposure" (Leichenko & O'Brien, 2008; O'Brien & Leichenko, 2000) attempt to capture these complex processes by referring to the different factors of current transformations and vulnerabilities in Arctic communities, emphasizing that

even though climate change might receive most scholarly and media attention, it is often not the dominant stressor. In the Arctic, the major drivers of societal impacts are climate change and globalization (Stephen, 2018), and Longyearbyen is a prime example in this regard (see also Sokolíčková, 2023).

5.2.1 Covid-19, Norwegianization and state control

The literature on Arctic change highlights globalization as a major driver of transformations in Arctic communities in addition to climate change, and in the Arctic as elsewhere, globalization is entangled with geopolitics (Young, 2010). In Svalbard, current policy changes are crucial for understanding local impacts of environmental and societal change (see also Hovelsrud et al., 2020). In our article *Changing Svalbard* (Sokolíčková et al., 2022b), we highlight how people locally experience that the Norwegian state is "tightening its grip" over Svalbard, a feeling that was enhanced during the pandemic, as we elaborate in Brode-Roger et al. (2022). We interpret this as a response to the recent economic, social and environmental changes, that are challenging policy and governance on Svalbard (see also Kaltenborn, Østreng & Hovelsrud, 2019). Two interrelated strategies can be observed: increased environmental regulations and attempts to control and "Norwegianize" the population of Longyearbyen. As we describe in Sokolíčková et al. (2022b), environmental management is an effective way for the Norwegian state to exert control over Svalbard (see also Saville, 2019; Ødegaard, 2022). Environmental regulations are currently being revised and tightened (Kaltenborn, Østreng & Hovelsrud, 2019), including the establishment and expansion of national parks and protected areas, regulations restricting motorized traffic around the archipelago (see also Salem et al., forthcoming), as well as regulations to the tourist sector, including the certification of guides.

In the socio-economic realm, the abandoning of the company town model and the diversification and liberalization policies of the economy in the 1980s (Arlov, 2003) resulted in decreased state control over the economy and demography of Longyearbyen (Sokolíčková et al., 2022b). The current economic restructuring from coal mining to a post-industrial economy based on tourism, research and education has led to an increase in the non-Norwegian population (Pedersen, 2017). In the logic of Norwegian Svalbard policy, in which Longyearbyen constitutes a "tool of diplomacy" (Hacquebord & Avango, 2009: 36) for maintaining and legitimizing Norwegian sovereignty over Svalbard, the increasingly international population of Longyearbyen constitutes a dilemma, as it undermines the

Norwegian "politics of presence" on the archipelago (Pedersen, 2017). As formulated by Zdenka Sokolíčková (forthcoming), through this framing, non-Norwegian individuals become "misinterpreted as political acts threatening Norwegian sovereignty". In the different articles (Brode-Roger, 2022; Meyer & Sokolíčková, 2023; Sokolíčková et al., 2022b) we describe how the Norwegian state is increasingly focusing on the Norwegianness of businesses and the population in Longyearbyen, which creates a hostile environment locally. The research shows the various ways in which the international profile of Longyearbyen (a direct result of globalization) in combination with climate change and the Covid-19 pandemic (also related to globalization) affect locally, creating tensions and vulnerabilities.

In Meyer (2022b), I trace how the Norwegian political aim of maintaining a stable Norwegian settlement on Svalbard defines urban planning and development, and explore challenges to urban development in Longyearbyen, which can be seen as resulting from combined economic, social and environmental changes. The town's identity, formerly firmly based in the coal mining industry, is today in flux as the economy is diversified, and heritage objects from the mining period are increasingly threatened by climate change. Climate change necessitates adaptation strategies in urban planning, while simultaneously introducing uncertainties through altered natural conditions. The comprehensive adaptation measures implemented after the avalanches in 2015 and 2017 included the demolition of almost 140 housing units, aggravating an already considerable housing shortage. Here we see the entanglement of climate change with other processes such as economic diversification and the growth in tourism, as well as with Norwegian Svalbard policy (ibid.). This housing crisis amplified the inequalities between those in governmental jobs, provided with highly subsidized, good-quality housing by their employers, and those working short-term contracts in tourism and the service sector. This gap goes along ethnicity, with mostly Norwegians in the former category and non-Norwegians in the latter. As we further elaborate in the article *Melting Worlds* (Meyer & Sokolíčková, 2023), housing policy in Longyearbyen, including the construction of new, state-controlled housing in response to the housing shortage after the avalanches, forms part of the state's strategy to increase the ratio of Norwegian residents without allowing for the settlement's growth. Because Longyearbyen's built environment is an essential upholder of Norwegian presence on Svalbard (Meyer, 2022b), physical adaptation in the realm of urban development necessarily has a (geo-)political dimension. As discussed in the article on adaptation (Meyer, 2022a), interviewed planners expressed confidence that the Norwegian state will ensure physical adaptation of the town due to its geopolitical importance.

Listening for local climate change counter stories hints at another aspect of the underlying politics of adaptation measures and indicates that the demolition of houses and consequent construction of new, state-controlled housing, are expressions of efforts to increase state control over housing and to curtail the non-Norwegian population in Longyearbyen (Meyer & Sokolíčková, 2023).

Norwegianization and state control also emerged as central categories from the work on the Covid-19 pandemic (Brode-Roger et al., 2022), another effect of globalization impacting profoundly and entwined with other changes. In the article we demonstrate how the local impacts of the pandemic were deeply entangled with the ongoing economic and demographic restructuring of Longyearbyen, a combination resulting in vulnerabilities and tensions locally. Personal stories show how systemic inequalities came to the fore as the pandemic hit Longyearbyen, highlighting the divisions between non-Norwegian and Norwegian inhabitants of Longyearbyen, in terms of economic support, social security and perceived safety. These divisions were further amplified by the increased focus on Norwegianness on the part of the state that became particularly apparent during the pandemic, which created a hostile environment for many non-Norwegians who felt undesired in Longyearbyen. After the articles were published, another explicit Norwegianization policy was implemented. The right to vote in the local elections, before granted everyone who had lived in Longyearbyen for three years, is now contingent on having lived for three years in a municipality on the Norwegian mainland. This effectively deprived most of the non-Norwegian population in Longyearbyen of their local voting rights, further hindering social integration and communitification (Sokolíčková, 2022b). The increased focus on Norwegianness by the Norwegian state and the resulting systemic inequalities and hostile environment can be interpreted as a consequence of a Svalbard policy that does not (wish to) come to grips with the realities of globalization (see also Sokolíčková, 2023).

5.2.2 Symbol politics, green transition and de-carbonization

Another essential "[interface] of 'environmental change' and 'economic change'" (Stensrud & Eriksen, 2019: 1) in Longyearbyen is the out-phasing of the mining industry. As expressed by Kevin in the vignette above, the closure of the Svea mines (Ødegaard, 2022) and the announced closure of Mine 7 and the coal-fueled power plant in Longyearbyen, is entangled with climate change, both in its causes as well as in how these processes are perceived and reacted to locally. Although the transition from resource extraction to a postindustrial economy presents a future

challenge for many Arctic communities (Larsen & Huskey, 2015; Southcott, 2010), climate change has barely been studied in this context, with the noticeable exception of recent publications from Svalbard (Sokolíčková, 2023; Sokolíčková et al., 2022b). My research adds to this field of study although some interesting aspects still remain to be studied.

In Sokolíčková et al. (2022b), we describe how the mine closures are contested locally. Many express concerns that these decisions were made from a distance, in lack of a proper knowledge base considering all expected impacts, and that there is no sound strategy for the intended green energy transition that is to follow the out-phasing of coal in Longyearbyen. To this, the war in Ukraine has added concerns related to sky-rocketing energy prices and energy sufficiency. A common argument locally is that a post-industrial economy merely depending on tourism and research is vulnerable, an argument that became louder during the pandemic and the resulting economic crisis and uncertainties. In the vignette, Kevin expresses another widespread sentiment in Longyearbyen related to the mine closure: that it is a failed symbol politics. While the primary justification provided by the Norwegian government for ceasing operations in Svea was its lack of economic viability, today it is predominantly portrayed and perceived as a decision driven by environmental concerns. Coal mining in the high Arctic where climate change already is severe is not compatible with the environmentally friendly image that Norway likes to portray. Another strategy often read into the mine closure in Svea and the subsequent "return to nature" (Ødegaard, 2022), is the geopolitical effort to prevent other nations from developing coal mining in Svalbard through strict environmental regulations (the former mining settlement Sveagruva and its surroundings are today part of the Van Mijenfjorden national park).

The criticisms to the out-phasing of the Norwegian mining industry on Svalbard reflect dissatisfaction with state politics but also a local identity strongly rooted in mining (Meyer & Sokolíčková, 2023; Sokolíčková et al., 2022b: 5). As coal mining is becoming the black sheep in a presumably sustainable Arctic, several of our interview partners feel that their livelihood is being blamed for climate change. We interpret their rejection of the official climate change discourse as a form of resistance to profound societal changes threatening societal positions, jobs and identities connected to the mining industry (Krange et al., 2019; McCright & Dunlap, 2011).

While visions of industrial actors were crucial in constructing Svalbard as a place to extract minerals in the past (Avango, 2018), Svalbard is today envisioned by the state and local actors as a future "post-carbon Utopia" (Ødegaard, 2022). With the decision to close the last

mine, Longyearbyen is today at a "serious crossroads" (Hovelsrud et al., 2020: 422) and *omstilling*—transformation—has become the guiding principle for future development. The vision is to transform Longyearbyen into a "showcase of sustainability", as formulated by the director of the University Centre in Svalbard, Jøran Moen, during a seminar organized by NITO entitled "Vision of Longyearbyen 2030", in Longyearbyen in December 2021. Considering the many environmental paradoxes Svalbard represents (Sokolíčková, 2023)—coal mining in the high Arctic, modern living in a remote high-Arctic archipelago for most only accessible by flight, where everything has to be imported, the strive for sustainable tourism (Andersen, 2022; Hovelsrud et al., 2021) and the use of nature for leisure (Salem et al., forthcoming)—there are still many open questions regarding the "sustainability" of future Longyearbyen.

Although a main topic of this research was climate change impacts, perceptions and adaptations, the findings thus demonstrate that climate change has been an entry point for studying the society in Longyearbyen at large as well as other, related changes and their entanglements with climate change. Another important point to highlight here is that although climate change receives paramount attention in media, academia and funding schemes (including the one financing this research), locally, it is often considered of lesser importance than other societal changes, which are often perceived as being more immediate and impacting more directly in Longyearbyen. In the words of Huntington et al. (2019: 1217), [climate change] "is but one among many major challenges, and often far from the most immediate concern, for many Arctic peoples as for others around the world." In Meyer & Sokolíčková (2023) we make a similar point that climate change is "not the only story in town", and call for caution to not let the preoccupation with climate change let us highlight dominant stories while veiling other issues.

5.3 Contributions to the anthropology of climate change

This research furthermore contributes to the anthropology of climate change and the related "human dimensions" literature. In the following section, I discuss the contributions of this research to 1) the literature on the societal impacts of climate change; 2) anthropological discussions about the importance of societal context and culture for understanding impacts, perceptions and adaptations; 3) the anthropological literature on climate change adaptation; and 4) discussions in anthropology about climate change perceptions and reception studies.

A main premise of the anthropology of climate change is that the impacts of this global phenomenon are highly localized (Adger et al., 2013), which makes the discipline well suited

for its study (Barnes et al., 2013). Climate change impacts on local communities and livelihoods are discussed in most climate ethnographies, and there is consensus that they are highly variable (O'Reilly et al., 2020). A key insight from the anthropology of climate change is that societal contexts determine climate change impacts and responses on the community level (see, for instance, Crate & Nuttall, 2009; Oliver-Smith, 2017; Barnes et al., 2013). This is the baseline assumption in the literature on climate change impacts and vulnerability, and reflected in concepts such as multiple stressors and double exposures, both discussed in chapter 3. However, the social, cultural and political factors that influence perceptions, impacts and responses, and how they play out in specific local contexts, remain relatively unexamined (Granderson, 2014: 56). There is surprisingly little theoretical discussion in anthropology about how to understand climate change "impacts", and how to conceptualize influencing factors, outside of the vulnerability perspective (for overviews, see Räsanen et al., 2016; Thomas et al., 2018). While this literature typically focuses on marginalized and disenfranchised communities and populations (ibid.), as well as on Indigenous communities as they are considered most affected by climate change, especially in the Arctic (Stepien, 2014), this research presents a case study from a very different societal context. By offering insights into climate change impacts on a community that has high adaptive capacity and is presumably resilient, this research deepens our understanding of how climate change impacts a non-Indigenous, non-marginal community, firmly upheld by the Norwegian state, and the societal factors that shape these impacts, adaptations and perceptions.

5.3.1 Perceived climate impacts: contributions to observation studies

My research participants notice a variety of changes in the weather and climate, including warming, changes in precipitation patterns, of wind directions and in sea-ice conditions. They perceive these changes as having a range of impacts on the natural environment, such as thawing permafrost, increased landslides and avalanches, loss of sea ice and glacial retreat (Meyer, 2022b; Ramage et al., 2022). A main aim of this research was to examine whether and how people perceive these environmental changes as impacting on the society they live in and on their own lives. As I show throughout the articles, people in Longyearbyen identify how the environment changes, and how this impacts the built environment. Many are very concerned about these impacts. While most perceive these changes to be a result of a changing climate, whether these changes are of an anthropogenic nature or not, is disputed. As we show in the article *Melting Worlds* (Meyer & Sokolíčková, 2023), perceptions differ within the community, and people express feelings of uncertainty, eeriness and even fear, but also incredulity,

ignorance and skepticism (Meyer & Sokolíčková, 2023). As I demonstrate in the articles, people in Longyearbyen see climate change as something concerning not only the Svalbard environment but also society. Through the survey about perceived societal impacts of permafrost thaw, we found that as much as 80% of the respondents felt that permafrost thaw has led to negative changes over the past ten years (Ramage et al., 2022). So which are the impacts people identify locally?

At the beginning of my fieldwork in Longyearbyen, in September 2018, I carried out a survey for the Nunataryuk project about peoples' perceptions of the societal impacts of permafrost thaw (Ramage et al., 2022). In the survey, we asked about which challenges people associate with permafrost thaw, and how they felt it was impacting their lives. I went from door to door, and either left the paper version of the survey to be filled out and picked up later, or filled it out with people in a short interview. A few months later, in spring 2019, I made a new friend in Longyearbyen. "Laila" from Argentina had moved up to Svalbard 11 months prior to work in a restaurant. She told me that she remembered me from the survey I had left at her apartment the previous autumn. After our short chat where I introduced myself and the survey, she had sat down and started filling it out. She soon had to start googling, she told me, since she was not quite sure what permafrost thaw actually meant and how it could affect her. She had read in the news about the avalanches and knew that there were houses in town that struggled with their foundations. "I tried to find out more about how permafrost impacts on the internet, but I did not know how to answer how it impacted me, so I left that blank. I knew it did something with the buildings, but I had to google to find out what exactly." I believe this episode tells us something important about the way many people in Longyearbyen perceive the societal impacts of climate change, including impacts of permafrost thaw. Firstly, it indicates that the built environment is the domain that most people talk about when it comes to climate change impacts, and the domain towards which most adaptations are directed (see Meyer, 2022a; 2022b). Secondly, it shows how people often find it difficult to pinpoint to what extent climate change is impacting them personally, and perspectives on this varied widely among my research participants.

A central finding across the articles is that the main perceived impacts of climate change on Longyearbyen are tangible and visible impacts on the built environment. These are the impacts that are of most concern and considered most pressing locally, and also the impacts that receive by far most attention politically and in adaptation efforts. In Meyer (2022a; 2022b) I discuss these impacts and how they are affecting the built environment in Longyearbyen.

While adapting the town to a changing environment has become a main driver in urban development, climate change is simultaneously creating uncertainties and altering the premises for urban planning and construction, which was emphasized by my interview partners as another main climate impact. In Meyer (2022a), my data is based on a sample of people working with urban and community development and construction: representatives of the local administration and politicians, engineers, technicians and planners, as well as people in the construction sector. However, their views reflect those of other people in Longyearbyen as well: impacts on the built environment were mentioned by most conversation partners as the main societal impact when asked about climate change. This finding is confirmed in Ramage et al. (2022), where we conclude that permafrost thaw in Longyearbyen is perceived as a very important challenge for infrastructure and for the physical environment, while it is not considered an important challenge for economic activities, culture, peoples' ability to obtain food from the land, or for health. Not surprisingly then, is climate change adaptation in Longyearbyen considered in physical terms (Meyer, 2022a): adaptation is about finding technical solutions to physical problems, with a focus on adaptation in urban development and planning, and construction, including security measures to protect the town from natural hazards.

While climate change impacts on the built environment were described quite similarly by different interview partners, what people told me about whether and how climate change impacts them personally was much less straightforward and differed widely among the people I spoke to. Especially at the beginning of my fieldwork, when the avalanches that struck town in 2015 and 2017 were still fresh in the memory of many, several of my conversation partners talked about how their feeling of safety was shook and expressed feelings of uncertainty and fear related to the changing environment. The shock and trauma people expressed in regard to the avalanches was often accompanied with a deep worry and anxiety over a changing environment. Many of my interview partners, even if they have not been personally affected by a natural hazard, expressed great concern regarding the changing environment, both those who have observed changes themselves, and newcomers to the island who are aware of how it is changing. Another emotion that was often expressed was anger directed at the capitalist industrial system responsible for a changing climate. For some, this anger is connected to political activism, which, in combination with a deep care and concern for the environment resulted in several climate strikes during my stays in Longyearbyen. Another topic that came up repeatedly, particularly among those that have lived on Svalbard for a long time, were

disrupted mobility patterns due to sea ice loss, glacial retreat, unfrozen ground and less snow. People express a range of emotions in relation to these experienced impacts, ranging from sadness over fear to indifference and denial. Some of these feelings can be described as "solastalgia": the distress caused by environmental change (Albrecht et al., 2007). People who have been living on Svalbard for a long time often expressed this in connection with a concern for the societal changes they are witnessed: a feeling that "everything" is changing, too fast, and often in an undesirable direction (see also Sokolíčková, 2023). An important aspect here is how long someone has been living in Longyearbyen. The turnover of the population is extremely high, and many only stay on Svalbard for a short while. As I discuss in Meyer (2022a), the collective memory of the town is thus very short and fragmented, and many people do not have long-standing ties to the environment that can be disrupted by climate change.

While many of my research participants feel directly and personally impacted in profound ways, others see climate change not as a personal challenge, but rather as a challenge for nature, society and humanity in general (Meyer 2022a). This is particularly true for permafrost thaw (Ramage et al. 2022): while most of the respondents of the survey (80%) indicated that thawing permafrost has led to negative changes over the past ten years, and most associated societal challenges to permafrost thaw, about 50% of the respondents said that it does not cause problems to them personally. In the words of one research participant: "I am more concerned about the effects of climate change on the nature. But I am not that concerned about myself." Another research participant, who has been living on Svalbard for seven years and studies climate change, put it this way:

> I mean I know that climate change is impacting Svalbard, and I am very concerned about that. But it does not affect my life significantly, other than defining what I study, and maybe that we cannot race around on our scooters over the sea ice as they used to. But the other changes the community is experiencing, like the tourism boom, the changes in the environmental regulations or the government taking away my voting rights, are much more immediate and significant. […] And now I'm anyway about to move down [to the mainland]. (Conversation with "Thea", February 2023)

While perceptions of personal impacts vary among the research participants, most people I talked to do not feel that their livelihood on Svalbard is directly threatened by climate change, and most participants emphasized that it will be possible to live there also in the future (Meyer, 2022a). They see climate change impacting simultaneously with several other changes (economic, regulatory, political, demographic), and climate change is often not perceived to be the most pressing issue.

To sum up, while people observe climate change impacts on nature and on the built environment, whether they ascribe this to anthropogenic climate change or not, varies. Furthermore, while some feel greatly impacted on a personal level, others are more concerned about climate change in a general way and about its impacts on nature and society. Their livelihoods and human life on general on Svalbard are generally not considered to be directly challenged by climate change (although maintaining a society on Svalbard is increasingly called into question on ethical grounds). As I show throughout the articles and argue in the next chapter, an important explanatory factor here is the societal structure and culture of Longyearbyen.

5.3.2 Societal context and culture: framing climate change

My research supports a central claim of climate change anthropology: how climate change is impacting, perceived and dealt with on the local scale is dependent on the social, cultural, political and economic factors that constitute the affected society. Previous research shows that Arctic communities depending mainly on local ecosystems are disproportionally sensitive to climate-induced changes in the natural environment (Huntington et al., 2005). In the anthropological literature on climate change in the Arctic and elsewhere, the point is often made that Indigenous communities thus are the ones most affected by climate change (Stepien, 2014), due to the dependence of their livelihoods and culture on the natural environment (Crate, 2008), as well as their long-standing relationships to the land, which are disrupted as the environment changes. Implicitly and explicitly this literature often assumes that "the more tied to the physical climate a community is morally, spiritually, and emotionally, the more devastating they perceive the risks to the environment to be" (Fink, 2019). Considering the findings discussed above, Longyearbyen presents a very different picture than that often painted of "threatened culture and livelihoods" (Nilsson, 2008) that have reached their "limits of adaptation" (Adger et al., 2009). As I show across the articles, the main societal impacts of climate change in Longyearbyen are in the realm of the built environment, and on the emotional and personal level. The economic sphere and social structure are less impacted. Also culture (in terms of language, spiritual dimension, values and worldviews) is impacted to some extent, as climate change awareness has become a defining value for many. The key to understanding this difference lies in the societal structure of Longyearbyen.

Longyearbyen is a settler community barely over 100 years old, with an economy based on tourism, research and education, coal mining and governmental transits to the public sector,

with an international and transient population, whose livelihoods are supported from the mainland. Climate change impacts on the different economic sectors in Longyearbyen are limited, and the survey described in Ramage et al. (2022) shows that economic activities are not perceived as directly impacted by permafrost thaw. As described above, the mining sector can be seen as being indirectly impacted by climate change, as climate politics strive for a de-carbonized future. We do not know much about impacts on the research and education sector, but this is likely to be ambivalent, as much of the research conducted on Svalbard is on climate change. As described by Dannevig et al. (2023), the tourist sector is experiencing impacts that represent both opportunities and challenges, and the industry is blooming even in the face of extreme climate change. Climate change risks to livelihoods in Longyearbyen thus remain indirect, as they do not depend on local resources that are depleted by climate change (Granderson, 2014). Because of this, and due to peoples' general short lengths of stay in Longyearbyen, climate change impacts on culture and livelihoods are limited. Climate change impacts on the built environment are, as we have seen, a major topic of concern in Longyearbyen. But since most people do not own their house or apartment in which they live, and infrastructure is for the most part owned by the state through the companies Statsbygg and Store Norske, such impacts are not existential to most people I talked to, even though there are important exceptions (see Ylvisåker, 2022). A similar finding concerns adaptation, which is considered a public responsibility, to be managed by the local administration and supported by the state (Meyer, 2022a). And, as pointed out in Meyer (2022a, 2022b), due to "big politics" and Longyearbyen's strategic and political importance, there is reason to believe that the Norwegian state will invest in the necessary (physical) adaptation of the town to ensure its presence also in the future. In addition to its current societal structure, Longyearbyen's history determines how climate change is impacting locally. The specific history of Longyearbyen as a coal-mining company town has created vulnerabilities and makes its built environment particularly susceptible to climate change impacts, but also creates other challenges such as a housing crisis (ibid.).

The cultural interpretive approach to climate change outlined above foregrounds the "systems of meanings and relationships that mediate human engagements with natural phenomena and processes" (Roncoli et al., 2009: 87). It directs our attention to meanings, perceptions and discourses related to climate change. While much of this literature is examining Indigenous worldviews in shaping perceptions and responses, my research suggests that a specific Western and modernist worldview is underlying and shaping the way both

climate change and adaptation is understood in Longyearbyen (Meyer, 2022a). As elaborated above, several interview partners distinguished between impacts on the self, on society and on nature, a finding that is reflected also in the survey on the societal impacts of permafrost. This indicates a perceived disconnection between these realms. I argue that this can be interpreted as an expression of a Western, modernist understanding of the human as separated from the environment (ibid,; Descola & Pálsson, 1996). Ingold's notion of the view of the environment as a globe (Ingold, 2008) is enlightening in this regard: the observer who considers herself as detached from environment, perceives the environment as a globe, and as an apart, complete whole. The globe view of the environment thus represents a process of separation of humanity from nature, an idea that Ingold sees as deeply rooted in modernity. This worldview can, as we will see in the next chapter, also help us interpret how adaptation is understood and practiced in Longyearbyen.

In conclusion, most people observe impacts on the built environment, while impacts on livelihoods, social structure and culture are of less concern. People's feelings of being directly impacted vary greatly among the research participants. The specific societal and cultural context of Longyearbyen influence climate change impacts and how they are perceived. However, many of these connections are not well understood yet. As we point out in Ramage et al. (2022), similar permafrost-thaw impacts are perceived very differently across the three case studies, but which role exactly culture plays in these different perceptions, is a field that still requires further research. Reflecting on my research and attempting to sum it up, I wonder if perhaps the way the question was framed makes it difficult to formulate conclusions. Inquiring about "impacts" implies an understanding of impacts as something concrete, visible and measurable. It implies an outside force that impacts on a system (Head, 2008; see also chapter 3.1), and forces us to define the entity this force is impacting on. Such reasoning might be useful in social impact assessments and the building of middle-range theory (Ellen, 2010). For the "thick description" focusing on the particular and local case of this research (ibid.), however, it makes sense to go beyond visible and measurable "impacts" and also look at the more subtle ways in which climate change comes to "matter" to people locally (Sokolíčková et al., 2022a). This includes listening for emotions, affections and meanings, as well as the different stories that people in Longyearbyen associate with climate change (Meyer & Sokolíčková, 2023). Many of these emotions connected to climate change are actualized in current debates about sustainability, de-carbonization and the "green transition" in

Longyearbyen (Ødegaard, 2021; Sokolíčková et al., 2022b), which imply that climate change is affecting life in Longyearbyen well beyond direct and concrete impacts.

5.3.3 Physical and feasible: contributions to the study of adaptation

Another way in which culture (in the cultural interpretive sense: as in meaning, values and worldviews), comes to matter in relation to climate change, is in the ways that adaptation is understood in Longyearbyen (Meyer, 2022a). In the social science literature on climate change adaptation in the Arctic, the common story goes something like this: Arctic communities are living at the front line of climate change, but due to their long history of living in a dynamic environment, they are resilient to change. However, the rate and magnitude of current climate change, in combination with socioeconomic factors such as the integration into a market economy, the effects of colonialization and competition over land, are increasingly constraining Arctic communities' ability to adapt: they are reaching their "limits to adaptation" (Adger et al., 2009). The case of Longyearbyen presents an interesting and contrasting contribution to this literature on climate change adaptation, in anthropology and related fields.

In Meyer (2022a) I describe how climate change adaptation is practiced in Longyearbyen. The findings show that adaptation is determined by societal context: the specificities of Longyearbyen as a highly modern, industrialized, Western and financially rich community, on a tight leash to the Norwegian state, with a fluctuating population, result in a specific form of climate change adaptation. I show how adaptation is considered a public responsibility, to be managed by the local administration and supported by the state. I furthermore show how adaptation in Longyearbyen is mainly a physical endeavor, including modifications of the built environment and securitization against natural hazards. Adaptation solutions are in Longyearbyen underpinned by Western, scientific knowledge and expertise, and the formal knowledge base for adaptation is ample. In the sense of rational, planned adaptation, then, Longyearbyen has high adaptive capacity. I argue that the avalanches of 2015 and 2017 put climate change adaptation high up on the political agenda in Longyearbyen and has now become a decisive factor in urban development and planning, underscoring the importance of "focusing events" (Amundsen et al., 2010) for driving adaptation. Adaptation is in Longyearbyen generally considered as technically feasible, and adaptation challenges are rather social and economic, as has been found to be true also in other Arctic contexts (Ford et al., 2015).

The findings add an interesting case to debates in anthropology on how culture, including worldviews, meanings and values, shape adaptation (Crate, 2008; O'Brien & Wolf, 2010; Roncoli et al., 2009). Even though this theoretical tenet has hitherto mainly been applied in the study of Indigenous peoples' responses to climate change, I demonstrate its usefulness also for analyzing adaptation in a non-Indigenous context. I argue that also in this realm the Western, modernist understanding of the human detached from the natural environment informs how adaptation is understood and practiced. Formal, Western, scientific knowledge and expertise is in Longyearbyen considered key for dealing with the impacts of climate change, expressing a "faith in science as a means of prediction and dealing with uncertainty" (Head, 2010: 237). Adaptation is furthermore rational, planned and considered a technical solution to physical processes, reflecting a reliance on technological solutions to cope with climate change. This concept of adaptation reflects once again the "globe view" of the environment (Ingold, 2008). Nature detached from humans becomes manageable, management which is "commonly described in the language of intervention" (ibid.: 467). The "moderns from the Western world" thus become "nature's masters and owners" (Latour, 1993: 9) in this modernist understanding of the environment.

This worldview and the related view on the environment thus inform a specific understanding of climate change adaptation. Another argument I add to the adaptation discussion (Meyer, 2022a) is that this understanding of adaptation contains what Thornton and Manasfi (2010: 149) have called an "adaptation bias": "a reliance on bolstering existing infrastructure through 'techno-fix' measures and a neglect of more socially transformative adaptation processes." As the anthropological record shows, humans adapt to changing environments not only by the means of technology, but through a wide range of processes, including social, cultural, political and economic change (Sutton & Anderson, 2010). Yet, there is a bias in much adaptation policies "toward technological interventions and narrow behavioral responses to specific risks" (Nelson et al., 2009: 272). A limited focus in climate adaptation policies on adaptation as science-backed technological solutions to physical challenges omits the more challenging task of truly transforming society (Meyer, 2022a). Considering that our current lifestyle is not environmentally sustainable, adaptation merely relying on techno-fix solutions can even be considered maladaptive (Thornton & Manasfi, 2010). In contrast, a more "transformative adaptation" (Fedele et al., 2019) or "transformational adaptation" denotes action that "changes the fundamental attributes of a system in response to climate and its effects" (Agard et al., 2014: 1758), and includes "fundamental systems' changes that address

root causes of vulnerability" (Fedele et al., 2019: 116). In Longyearbyen, there are several bottom-up initiatives to make the place more environmentally sustainable, and the top-down "green transition" has become a major political issue locally during the years of my fieldwork. My research suggests that climate change adaptation should be re-conceptualized to include this more fundamental societal transformation, and that the current (envisioned) transition of Longyearbyen towards a post-carbon society presents an interesting case study in this regard.

A related contribution to the adaptation literature concerns the politics in which climate change adaptation is embedded in Longyearbyen, and the tensions and power relations that this entails. This field is hitherto understudied, and O'Reilly et al. (2020: 20) call for "[i]ncreased attention to the political nature of climate solutions, and how transformative such actions should be in order to enable just futures for both humans and the nonhuman world". In Meyer (2022b) I discuss how climate change and subsequent adaptation measures intensified the housing crisis in Longyearbyen and resulted in increased state control over housing, indicating how politics intersect with adaptation (see also Meyer, 2022a). The underlying politics of adaptation measures were further explored in our analysis of climate change discourses (Meyer & Sokolíčková, 2023), which leads me to the final point.

5.3.4 Rejection and resistance: contributions to reception studies

Finally, this research contributes to the growing field of reception studies in anthropology (De Wit & Haines, 2021, Rudiak-Gould, 2011; see chapter 3.5). In Meyer & Sokolíčková (2023), we consider the discursive aspect of climate change—climate change as a "scientific narrative, discourse, or idea" (De Wit & Haines, 2021: 2)—and analyze the reception of the climate change discourse locally in Longyearbyen. Reception studies complement observation studies and move beyond the "narrow parameters of global climate change as crisis narrative" (ibid.: 4), and entail listening for counternarratives (O'Reilly et al., 2020: 14). We explore different "stories" about climate change and adaptation in Longyearbyen (and emphasize that climate change is indeed not the only story in town), and find dominant narratives and "counter stories", the latter nuancing and contesting the former. By contextualizing these "minor stories" (Katz, 1996) we aim to understand them, and expose the underlying politics of the dominant climate change and adaptation discourses. We connect the literature on reception studies to anthropological studies of rejection and resistance (De Wit, 2020; Krange et al., 2019; McCright & Dunlap, 2011) and show how the minor stories contest the dominant climate change discourse and criticize it for being over-simplifying and sensationalist. Furthermore,

the counter stories indicate that the dominant discourse is sometimes being (mis)used for other purposes.

Our article adds two nuances to the existing literature of reception studies. First, we show how reception studies are well-suited to expose the politics and power relations in which climate change and adaptation discourses are embedded. From the counter stories we learn that the dominant climate change and adaptation discourses might function to serve political purposes, whether intended or not. We demonstrate how authority and power is both constituted and contested in dominant discourses and the counter stories respectively, and argue that seemingly apolitical adaptation measures are indeed related to sovereignty politics. The article thus adds to the literature on the power and politics constitutive of societal transformations as a response to the climate crisis (Nightingale, Gonda & Eriksen, 2022). Second, we make the case that adaptation discourses and policies should be added to the agenda of reception studies. As the case of Longyearbyen demonstrates, the dominant climate change discourse legitimates specific understandings of adaptation and corresponding adaptation policies that impact society. Examining how these policies are received and interpreted sheds light on uneven power relations and the interests and agendas behind certain adaptation measures. The adaptation literature has been found to pay insufficient attention to the political mechanisms behind adaptation efforts (Eriksen, Nightingale & Eakin, 2015). Our article can thus be seen as a contribution to this literature and suggests that the lens of reception studies is useful to contribute to the "empirical basis from which to theorize the politics of adaptation" (ibid.: 523).

Finally, we agree with Brüggemann & Rödder (2020) that "it is not only of academic interest, but also of practical importance to study local discourses about climate change" (ibid: 3). To solve the climate crisis, human action is needed, and this hinges on how humans interpret the challenge at hand. We thus subscribe to Hulme's call for listening and understanding, rather than excluding, different perceptions of climate change: "[i]f we are to understand climate change and if we are to use climate change constructively in our politics, we must first hear and understand these discordant voices, these multifarious human beliefs, values, attitudes, aspirations and behaviours" (Hulme, 2010: xxvi). The official climate change discourse loses credibility by people who feel their perspectives are suppressed in the dominant narratives, and this feeling of being neglected is paired with a feeling of not being part of the solution, either. Listening carefully to local voices is thus crucial for understanding and ultimately moving in the direction of fair and transparent climate change politics.

6 Conclusion: reflections on "Arctic change"

We are living in a time of multiple crises. These entwined climatic, economic and political upheavals entail fundamental practical and ethical problems and dilemmas, but also pose new challenges to anthropology (Caglar et al., 2023): how do we conceptualize multiple entangled hybrid processes, encompassing multiple scales?

In this study I have examined how climate change, interweaved with manifold processes across various scales, is playing out and experienced in Longyearbyen, Svalbard. The thesis contributes to the anthropology of (Arctic) (climate) change by focusing on a societal context that differs a lot from much of the anthropological literature on this topic and from this region. Longyearbyen is often portrayed as a showcase of Arctic climate change. In an environmental sense, it is truly how we imagine the Arctic to be: cold, icy, empty, and now: melting. Yet socially, Longyearbyen disrupts our "Arctic imaginary" (Brode-Roger, 2021). As I argue throughout this thesis, Longyearbyen is in many ways different from the traditional anthropological climate change subject in the Arctic: it is a non-Indigenous, extremely transient, hyper-connected and international settler community, lying at the center of Norway's strategic interests in the north. It is thus far removed from the modernist fantasies conveyed by much of the "human dimensions" research, often well-supported by anthropology: the local, traditional climate change victim (Sanders & Hall, 2015). Although commonly imagined otherwise, Arctic "lived realities continue to reflect stark contrasts in social and political processes" (Schweitzer, 2022: viii). At a time where the "new realities of global connection through climate outstretch all anthropological theories about locality, sociality, and connectivity" (Hastrup, 2013: 270), it is time to revise our image of the Arctic as a remote frontier frozen in time. The case of Longyearbyen, where multi-scalar, interrelated social and environmental processes converge, can contribute to our reconceptualization of the Arctic to consider its dynamic global, interconnected and cosmopolitan (Hulme, 2010) dimensions, in anthropology and beyond.

This thesis adds to our understanding of a changing Svalbard and the specific developments and challenges Longyearbyen is currently facing. The research is based on a "traditional" anthropological study, focusing on one specific place, within a relatively short time frame (4 years), utilizing "thick description" (Geertz, 1973) to "shed light on particular cultural situations" (Ellen, 2010: 394). However, the research shows that the specific developments and challenges Longyearbyen is currently facing are very much a result of

intersecting hybrid socio-natural processes on various scales, encompassing the local and the supra-local. Communities all over the world are grappling with the entangled effects of globalization and climate change, and some of the topics explored in this thesis can offer lessons beyond its particularity.

The Arctic is often considered a canary in the coal mine for climate change, "foreshadowing for the rest of the planet what warmer and wetter future awaits" (Bennett, 2023), and Svalbard is a prime showcase in this regard. To what extent are the insights gained regarding climate change transferable to other Arctic locales? The main takeaway from this study is that climate change is deeply intertwined with other changes, and that these multiple and hybrid processes on various scales result in specific challenges and frictions locally in which it becomes impossible to separate concerns with the "natural" from "social" change, as well as the "local" from the "global". My research furthermore demonstrates the entanglement of material and discursive dimensions of climate change and adds to the literature a perspective on how these aspects can be studied together. This thesis thus urges the reconceptualization of central theoretical categories in climate change anthropology and the study of change more generally, a point I will return to at the end of this conclusion.

Due to Svalbard's specific geopolitical importance, the transient population and large share of local experts, some of the insights from Longyearbyen regarding specific societal impacts and adaptation are not easily transferable to just any other Arctic locale, but they can contribute to important knowledge through comparison. Importantly, Longyearbyen is fundamentally different from Indigenous communities in the Arctic, who have long-standing and existential relations to the regions they inhabit, and whose histories characterized by colonial violence result in specific vulnerabilities. The impacts of climate change in Longyearbyen cannot be described as "cryocide" (Ulturgasheva & Bodenhorn, 2022b), meaning the "risks faced by peoples across the globe who depend on ice-based landscapes for their existence" (Bodenhorn & Ulturgasheva, 2022: 2). In Longyearbyen, people's existence and subsistence does not depend on the cryosphere. Climate change significantly impacts on the built environment and on the emotional and personal level, but has limited economic impacts, and does not disrupt livelihoods or subsistence activities necessary for survival, nor place attachment that spans generations. The Longyearbyen case thus demonstrates how crucial the societal context is for understanding how climate change comes to matter locally, but also points to a significant research gap. The physical effects of climate change, such as permafrost thaw, may be quite similar across the Arctic, but how these processes are impacting, perceived

and acted upon, varies widely. A comparative view on which factors explain this variation between communities is still lacking. My research furthermore shows that perceptions of and stories about climate change also differ greatly *within* communities, and that understandings of local environmental change are deeply entangled with the global "travelling idea of climate change" (de Wit et al. 2018: 1), thus contributing to the study of local climate discourses across the globe (Brüggemann & Rödder, 2020).

In Longyearbyen it is a common saying that "the state is everywhere", and that includes issues related to climate change. As I have shown, climate adaptation is imbued with (national) politics, and the envisioned "green transition" must be understood in the context of Norway's geopolitical ambitions in the Arctic. Furthermore, the Covid-19 pandemic highlighted the frictions that arise locally when societal developments do not align with state politics and geopolitical goals, and how this indeed can reinforce nationalist dynamics, a tendency observed across the globe (Bieber, 2022). The Longyearbyen case is thus illustrative of how national interests and strategies shape local communities and their developments and challenges in the geopolitical "hot spot" of the Arctic. Recent developments, such as Russia's war against the Ukraine and increased demand for raw materials to fuel the "green shift" might intensify the "scramble for the pole" (Dodds & Nuttall, 2016). The "death of Arctic exceptionalism" (Bennett, 2023) gives reason to believe that national interests will only gain significance in determining the fate of Arctic local communities in the time to come.

Finally, there are some important lessons to be learned by the case of Longyearbyen regarding the "green" and "sustainable" transitions that are often proposed as solutions to the climate crisis. Although extractivism is still key to a large share of Arctic economies (Sörlin, 2022), de-industrialization and a shift to tourism and research/education is an increasing trend (Larsen & Huskey, 2015: 166-167), and characterize transformations in Europe at large. In Svalbard, the out-phasing of coal is framed as an important step towards a "green" future. During this research, the image of Longyearbyen as a showcase of "green" and "sustainable" living in the Arctic was added to the image of Svalbard as a showcase of climate change, the latter legitimizing the former. As of yet, this focus on the "green" shift is rather atypical in the Arctic, but the Longyearbyen case might be insightful for future developments in the region, and the topic is already of great relevance in more southern (European) latitudes. The examination of the intersections of climate change (discourses) with the low-carbon transition remains a pressing but understudied task for social scientists, and this thesis offers some first insights into the role of the climate change discourse in driving post-industrial restructuring.

Relatedly, the Longyearbyen case is a reminder that the buzzword of "sustainable development" proliferating in Arctic discourses requires reflexivity and critical scrutiny (Stephen, 2018: 223). Sustainability has become an essential leitmotif of the transition Longyearbyen is now embarking on, with the expected end of coal mining and enhanced environmental protection. This transition is accompanied by tensions and challenges locally, resulting from the limited agency of local actors in defining the developments and the widespread feeling that the processes and decisions driving these transitions originate elsewhere. The Longyearbyen case highlights the fact that "green" transitions need to be just to be truly sustainable (Wood-Donelly & Ohlsson, 2023), and this includes to listen to diverging voices and perspectives and grant the people who will be affected greater agency and influence. Comparing the Svalbard case to other Scandinavian places embarking on a "green transition", the non-Indigenous context of the former again stands out. While in mainland Northern Norway green energy projects such as wind parks are threatening Indigenous livelihoods and can be seen as "green colonialism" (Normann, 2021), Svalbard is often portrayed as a perfect "laboratory" for post-industrial experiments, both delimited and driven by Norway's environmental aspirations and (geo)political ambitions.

Regarding climate change adaptation I have argued that a narrow focus on technical solutions to physical problems fails to address the far greater challenge of transforming society at large in the face of the climate crisis. A transformative approach to adaptation, in terms of fundamental system change (Fedele et al., 2019), is needed, but what this would look like (in the Arctic and elsewhere) is still understudied (ibid.). Despite the urgency of climate change, the case of Longyearbyen demonstrates the importance of avoiding "climatism" (Hulme, 2023)—the tendency to reduce contemporary politics to climate change mitigation and adaptation (see also Stensrud & Eriksen, 2019, and Schweitzer, 2022: viii). As this thesis demonstrates, climate change in Longyearbyen is only one among many challenges to be dealt with, and often not considered as the most pressing. However, the official envisioned futures for Svalbard tend to emphasize environmental aspects rather than the social dimension of building a liveable and viable community. Reducing Arctic challenges to climate change and framing the solutions as "transformative adaptation", "sustainable development" and "green transition", runs the risk of disregarding the social and political problems in which climate change is intertwined. Similarly, an uncritical usage of the Anthropocene concept as an era defined by environmental problems might downplay current social and economic crises. A holistic approach is thus needed, one that acknowledges the entanglement of environmental,

social, political and economic processes in creating both challenges and solutions, and to this anthropology has a lot to contribute.

I want to end this synthesis by reflecting on the main insights from my research and proposing the notion of **"Arctic Change"** as a holistic framework to the study of ongoing transformations in the Arctic (and elsewhere). My research demonstrates that the specific challenges and processes I have examined are results of entangled socio-natural processes on various scales, comprising both discursive and material dimensions. First, the findings indicate that while categories such as climatic, social, political and economic changes are useful as heuristic tools that allow us to speak and write about different phenomena (e.g., avalanches or the out-phasing of coal mining), "in reality", these processes are deeply entwined. For instance, when my research participants are concerned about housing, this must be understood in relation to a variety of socio-natural processes: the avalanches that struck town, the growth of the service industry and Norway's "Norwegianization" politics. Second, we have seen how entangled climate change impacts both physically and as a discourse. When my research participants talk about climate change, they talk about environmental change but also express their worries about losing their jobs in the mine. The latter, again, is not only an expression of "socio-economic" change, but is interconnected with discourses about the "green transition", which again can only be understood in the context of the climate crisis and Norway's geopolitical ambitions to make Longyearbyen an Arctic showcase. Third, we have seen how Longyearbyen is enmeshed in supra-local processes that create and shape the specific developments and challenges of the place that this thesis sheds light on. When an Argentinian woman, who moved to Longyearbyen two years ago, tells me that the number of mosquitos on Svalbard this summer is abnormal and clearly an expression of climate change, this must be interpreted as an expression of a "global imaginary" in which "people's imaginations are deeply infiltrated by global connections and images" (ibid.). When a whole neighborhood is demolished under the slopes of the *Sukkertoppen* mountain, this is not merely a local response to a changing environment, but deeply entangled with state politics to increase control over housing, which again must be seen in the light of recent demographic developments in which Longyearbyen is becoming ever more globalized. The uncertainty and hostility that non-Norwegian residents experienced during the Covid-19 pandemic, itself a consequence of globalization, are a result not of local but state politics aimed at reasserting the Norwegian profile of Longyearbyen in an international "scramble" (Dodds & Nuttall, 2016) for a

globalized Arctic. The Longyearbyen case thus highlights three related aspects of change to consider when studying a transforming Arctic.

The shortcomings of much (Arctic) climate change research in anthropology and related disciplines, and particularly in interdisciplinary projects, can be similarly summarized in three broad categories: 1) a "siloed" approach, framing climate change as *the* dominant challenge that can be isolated from other ongoing changes, and that is at best studied "in the context of" other processes and transformations; 2) a one-sided emphasis either on the physical or the discursive dimension of climate change; and 3) an emphasis on the local, which may lead to the risk of ignoring supra-local processes in which the local is embedded. To overcome these shortcomings, Arctic change must hence be addressed holistically in at least three dimensions: entanglement/hybridity, ontology and scale. The notion of "Arctic change" draws on current debates in anthropology and the environmental humanities and integrates three key theoretical aspects that in combination result in a holistic approach to change. These revolve around central dualisms on which anthropology has long relied, namely nature-culture (climate-society), material-discursive and local-global (see, for instance, Hastrup, 2013; Hulme, 2010; Sanders & Hall, 2015). As this and other empirical studies demonstrate, in peoples' lived experiences, these categories are blurred.

Entanglement and hybridity: first, climate change is a hybrid phenomenon, its causes and consequences deeply entangled with societal processes and changes. Climate change itself is a result of human activity, and how this change is impacting, perceived and responded to locally, is entwined with other ongoing processes. Research on the "human dimensions" of climate change must address these complex entanglements and requires an understanding of the world in which the natural and the social are seen as enmeshed instead of separate. This has been argued in anthropology already for a while. However, siloed approaches to climate change continue to dominate research questions, grants and project structures. Climate change must be conceptualized as a hybrid socio-natural phenomenon, to be studied not in the context *of*, but as entangled *with* other processes. This approach inhibits a strict separation between climatic and societal changes, and ultimately between nature and culture, and thus dovetails with current debates about ontology in anthropology and related fields.

Ontology: the second theoretical notion of a holistic study of Arctic change implies to approach climate change in its material *and* its discursive dimensions. In this synthesis I argue that climate change research can greatly benefit from engaging with current debates about ontology in anthropology and related fields. For research on climate change, this discussion is

particularly fruitful in Anthropocene scholarship and attempts to overcome modernist dualisms. I propose to capture the nature-culture hybridity—so evident when it comes to climate change—by applying a non-dualistic ontology that acknowledges nature and culture as intertwined, while recognizing their respective ontological status. I further maintain the necessity for linguistic distinctions between these categories that are indeed entangled. This approach allows us to address the challenges of the Anthropocene—nature-culture unleashed—without depoliticizing or reducing nature to culture, or vice versa. Without recurring to an undifferentiated monism, this approach opens for addressing both the material and the discursive dimensions of climate change. This means to account for both the physical consequences of climate change and to the impacts of the climate change discourse, which influences perceptions and can be (mis)used for political agendas. To achieve this, I propose to integrate cultural ecological and interpretive approaches to the study of climate change, and to combine observation and reception studies.

Scale: third, the (anthropological) study of entangled climatic and societal change defies any notion of a locally bounded field (Hastrup, 2013). Climate change not only contributes to the dissolution of the nature-culture dualism, it also dissolves the spatial distinction between the global and the local (Hulme, 2010: 273). Anthropology itself, long reliant on and indeed producing the notion of bounded "cultures", thus stands at a "watershed": "[t]he entanglements of natural and social processes, and the possible anthropological studies, are certainly not delineated by fixed cultures or well-defined societies" (Hastrup, 2013: 278). The specific effects and challenges resulting from entangled socio-natural changes are thus simultaneously local *and* global.

The approach to "Arctic Change" I propose in this thesis thus refers to a holistic framework to study multi-scalar entangled climatic and societal transformations, attending to both material and discursive dimensions of change. The approach integrates three key theoretical notions that in combination address the changes that the Arctic and the world at large are experiencing. Including "Arctic" as a geographical denominator points to the fact that climate change is particularly pronounced in the Arctic, although not specific to the region. It further alludes to the anthropological stance that although the crises and changes we are witnessing are multi-scalar, the specific problems they create are experienced by people who continue to relate to specific places; some temporarily, others more permanently. "Everything is at a time and in a place" (Eriksen 2022: 1), and in this also lies the potential of local solutions (ibid.:1-2). The stories that make up this dissertation express various lived experiences of

entangled multi-scalar changes in Longyearbyen at a specific point in time. They also point towards desired futures and outline different ideas and strategies on how to get there. Anthropologists have shown how the problems resulting from the grand changes of our time affect people as they play out locally. Now is the time to look for and create solutions, not top-down, but starting from the ground up.

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Publication I: Changing Svalbard: Tracing interrelated socio-economic and environmental change in remote Arctic settlements

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Changing Svalbard: Tracing interrelated socio-economic and environmental change in remote Arctic settlements

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Abstract

The archipelago of Svalbard is a good example of an Arctic locale undergoing rapid changes on multiple levels. This contribution is a joint effort of three anthropologists with up-to-date ethnographic data from Svalbard (mostly Longyearbyen and Barentsburg) to frame and interpret interconnected changes. The processes impacting Svalbard are related to issues such as geopolitical interests, and increasing pressure by the Norwegian government to exercise presence and control over the territory. Our interpretations are based on a bottom-up approach, drawing on experiences living in the field. We identify three great ruptures in recent years – the avalanche of 2015, the gradual phasing out of mining enterprises and the COVID-19 pandemic – and show how they further impact, accelerate or highlight preexisting vulnerabilities in terms of socio-economic development, and environmental and climate change. We discuss the shift from coal mining to the industries of tourism, education, and research and development, and the resulting changed social and demographic structure of the settlements. Another facet is the complexity of environmental drivers of change and how they relate to the socio-economic ones. This article serves as an introductory text to the collection of articles published in Polar Record in 2021/2022 with the overarching theme "changing Svalbard". Issues discussed range from socio-economic change and its implications for local populations including identity of place, through tourism (value creation, mediation, human–environment relations, environmental dilemmas, balancing contradictory trends), to security and risk perception, and environmental and climate change issues.

Introduction

The multilayered alterations in Svalbard recently can hardly remain unnoticed, and there are multiple reasons for putting "changing Svalbard" in the spotlight. The archipelago is considered a "hotspot of climate change" (Grünberg, Groenke, Jentzsch, Westermann, & Boike, 2021; Vidal, 2017), attracting attention from researchers, journalists and visitors eager to study environmental impacts. Simultaneously, its settlements are undergoing structural economic changes (Arlov, 2003; Hovelsrud, Kaltenborn, & Olsen, 2020; Norum, 2016; Reymert, 2013; Schennerlein, 2021) with coal mining being replaced by tourism (Viken, 2011), research and education (Misund, 2017; Misund, Aksnes, Christiansen, & Arlov, 2017; Pedersen, 2021) and development of innovative technologies, with a corresponding growth in the service sector. Such developments provide a unique opportunity for studying changes in Arctic communities (Paglia, 2019). The archipelago has no Indigenous population. It is remote, but at the same time hyper-connected. Its economy is increasingly post-industrial (Statistics Norway, 2020). And due to its geopolitical significance, it lies at the centre of the political interests of industrialised, affluent nations such as Norway, China, the Russian Federation, but also the USA or Member States of the EU (Avango et al., 2011; Grydehøj, 2014; Grydehøj, Grydehøj, & Ackrén, 2012).

Whereas Svalbard is often portrayed as a pristine and untouched wilderness, it is and has been very much a peopled place (Kruse, 2016). Study of the human dimensions of life in Svalbard used to be scarce compared to the large amount of natural science research, but this is changing. We also seek to challenge the usual distance from which issues related to people in Svalbard are studied. Its communities are often looked at from above and afar and conceptualised as geopolitical tools. Or, as people in Longyearbyen often say, "we are all here for a reason". This collection of articles mostly looks at Svalbard from below and seeks understanding from the various perspectives of people who live on and visit the archipelago.

Distance in time is also common. History, for example, in the work of Thor Bjørn Arlov (e.g. 2003), Per Kyrre Reymert (2013), Bjørg Evjen (1996) or Vadim Starkov (1998), archaeology and cultural heritage such as in the work of Susan Barr (e.g. 2019), Frigga Kruse (e.g. 2013), Louwrens Hacquebord and Dag Avango (e.g. 2009) and other disciplines have traditionally

delivered important findings about the predecessors of current Svalbard inhabitants. Scholars in this collection of articles, with a few exceptions, aim at communicating knowledge relying on contemporary perspective from within.

In this article, we aim to outline changes the archipelago is undergoing. We first set the scene, acknowledging Svalbard's settlements exist for purposes of Russian and Norwegian presence, with deep implications for governance. We continue with a recent history of change in the most researched towns, Longyearbyen and Barentsburg, with some references to Pyramiden. We then elaborate on changes in three spheres: economy, social structure and environment, before combining these threads and discussing implications for life in Svalbard.

Methodologically, all authors are social anthropologists using qualitative methods such as in-depth interviews and long-term participant observation. Contrasting with the myth of "there is little social science research in Svalbard", the locale is currently widely researched and much of the existing literature is based on (at least partially) ethnographic data. Yet the main asset of ethnography – years-long stay in the communities – is rather unusual. The authors resided in Longyearbyen and Barentsburg in 2018–2021 and worked ethnographically in an independent manner, collecting data in different languages and with access to different segments of the settlements' populations. Analysis presented in this contribution is a result of joint discussions over our data, parts of which we interpret in our individual contributions in this collection. In this text, we provide a framework to the collection and also draft possible future avenues of Svalbard social science research.

Presence, control and geopolitics

Viewed from above and outside, Svalbard appears a geopolitically significant place, an Arctic focal point of economic and political interests (Grydehøj, 2020). The archipelago's geopolitical importance runs as a red thread through its history and has very much defined the establishment and development of its settlements. The main objective of Norway's Svalbard policies is maintaining Norwegian settlements to legitimise Norwegian sovereignty over the archipelago (Ministry of Justice and the Police, 1974–1975; Grydehøj, 2014; Grydehøj et al., 2012; Ministry of Justice and Public Security, 2015–2016; Pedersen, 2017). Svalbard's largest town and its administrative centre, Longyearbyen, can thus be understood as a "tool of diplomacy" (Hacquebord & Avango, 2009, p. 36), an upholder of Norwegian presence in the archipelago. Since the town's establishment, this political goal resulted in state support of coal mining. In recent years, the facilitation of tourism and heavy investments in research and higher education have served the same purpose (Avango et al., 2011; Misund, 2017; Pedersen, 2021; Roberts & Paglia, 2016). Compared to the "company town" mining years, the diversification and liberalisation of the economy in Longyearbyen in the 1980s (Arlov, 2003) resulted in decreased state control over Longyearbyen. Recent economic, social and environmental changes are challenging policy and governance on Svalbard (Kaltenborn, Østreng, & Hovelsrud, 2019). As noted in the following contributions, recent developments indicate Norway's attempts to tighten control over the archipelago.

Whereas Norway's geopolitical efforts on Svalbard have mainly been studied through the lenses of international relations and politics (Ulfstein, 1995; Qin, 2015; Øystein, 2020), Brode-Roger (2022) studies the impacts of the Svalbard Treaty on Longyearbyen residents from below. Drawing on rich qualitative data from focus groups with residents, she shows how the Treaty shapes community life and residents' lived experiences. By framing her analysis in an identity-of-place framework, she analyses how Svalbard's special territorial status structures life in Longyearbyen. She points to an inherent conflict between the Svalbard Treaty and a true local democracy, causing confusion and frustration among Longyearbyen residents.

The same underlying motives define Russian Svalbard strategies (Olsen, Vlakhov & Wigger, 2022): to uphold and maintain the Russian presence (President of Russia Decree, 2020). During most of the 20th century, the Soviet Union was the only state besides Norway to make active use of resource extraction rights provided under the Treaty, while some other states maintained minor research activities (Arlov, 2003). At times, Soviet citizens were the dominant population group, and Barentsburg and Pyramiden were a showcase of the Soviet lifestyle. After 1991, the Russian-speaking community declined significantly (with Ukrainian citizens becoming the most numerous nationality), but the full shutdown of the colony was never considered an option for political reasons: Russia views its Svalbard settlements as a strategically important outpost in the Western Arctic (Portsel, 2011, Nabok, 2013) pivotal for international relations with Norway and other Arctic states. Like the Norwegian case, state support has always been vital for the Russian communities, both in coal mining and post-industrial attempts undertaken during the past decade (Vlakhov, 2019). In the Russian case, the issue of property rights is also prominent as the state-owned company *Trust Arktikugol* (henceforth referenced as Arktikugol) is the sole owner of all Russian land plots and infrastructure, and therefore enjoys exclusive rights in the settlements, allowing no private businesses and keeping the Russian settlements effectively under state control.

From the perspective of Svalbard's inhabitants and visitors, however, the archipelago takes on an additional meaning. It is home, an emotionally significant place, where everyday life unfolds and experiences come about, a place people remember, imagine and co-inhabit. This friction created by the omnipresent awareness of local governance deficiencies deserves close attention. In the Russian community, the desire for more agency at the local level is growing, and the community is currently caught between the hammer of modernisation and the anvil of planned economy. Even though the local demand for change has a history dating back to the 1990s (when the company only had limited resources to sustain decent life in town), Arktikugol still aims at the traditional model of company town with top-down power relations and no plans for local self-governance.

Residents of Longyearbyen are well aware the town exists for (geo-)political reasons (Brode-Roger, 2022), and a common comment in the field is "everything here is big politics". The link between local and national politics is ambiguous; local politicians and authorities communicate on a regular basis with central politicians, which would be rather unusual in an equally small town on the Norwegian mainland. But at the same time the overarching strategy for Svalbard is being designed in Oslo, with local stakeholders welcome to offer input, but no direct say in political decisions made behind a closed door. Employees of the Governor's Office and other direct representatives of the state are often perceived by Svalbard residents as distant from local affairs. The high turnover among employees both at the Governor's Office and the Municipal Council contributes to the widespread feeling people in powerful positions fail to take local needs into account. Another deficiency in the governance of Longyearbyen

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is that large segments of the population are not politically represented. The 2021 decision of the Norwegian Ministry of Justice to take away voting rights from non-Norwegians who have not lived in Norway for at least three years will make the gap even wider.

Norwegian officials claim the strategy for Svalbard remains consistent, yet actual developments in Longyearbyen since the 1990s do not always match the state's strategy, and residents notice the state is claiming more control. This is the case with environmental regulations impacting tourism, avalanche protection, services or the reorganisation of housing management. Seen from below, the runaway development of Svalbard during recent decades is causing problems, but the firm grip of the state is not unequivocally supported either. Many express a wish for more local power in decision-making. As the leader of Visit Svalbard put it in a panel discussion about tourism organised by Artica Svalbard in summer 2020: "To the member of Parliament: please don't use the remote control from Oslo. Listen to the locals. Cooperate with the locals. Not only listen to advice, but let us be part of the solution. Don't just find some easy solution that looks fine from Stortinget".

The recent history of change in Svalbard settlements

There is no point in dwelling on a detailed historical overview as this has been done by others (Arlov, 2003; Evjen, 1996), but we shall attempt to outline the context of historical change in Longyearbyen and Barentsburg as the collection's backdrop. Most of the contributions are dedicated to current issues that relate directly to the historical developments marked out below.

While Svalbard was first documented by the end of the 16th century, Longyear City was founded in 1906 by the American Arctic Coal Company (Arlov, 2003). Only the first 10 of the 115 years of the settlement's existence are not related to Norwegian interests; in 1916, Store Norske Spitsbergen Kulkompani (SNSK; renamed Store Norske in 2020) took over. Since then, claiming Longyearbyen is a Norwegian settlement has never ceased and lately the urge to do so has intensified. A similar story can be told about Barentsburg. Founded in 1920 by the Dutch enterprise of NESPICO (Portsel, 2011), the town was sold in 1932 to the Soviet Union, which developed Barentsburg as a model Soviet settlement (together with Grumant and Pyramiden) and effectively erased any memory of the Dutch decade of its life. Arktikugol has been exclusively responsible for the development of coal mining and later other industries in all Russian-speaking settlements. Only secondary supporting functions were occasionally contracted to other operators (Borovoy, 2020).

Longyearbyen was a settlement with a clear purpose: mining coal (Hacquebord & Avango, 2009; Pedersen, 2017). The company ran the town and provided services such as transportation, work contracts, housing, boarding and health care (Evjen, 1996; Evjen, 2001). The level of Longyearbyen's connectedness in 2020 is incomparable to the early 1970s; when people tell stories about "the old days" they often refer to "the last boat" (in autumn) and "the first boat" (in spring). In 1975/1976, the new airport in Longyearbyen opened and the year-round accessible Svalbard came into being. In 2019, 185,218 people travelled through Svalbard Airport. The opening of the airport and improved telecommunications were not the only major shifts for Longyearbyen. The seventies was the period of modernisation and "normalisation" – the company town model was abandoned and Longyearbyen was transformed into a family society (Arlov, 2003; Ministry of Justice and the Police, 1974–1975). More family housing was offered and welfare improved. Longyearbyen in the 1980s is remembered as still a well-functioning company town with exciting signs of a new era to come. Tourism was an additional and marginal business, but small private enterprises appeared and signals from the government clearly pointed to the future economic backbone.

Barentsburg and other Russian-speaking settlements were largely developed as a showcase of the "progressive" Soviet lifestyle (Portsel, 2012), resulting in a strict selection process for those coming to Svalbard. People remembering this period of prosperity and abundance recall the free food, best equipment and substantial wages making people contend with each other to get to Barentsburg or Pyramiden (Vlakhov, 2020). The Soviet policy was to make life in the towns as similar to life on the mainland as possible, including a full range of social services (hospital, kindergarten, school, sports and culture hall, etc.) and means of self-sustenance (greenhouses, farms, etc.). Such policy also had an ideological implication of making the Soviet nationals feel they were still in the Soviet state and lifestyle, as they were technically on foreign soil, no less a "capitalistic" one. Re-creating the sense of being at home was therefore a tool of ideological control, deemed necessary even after extensive background checks. This resulted in the relatively high degree of being connected to the Soviet mainland and supply quality while remaining as independent from Norway as possible through regular supply chains and workers' mobility. Interestingly, the launch of Svalbard Airport weakened this position as its services became indispensable and allowed Norway to gain the high political ground (Arlov, 2003). This is still the case today as the bulk of Barentsburg's connections to the outside world go through Longyearbyen, including transportation and the fibre optic connection to the Telenor internet cable. In most cases, only mining-related, consular or emergency flights are allowed by the Norwegian authorities, much to Russia's displeasure as this halts their development prospects (Grydehøj, 2014).

Only 6% of Longyearbyen's current population (about 140 people) moved to the island more than 20 years ago. Thus, only a limited pool of people remember the 1990s when numerous crucial developments took place. In the geopolitical context, the disintegration of the Soviet Union was a major factor in the euphoria of a suddenly unipolar world. Norway felt confident about Svalbard. The company town model was finally dismantled as community-oriented services were separated from coal mining, and the State promoted business development and economic diversification. Tourism crystallised as a strategic business, both in terms of legislation and funding. The now foreign-owned company of Hurtigruten bought Hurtigruten Svalbard, the biggest tour operator, in 1992. Research established solid footing through the opening of The University Centre in Svalbard (UNIS) in 1993. Spirits were high even in the mining business. The Svea Nord project was launched, with the mine opening in 2001. Longyearbyen was thriving and developing fast, slowly losing some of the typical traces of a company town.

During the same period, the Russian settlements suffered severe decline. Barentsburg, peaking at more than 3,000 residents in the 1980s, fell under 300 as the state had much more urgent business to deal with in the 1990s. Many residents left in order to survive as state-paid wages suddenly became next to nothing. The "rise and fall" of Pyramiden is examined by Kavan and Halašková (2022) through the lens of the changing physical environment, based on field observations and illustrated by aerial photographs. Following population increase, infrastructure development in

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Pyramiden took place mainly in the 1970s and 1980s. With the end of the Soviet Union, the Kremlin could not afford to support both Barentsburg and Pyramiden. Sharp decline in state funding, together with a plane crash in 1996 near Longyearbyen which took the lives of 141 Arktikugol employees, led to the closure of Pyramiden in 1998 and minimisation of Barentsburg activities. Relating the development of the town to its broader geopolitical context, the collapse of the town, as well as recent ambitions to maintain activities through tourism and research, is geopolitically motivated and can be seen as indicators of Russian interests on Svalbard.

In the Norwegian settlement in the 2000s, what had started in the 1990s continued. A unique form of local democracy (Longyearbyen Lokalstyre), with numerous limitations (Brode-Roger, 2022) and without a univocal support of local inhabitants, came into being in 2002. As tourism grew more tourism workers were needed. Seasonal and part-time jobs in areas such as hotel/cleaning services, gastronomy and catering, or maritime and land-based tourist industry were – unsurprisingly – unattractive for Norwegian job applicants. Science and research, generally at unease when combined with nationalist interests, also attracted non-Norwegian scholars and students to the ever-more-cosmopolitan town. As described by Sokolíčková (2022), the texture of Longyearbyen's population changed profoundly. The level of cultural and language diversity of Longyearbyen has grown, in autumn 2021 home to about 2,400 people with passports from 58 different countries (personal communication with the local office of the Norwegian Tax Administration, 3 December 2021).

In Barentsburg, now the sole Russian representative in Svalbard, the gradual rise of the Russian economy revived local hopes for the future. With stable and even increasing state support, the company was re-established and stabilised the supply chain and employee rotation model, followed by the town modernisation process initiated in the late 2000s. Barentsburg has again become an attractive place to work and live for coal miners, especially Eastern Ukrainian ones where the economic situation continues to deteriorate.[1] The number of residents grew to almost 500, the revamping of the town outlook commenced and even Pyramiden was cautiously reactivated as a tourist destination. As Russia started to develop and modernise its Arctic strategies, Barentsburg has returned to its position of the strategically placed outpost in the western Arctic (President of Russia Decree, 2020). At the same time, research and tourism is developing. In 2014, the launch of the Russian Research Center in Svalbard was announced, putting all previously isolated Russian research projects under one umbrella and increasing state and industrial funding for "strategically placed" Arctic research in the archipelago. The development of tourism was even more impressive, with the semi-independent tourism branch of Arktikugol called Grumant effectively modernising the Soviet-style look of the town and creating dozens of service industry jobs which attracted many young, well-educated professionals. Barentsburg has ceased to be an exclusively coal-mining settlement and is moving towards the dream image of the profitable and viable (Olsen, Vlakhov & Wigger, 2022) "Modern Russian Arctic Town" (Vlakhov, 2020), though still a company one.

The deterioration of the Russia–West relations after the 2014 Crimea crisis and the Eastern Ukraine war (which affected Barentsburg considerably as most of the local miners and their families originate from the Donbass region), along with a general fall in coal prices, might lead one to the conclusion the situation in Barentsburg would once again become catastrophic. However, that was not the case. The Russian state continued to support the development of the "new Barentsburg", as the Arctic is the only international arena where Russia remained friendly with all its neighbours and continued the peaceful collaboration (Vlakhov, 2020). The Donbass miners viewed Svalbard as a safe haven during the 2014 Eastern Ukraine war – and after, too, as the mainland industries were destroyed or damaged while Arktikugol still provided competitive wages. Tours to Svalbard became increasingly popular, income from tourism (both from Russia and elsewhere) grew and the company was able to reduce coal production to an absolute minimum and focus on further tourism development. There have been some accidents briefly disrupting development (a helicopter crash in 2017 and others), plus political feuds such as the disputed visit of Dmitry Rogozin (a Russian government executive under Western sanctions) in 2015 (BBC, 2015), but the general line was unaffected – until 2022.

The Svalbard settlements are often portrayed as "communities in constant change" which is a rather accurate description of their state during the recent decades: numerous changes and initiatives were introduced and implemented both at the national and the local level, creating a unique picture of societal development in the remote Arctic territory.

The three great ruptures

In Longyearbyen, the decade of 2010s was the era of three "great ruptures". All had major impacts on life in Svalbard. In December 2015, an avalanche hit a neighbourhood, destroyed 11 houses, killed an adult and a small child. The avalanche is one of the most powerful "collective memories" related to climate change in Longyearbyen (Ylvisåker, 2020). It was a shocking and painful event, and it shook the shared feeling of being safe at home. It is still impacting safety and governance, local climate change discourse, community cohesion, visual identity of the place, focus of applied research, future urban planning and other levels (Meyer, 2022).

In the same year, SNSK admitted low coal prices were economically unsustainable. It soon became clear the era of Norwegian coal mines in Svalbard was over despite the monstrous investment in Svea Nord and the brand new mine of Lunckefjell opened in 2014. The decision to terminate coal mining and the resulting population exchange (though not de-growth) meant another major rupture. In 2016, the last operating mine was Mine 7 close to Longyearbyen. The popularity of Svalbard among international visitors steadily grew, new companies and tour operators were mushrooming, summer months started to be unbearable in Longyearbyen in terms of volume and intensity (Saville, 2022), and increasing numbers of often non-Norwegian employees signing sometimes illegal contracts contributed to a severe housing crisis culminating in 2019. The language barrier, a result of a steady flow of non-Norwegian workers combined with abolishing the offer of a public language course, contributed to deeper segregation (Sokolíčková, 2022). While the business was doing well

[1]After this article had entered the review phase, the 2022 Russia-Ukraine military conflict broke out, drastically changing the global as well as Svalbard's political landscape. These events will likely have a profound impact on Svalbard communities and their relations. Due to the still unfolding state of the events at the time of publication, as well as lack of reliable data and in-person experiences, we designate the analysis of the 2022 situation as the most urgent task for future studies.

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in terms of profit, the added local value of tourism became ambiguous.

In February 2020, just before the COVID-19 pandemic outbreak, Visit Svalbard and AECO were expecting an increase in conventional and cruise ship passengers during the summer. On March 11, the third major rupture occurred when Norway announced strict measures to prevent further spreading of the coronavirus, hitting tourism in Svalbard hardest and, due to extreme infection control measures compared to the mainland, causing the worst overall economic suffering of any area in Norway (Brode-Roger, Zhang, Meyer & Sokolíčková, 2022).

Compared to Longyearbyen, the pandemic affected Barentsburg to a lesser extent as Arktikugol was able to install and uphold the quarantine and testing system for its employees in Moscow, so the habitual personnel rotation (via charter flights every two months) remained intact. The tourism department also remained afloat, accepting as many European visitors as possible under Norway's infection control measures. This was possible because the state support of the company remained in place for strategic reasons. Local residents on social media report life in the town hardly differed from 2019. The only heavily impacted sector was research as most Russian-based researchers were unable to get to the archipelago in 2020. The invasion of Ukraine in 2022 heavily influenced both tourism and research in Barentsburg, but conclusions about long-lasting impacts cannot be drawn yet.

In 2022, several major legal adjustments to the framework in Svalbard are being negotiated. Changes are suggested centrally to legislation regulating cruise tourism, certification of guides, movement around the archipelago, education services or participation in the local democracy system. These developments point towards tightened state control. The ruptures we outlined are not the triggers of the recent developments – but are not irrelevant either, as they speeded up processes already underway.

Changing economic bases in Svalbard settlements

Longyearbyen today is at the end of the profound restructuring from an industrial to a post-industrial economy that initiated at the end of the 1980s (Arlov, 2003). A "three-pillars" strategy was decided: Longyearbyen's economy would rely on coal mining, tourism, and research and higher education (Ministry of Industry, 1990–1991). When the government opted for continued coal mining in the Svea area in 2001 a period of "new-industrialisation" began (Arlov, 2003). At the peak, nearly 400 people were employed in Svea, a mining camp approx. 50 km south of Longyearbyen, which workers commuted to by airplane from Longyearbyen. After more than a decade of high production, operations were put on hold in 2015 and 2016 due to low coal prices. In 2017, the government announced a cease to all coal mining at Svea, and it was to be "rehabilitated" to its original state (Vindal Ødegaard, 2021). All infrastructure and waste shall be removed by 2025 (except for structures dating back to before 1946 and thus protected as cultural heritage). The project is financed with 1.8 billion NOK in the state budget and presented as "one of the most ambitious environmental projects in Norway" (Store Norske, 2020a).

Today, Mine 7 near Longyearbyen and the Barentsburg mine are the two last ones operating in Svalbard (there are none in mainland Norway). Mine 7 is operated by Store Norske and employed 48 persons in 2020 (Store Norske, 2020b). It produces coal on two shifts year-round. In 2020, approximately 40% of the coal was sold to the coal-driven power plant in Longyearbyen, and the rest exported to Europe as metallurgical coal (ibid.). In early 2021, the public was informed of the government's decision to close down within a few years. There is currently no new long-term energy solution for Longyearbyen, but many stakeholders – including Longyearbyen Lokalstyre and Store Norske – are investing in finding one soon. As a result of the elimination of coal mining, Store Norske itself is being restructured. The state-owned company has lost its original position as the defining institution in Longyearbyen but intends to remain a central player. It sees its future in the realms of property (see the purchase of large property owned by the biggest tour operator, Hurtigruten Svalbard, in 2021), logistics, energy and infrastructure, and cultural heritage/tourism.

The Russian case has largely followed the Norwegian path, though the change had not started before the fall of the Soviet Union. After the closure of Pyramiden in 1998, the Barentsburg mine, designed to operate at 350,000 tons of coal per year, has constantly decreased production and is currently operating at its minimum capacity of 120,000 tons (Government of Russia Decree, 2014). Most is used at the local power station and the rest sold to Russia. Current coal reserves will be enough to continue production until 2030 (Government of Russia Decree, 2014). But the company has no immediate plans of closing the mine as the Russian presence in Svalbard must be maintained and bringing fuel from the mainland is not considered an option. The company has been developing tourism and related industries and allowing more space for research activities, but preserving its key role for the town (Schennerlein, 2021). This is in contrast to Longyearbyen where private enterprises were allowed into the market. Arktikugol is not independent in its decisions and must follow the government strategy.

The closure of Svea Nord and Lunckefjell, as well as the announced closure of Mine 7, is strongly contested locally. There is a widespread feeling among Longyearbyen residents – especially among those who work or worked in the mining industry – it was a decision made from far away, on a too-thin knowledge base, and without a proper strategy for what was to come after. The closure of the mines is viewed as the end of a perceived "hjørnesteinsbedrift", a company of vital importance for the provision of jobs. Many believe sole dependence on non-industrial sectors creates a synthetic society and economic uncertainties, an argument that became louder during the pandemic when the vulnerability of tourism became visible. The closure is furthermore often perceived as failed symbolic politics. In 2017 and 2018, the government's main argument locally in Longyearbyen was that continued operation in Svea was not profitable. Today it is mainly presented and read as an environmentally motivated move: a state that presents itself as a "climate nation" cannot support coal mining in the high Arctic. The closure of the mines is also interpreted by some as a strategy for preventing other nations from developing coal mining in Svalbard. These criticisms are not undisputed. They reflect a local identity strongly rooted in mining, but an identity changing concurrently with the economic changes. Similarly, though not identically, in Barentsburg the old "mining elite" has been strongly opposing the latest turn towards tourism since 2013. However, as the role of tourism has grown and most social services were subordinated to the tourism department, greatly improving the quality of life in the town, the two "parties" grew more friendly and recognised each other's usefulness to the community.

To study how these socio-economic transitions are embodied and perceived by local residents remains a major task for social science research on Svalbard. Olsen, Vlakhov and Wigger (2022)

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explore Barentsburg and Longyearbyen residents' perceptions of socio-economic transition, framing their analysis in the concept of community viability. The article is the first in the field to compare the perspectives of the inhabitants of these very different settlements going through similar transitions. They find that the transition is being perceived as happening at a much faster pace in Longyearbyen, and that tourism development is a controversial topic in both settlements. Drawing on rich qualitative material they describe and analyse how socio-economic transitions impact economy and community, highlighting environmental and social dilemmas emerging through the transitions. Through the eyes of the locals they show how the socio-economic transition alters community dynamics, restructures social relationships and changes the sense of being local.

Tourism has existed in Svalbard since the archipelago was documented (Viken & Jørgensen, 1998), but the current scale of tourism would not be thinkable without government support. As the industry that employs most people (Ministry of Trade, Industry and Fisheries, 2019), it constitutes a major agent of the current transformations (Olsen, Hovelsrud & Kaltenborn, 2020). Dependence on global mobility is key not only for businesses such as hotels or tour operators but also for services such as bars, restaurants and shops. Most other economic activities such as research and education, local governance, coal mining and some segments of the building industry need support from public finance. Tourism, on the contrary, is not viable without economic revenues. As analysed by Saville (2022), Longyearbyen has transitioned from a mining town to a tourist destination. Saville traces both changes and continuities in this transition and narrates the experienced changes from the perspectives of involved actors. Applying a values-based analysis, asking what is perceived as important, she shows how tourism is perceived to offer both opportunities and services, contributing to a vibrant, cosmopolitan society, and at the same time challenges sovereignty agendas, community relations and comes with environmental dilemmas. As a response to perceived negative impacts and indicators of overtourism in the years before the pandemic, the Norwegian state and local tourist actors are now making efforts to increasingly manage tourism (ibid.). As the pandemic has moved into its third year, increasing environmental regulations is being put into place and governmental support is directed towards other economic activities. One could argue that Longyearbyen today is not a fully-fledged "tourist town" any longer. The dilemmas this industry presents to tourist actors and Svalbard inhabitants, however, remain.

As shown by Hovelsrud, Veland, Kaltenborn, Olsen & Dannevig (2021), a major challenge facing the tourist industry on Svalbard is to navigate between economic growth and environmental governance. Local tourist actors must play a "balancing act" among diverse and often competing demands of climate change mitigation, environmental management policy and demands for increased tourism. In their commentary, they introduce a methodology and theoretical framework for studying this dilemma and argue for co-creation between industry and academia to foster business sustainability.

Andersen (2022) approaches the same dilemma between mass tourism and environmental concerns, from the viewpoint of Svalbard guides. Drawing on ethnographic fieldwork she describes how they deal with the paradox of working in an industry that threatens the environment they care for so deeply. By engaging the theoretical concepts of negotiation of everyday practices and reciprocity she applies a fruitful approach to the anthropological study of human–environment relations and shows how the guides balance caring for the environment against the dilemma of working in tourism.

As argued by Kotašková (2022), Svalbard's transition from coal mining to a (nature-based) tourism destination also manifests materially, as mining remnants become cultural heritage and part of the environment that tourists seek to experience. Drawing on rich ethnographic material from guided tours and applying a relational approach where both humans and non-humans are seen as constituting reality, Kotašková shows how mining remnants both act as materialisations and agents of the socio-economic changes Svalbard is currently undergoing. Through their status as cultural heritage, on guided tours, and through the agency of the objects themselves, the mining objects become "naturalised" and thus an integral part and constituent of the wilderness imaginary of Svalbard.

Research and education were presented early in tandem as the third pillar of Svalbard's economy, but recently have become separate pillars (Hovelsrud et al., 2020). The Norwegian state invests heavily in this sector, which it considers an important "tool" for its Svalbard policy (Misund, 2017). The development of UNIS as a "Norwegian pillar in Svalbard" (Misund et al., 2017) is telling in this regard. As shown by Pedersen (2021), the same motive can be identified behind some other states' research presence on Svalbard, who employ "national posturing" to signal their foothold in the Arctic region.

Locally a society based mainly on research and education is not seen as a sustainable foundation for the future, even though scientific and educational activities play a major role in the present and likely in the future of Svalbard. Coal mining is doomed to cease within about three years, research and education is dependent on public funding and it will take several years before tourism is back on the pre-pandemic level (in the light of the newly suggested regulations and the 2022 events, it may never reach the previous intensity). While research and education employment has been stable or slightly increased since 2020, employment in mining decreased further, and employment in tourism and services decreased significantly (from about 600 full-time equivalents (FTE) to 370 FTEs within two years, Statistics Norway, 2021). It is also the sectors of public administration (both local and governmental) and satellite communication that employ large segments in the population, and the number of jobs available in public administration has surpassed jobs in mining.

Even if public administration keeps hypertrophying, other types of economic activity are desirable and the near future will show which of the potential or recently initiated projects will succeed. Planned investments into green energy solutions might be a hint the Norwegian state would like to turn Svalbard into a "testination", a showcase of innovative sustainable technologies saleable worldwide. Shipping, climate change adaptation technology or satellite technology might also belong to fast-developing businesses.

Changing demographics and social structures in Svalbard settlements

As several of the contributions show, the described economic changes are accompanied by profound social changes in Svalbard settlements. Olsen, Vlakhov and Wigger explore Barentsburg and Longyearbyen residents' perceptions of economic transition. They highlight environmental and social dilemmas emerging through the transition and show how the

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community dynamics and the sense of being local have changed as a result. Sokolíčková shows how increased transience, lack of continuity and weakened social cohesion further impact Longyearbyen's potential for "communitification". Middleton examines the availability of demographic and socio-economic data indicating socio-economic changes in Norwegian and Russian settlements in the archipelago. She finds that whereas there exist detailed data on demographics and economy for the Norwegian settlements, little data are available for Barentsburg and Pyramiden, creating a knowledge gap concerning current socio-economic processes and transformations in the Russian settlements.

To understand the scale and depth of change in Svalbard, we include a rather detailed overview of demographic and social trends in both settlements. Statistical data are a prerequisite for adequately assessing the impacts of the socio-economic transitions on Svalbard. In Longyearbyen, the population has constantly increased despite the governmental wish to flatten the curve, repeated for several decades in the White Papers on Svalbard. Pedersen (2017) frames the tendency – especially when it comes to increased migration from other countries than Norway – as a security threat for Norway's absolute sovereignty over Svalbard. Our collection includes a different perspective, from within through an ethnographic insight (Brode-Roger, 2022; Sokolíčková, 2022). On 31 August 2020, 2,354 residents were in the Norwegian Tax Administration register. These numbers only have a limited information value as there are strong incentives for registering at the tax office when moving to Svalbard, but not for de-registering when leaving or moving internally. A total of 1,495, or 63.5%, were citizens of Norway. The three biggest national minorities are Thai (137 people, 9%), Swedes (108 people, 7%) and Filipinxs (100 people, 7%). Over 50% of households consist of one person, 74% have one or two members. The turnover is high; 43% of the residents stay less than two years and 64% less than five. Since 2009, three quarters of the newcomers are women. The gender ratio is about 53% men and 47% women. The population is very young, with about half of the people aged 20–44, almost 400 children and only few elderly (Statistics Norway, 2021). The changing social structure in Longyearbyen is best characterised as a highly international, heterogeneous and liquid community consisting of many living on their own, some couples and some families.

During the company town times, the community mainly consisted of Norwegian young males (Evjen, 1996). The normalisation politics of the 1970s and 1980s were successful, with Longyearbyen having a fair share of women and children in the 1990s (Arlov, 2003). While the newly installed "family community" mostly consisted of Norwegian citizens, of which 41% were from northern Norway in 2009, the share of international residents in Longyearbyen grew rapidly in the 2010s, reached 37% in 2020 and went down to 35% in 2021 (Statistics Norway, 2021). The current changing social structure is an outcome of the fundamental economic restructuring in combination with structural factors related to the Svalbard Treaty, as well as globalisation processes. Coal mining employed mostly Norwegians; tourism, research and education are international arenas. The Svalbard Treaty grants citizens of the signatory countries equal access to the island and right to engage in commercial activities outlined by the Treaty. Furthermore, Svalbard is not part of the Schengen Area and regular visa requirements do not apply. Combined with a booming tourism and service industry, Longyearbyen is an attractive destination for international migrants.

Several tensions arise alongside changing demographics. The main objective of the State is to maintain a "robust, Norwegian family society" (Ministry of Trade, Industry and Fisheries, 2019, p. 18). The numbers presented above and some of the collection's contributions show these traits are not what actually characterises the town. Another official strategy is not to turn Longyearbyen into a lifespan society for economic and political reasons. There is limited access to health care, social services and education, and the legal landscape (e.g. properly regulating work contracts) does not cover the needs of a diverse community. Legislation affecting Svalbard is complex, there is a perceived lack of information about the rules and pitfalls and most of the information is only accessible in Norwegian. The pandemic has exacerbated existing vulnerabilities and there is an increased focus on Norwegianness. Simultaneously, central and local governments are making attempts at clarifying responsibilities and demarcating terrain through new regulations and laws.

In Barentsburg, after the drastic depopulation in the 1990s, the current number of residents is more or less what the current minimal levels of coal extraction require. It is often quoted (e.g. reported by Portsel (2011) and numerous Arktikugol officials; however, no credible and open statistical reports seem to have been preserved) that more than 2,000 people used to live in each Russian-speaking settlement – Barentsburg and Pyramiden – at the peak of the Soviet Svalbard era, namely in the mid-1980s before Perestroika started. The latest 2021 data (Statistics Norway, 2021) list 378 residents in Barentsburg and Pyramiden, but the numbers fluctuate semi-annually by several dozen due to seasonal workers' inflow in the summer (tourism- and research-related) and the annual leave roster peaking during winter. There are no detailed statistics publicly available through Norwegian Statistical Bureau or Arktikugol (Middleton, 2022), but our unofficial inquiries in Barentsburg suggest such estimates are accurate – though some groups residing in Barentsburg for a considerable amount of time are not registered and therefore not covered by official statistics, such as trainee students in research labs and seasonal construction workers of Tajik nationality. This means the actual pre-pandemic number of Barentsburg residents is somewhat higher – roughly 500 during off-peak season and 550 during summer.

It should also be noted several Arktikugol employees live in Pyramiden, often – and incorrectly – called a ghost town. Pyramiden is an increasingly popular tourist destination, a "sanctuary of the Soviet 1970s where the time has stopped" (Grumant, 2020), and personnel are stationed to keep the abandoned town habitable and provide tourism services. During the peak weeks of the summer season, about 30 staff members reside in Pyramiden, while the winter numbers are five to seven. In this article, all residents of two Russian towns are counted as a whole. Most Barentsburg residents are employed by Artikugol. However, the number of people working in the underground mine is low, totalling around 100 and constantly decreasing as operations function at a minimum. The rest of the Arktikugol staff work at mine support and town facilities, management, service industries and the tourism department. In sharp contrast to Longyearbyen, the town remains a company one to a high degree: only the Russian consulate (around 10 people) and the research stations (around 20 permanent residents, plus seasonal visitors) are alternative employers. However, Trust Arktikugol strives to preserve the full range of social services inherited from the Soviet "showcase" model (school, canteen, stores, hospital, sports hall, etc., plus a range of tourism attractions such as two restaurants with a brewery, museums and kennels). The diverse employment range for a small

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company town puts it into a separate category rarely found elsewhere (Vlakhov, 2020).

The social structure of the community is typologically similar to Longyearbyen. The official policy of Arktikugol is – and has been since the Soviet times – to employ staff on a short-term basis, usually between one and three years. To secure constant rotation of the staff, an intricate wage payment system is used which makes it financially impractical to stay in Barentsburg after several years. This "come at will, but go away before long" system has been heavily criticised as many residents grow fond of the place, developing an articulated form of local identity (Olsen, Vlakhov & Wigger, 2022). As a result, some jobs requiring a strong sense of place, first of all tourism-related positions, as well as top management positions, are now specifically encouraged to last longer in order for employees to develop this looked-for local identity.

The national composition of Barentsburg does not reflect its "Russian" status as the majority (about three quarters) of the local residents hold Ukrainian passports, other groups being Russians, Armenians, Tajiks and sporadic representatives of other post-Soviet nations. However, the town is still universally perceived as Russian both because the company is run by the Russian government and headquartered in Moscow and because the top positions in mine management and tourism development are filled by Russian nationals. In addition, eastern Ukraine, particularly the Donbass region where most Barentsburg residents originate (being a traditional point of origin due to technical similarity of mines), has been strongly pro-Russian since the fall of the Soviet Union. Nearly everyone in the town speaks Russian and identifies as Russian, which effectively prevents ethnic conflict,[2] binds the community together and counterposes it to Longyearbyen, which is consequently perceived as a foreign land and not a true neighbour (Vlakhov, 2019).

As for gender and age composition, the Barentsburg community is by no means a natural one. The majority of local residents are male, totalling up to 80% of the local population (compared to 54% in Longyearbyen and Ny-Ålesund, where gender balance is recently being achieved); this stems from Russian federal regulations which, until very recently, prohibited female work in "dangerous sectors" such as mining. Traditionally, most women living in the town used to work in the service sector (cooking, cleaning, etc.) and accompany their husbands. In recent years, changes have come as tourism and research development has brought more female professionals to the town, but Barentsburg remains a heavily male-dominated place.

The age groups are also distributed unevenly. About 50 children live in the town, provided with day care and school services, but the 18–25 age group is virtually nonexistent as school graduates go to the mainland to continue their education. By contrast, people aged 25–35 are numerous in mining, tourism and research as the company strives to decrease the median age of the town residents for pragmatic reasons (lower wages and higher productivity). The older cohorts are represented in management and high-responsibility positions, with people over 65 also virtually absent from population structure ("forced retirement" as it is called locally).

As for Barentsburg, the community's search for agency and development into a stable, permanent settlement is crucial on this stage, with Longyearbyen-like issues likely to follow. It should also be noted that, very similar to Longyearbyen's "Svalbardbasillen" (Heiene, 2009), a "Polar Virus" phenomenon is well known in Barentsburg, when a person comes to town, then leaves it – seemingly for good – and returns later for another round "unable to live away from this place". In some cases, many years can pass before they return (e.g. there are people in Barentsburg who were originally based in Pyramiden in early 1990s), and most illustrious veterans (10–20 years spent in Svalbard) usually follow this path.

Many of the problems and frictions mentioned above were widely known before the coronavirus pandemic, but some of the vulnerabilities became even more apparent and urgent after the lockdown of Norway, paralysing Svalbard in March 2020. Addressing the unresolved flaws of how Svalbard communities are currently sustaining themselves economically, how they are governed and how social impacts of environmental and economic change are being handled belongs to the ambitious goals of our collection of articles.

Changing climate and human–environment relations

In addition to the described economic and social transitions, the natural environment on Svalbard is changing, affecting its communities (Hovelsrud et al., 2020; Norsk Klimaservicesenter, 2019). As emphasised by several articles in this collection, human settlements and activities on Svalbard present several environmental paradoxes (Andersen, 2022; Hovelsrud et al., 2021; Saville, 2022). For one, human life in Svalbard can per se be seen as environmentally unsustainable. Due to several factors – such as remoteness, which demands all resources and people to be flown in, harsh climate, coal-fired energy plants and ships running on heavy fuel oil – residents and tourists have an extremely high carbon footprint. Furthermore, coal mining in a region at the forefront of climate change is a (seeming) paradox and Longyearbyen is often represented as a contradictory town in this regard (Deiller, 2016). However, locally, this interpretation is contested since coal is a local resource and predominantly used in industry. Lastly, the decision to foster tourism in a vulnerable environment that is supposed to be protected is a challenging "balancing act", as described by Hovelsrud et al. (2021). People in Svalbard are thus well aware of these dilemmas, but they are perceived in a variety of ways and people have diverse ways of dealing with them.

The same goes for climate change, which is particularly pronounced in the archipelago. Svalbard has experienced a remarkable rise in annual mean temperatures: from 1971 to 2017 a warming of 3–5°C was observed (Hanssen-Bauer et al., 2019). There is an increase in precipitation and extreme weather events, and scientists project a warmer and wetter climate in the future (ibid.). While an abundant amount of research related to the Svalbard climate and environment documents the far-reaching environmental impacts of these changes – including the reduction of glaciers, flooding, thawing permafrost, landslides, coastal erosion and reduced sea ice – research on its societal impacts is scarce. As elaborated by Ezau and Miles (2022), Longyearbyen is already affected by environmental changes triggered by climate change, which poses both challenges and opportunities. The authors provide a detailed description of local climate change impacts on Longyearbyen and link them to current economic changes in the settlement. Discussing the implications of climate change for potential economic pathways and sustainable development, they argue that climate change influences economic diversification and ultimately impacts Longyearbyen's transition towards a more sustainable and resilient development.

For local inhabitants, the changing climate creates a sense of uncertainty, unpredictability and risk. People report knowledge

[2]Tracing attitude dynamics in light of the 2022 events is one of the most pressing research tasks as no clear future development scenarios can be suggested at this stage.

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that was once considered sound has become unreliable, and areas once considered safe are risky now. However, though many are concerned about the environment and how it changes, we do not find climate change substantially challenges peoples' day-to-day lives. Other social and economic issues are often perceived as more pressing locally. As described by Meyer (2022), climate change adaptation has been high on the local agenda in Longyearbyen, especially after the avalanches in 2015 and 2017. According to Meyer, climate change adaptation in Longyearbyen is approached as a technical solution to physical problems, considered a responsibility of the local authorities and the state, and adaptation measures are seen as a task for experts.

Climate change and the Anthropocene more broadly also urge us to rethink modern conceptions of human–environment relations, and several authors in this collection of articles contribute exciting perspectives from Svalbard to these debates. The Arctic is often portrayed as vulnerable human-less wilderness and climate change victim (Brode-Roger, 2021), and Svalbard is no exception. By applying a geo-aesthetical approach, La Cour (2023) shows how different representational discourses produce certain imaginaries and landscapes. Shifting the focus from representation to mediation, however, she argues that Svalbard also can contribute to new imaginaries of the Arctic as multifaceted, historised, cultured and peopled, and that the Svalbard guide plays a crucial role as mediating figure of changing versions of the archipelago.

As a response to an elevated pressure on the Svalbard environment, the frameworks for managing it (Saville, 2019) are currently being revised and tightened (Kaltenborn et al., 2019). The Svalbard Treaty obliges Norway to preserve the natural environment of the archipelago. The "conservation and protection of Svalbard's natural environment" is one of the main goals of Norway's Svalbard policies (Ministry of Justice and Public Security, 2015–2016), which furthermore state Svalbard shall be "one of the world's best-managed wilderness areas" (Ministry of Justice and Public Security, 2015–2016). During the past two years, the government has announced the development of several management and protection plans for different parts of Spitsbergen, potential limitations of the size of vessels in certain areas, extending the heavy-fuel ban and evaluating requirements for certification of guides. The government also announced in 2020 environmental regulations for the archipelago as well as regulations relating to tourism were to be revised, a process with far-reaching consequences in terms of access to certain areas and motorised traffic. While the government stresses the rationale is increased pressure on Svalbard's nature and cultural heritage due to climate change and increasing traffic (Regjeringen.no, 2020), these are also signs of strengthening state control over Svalbard. Locally these developments stir concern, not only for tourist operators who depend on access to wilderness areas but also for residents whose mobility by motorised vehicles (snowmobiles and boat) is a prerequisite for outdoor life, which for many constitutes an important factor for well-being and motivation to live in Svalbard.

The Russian-speaking community is in sharp contrast to the Norwegian one on environment-related issues. Environmental discourse in Russia and many other post-Soviet societies is virtually nonexistent (Kaltenborn et al., 2019), meaning climate change, ocean pollution and other issues are neither discussed nor even conceptualised by Barentsburg residents, most of them coming from places far from the Arctic and its environmental problems. This makes it hard to compare Longyearbyen and Barentsburg as most of the latter's residents "do not think that way", as put by some of them. Only the most practical issues with visible effects are perceived and discussed there, such as waste separation (copied from Longyearbyen) and clean-ups of Soviet-era waste deposits attempted since 2018. The Russian community, receiving Norwegian policies in form of final legislation and obliged to adhere to it (e.g. limited use of helicopters, fishing licences, heritage infrastructure protection, etc.), is often displeased with this lack of agency and therefore criticises the "fuss about environment", even if agreeing with the core idea of resisting climate change and protecting Arctic nature. However, practical environmental regulations (such as waste separation) are strictly followed in order not to cause an international conflict. This situation is nevertheless slowly changing and environmental issues are gaining wider recognition in the Russian public discourse. It should be noted Barentsburg is located much more conveniently than Longyearbyen with regard to dangers such as avalanches and there are really no urgent environment-related issues there, but the next line of problems (such as water security and coal dust management) can become urgent rather quickly.

Disasters, and how they are handled, are crucial for understanding human–environment relations in the Anthropocene. Duda et al. (2022) show that studying how communities deal with disasters also provides insights into cooperation between Russian and Norwegian settlements. They examine Barentsburg residents' disaster risk perceptions and find they generally consider the settlement safe and have a high trust in existing multinational (Norwegian and Russian) disaster risk reduction and response (DRR/R). The authors conclude that informal actors and relationships play a key role in DRR/R on Svalbard, indicating a potential for international cooperation. Their findings confirm some of the conclusions by Tiller, Ross and Nyman (2022) but are novel in their focus on informality and comparison between the two settlements.

Looking beyond physical climate change as an idea and a discourse (Hulme, 2009; Rudiak-Gould, 2011) is a phenomenon worth studying in Svalbard. The archipelago is a centre of attention in global climate change discourse, attracting journalists, scientists and visitors who wish to witness and document these changes. We argue this also influences the perception and salience of the issue locally. Comparing Longyearbyen and Barentsburg, it is striking that climate change receives such different attention in two locations experiencing the same physical processes. Certainly, this can to some extent be explained by varying physical conditions (location of the towns, building traditions, etc.), but we argue the climate change discourse very much shapes peoples' perceptions of these changes and their impacts. Especially, in Longyearbyen, the discourse of societal impacts of climate change – and declared environmental consciousness combined with ambitious plans regarding reduction of emissions and readiness to invest into infrastructure mitigating climate change impacts – is prominent. In signals sent from the central government, strategies developed by local authorities and in the media it is not rare climate change dominates where our participants hardly ever believe it is the true cause or driver of the developments. Environmental concern, seemingly apolitical, seems to be an easy pick when further measures designed to tighten control over what is happening in Svalbard need to be introduced, for example, when it comes to housing (be it demolition or ceased use of existing houses, avalanche protection or building new residences). Environmental changes and related discourses and policies are likely to be a main driver of future developments in the archipelago, developments

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triggered by global changes and supralocal discourses impacting on the local level.

Conclusion

Our collection of articles covering a wide range of issues discusses a changing Svalbard from different perspectives. In this introductory article, we commented on multilayered changes, including on a global and supralocal scale, impacting life in the archipelago. All these processes are of anthropogenic nature, but their scope, scale and speed differ. Even though their local impacts and responses are particular, the changes we observe in Svalbard reflect changes and related challenges observed elsewhere in the Arctic and beyond. Svalbard is a "small place" where the "large issues" (Eriksen, 2015) of globalisation and climate change are particularly pronounced (and co-produced).

Climate change impacts locally in terms of lower level of predictability and higher level of risk. The range of environmental dilemmas spans from striving for sustainable tourism through responsible use of nature to low-carbon energy production. The pandemic has altered an already fast-changing economy and population in Longyearbyen, and although locally things seem to be slowly returning to normal, the long-term effects remain to be seen. The potential for population growth and diversification in Svalbard settlements clashes with the instrumental value they have for nations interested in exercising power in the Arctic, resulting in what is locally felt as a tightening grip of the Norwegian government. State attempts to regain partially lost control over economic, social and environmental developments and changes include efforts to limit access to nature, set strict rules for economic activities, safeguard the dominance of the Norwegian population, foster mechanisms encouraging regular turnover and minimise local decision-making. These developments in Longyearbyen noticeable since 2020 indicate a shift from a previously company town through a "tourist town" (Saville, 2022) to a "state town" (Haugli, 2021). Similar developments can be observed in the Russian community recently, such as changes in tourism management and plans for further natural resource exploitation instead of post-industrial transition. In this respect, Svalbard is a locale where the move towards a post-industrial future entails also increasing importance of state and public sector and ultimately defines the transition(s), with local populations rather disempowered to be part of shaping the desired future(s).

The aim of the collection of articles was to map the territory of a rapidly changing Svalbard and its intertwined layers. Contributions included in the collection cover different areas unevenly. Most attention is paid to the socio-economic change and its implications for local populations (in the contributions of Olsen et al., Sokolíčková and Middleton), including changing perception of identity of place (Brode-Roger). Access to reliable and accurate statistical data about trends underway in all Svalbard settlements is a clear need. Most researched are processes and challenges related to tourism, with a wide range of issues including value creation, human–environment relations, environmental dilemmas and balancing sometimes contradictory trends, with tourism stakeholders and guides as the most present voices (in the contributions of Saville, Kotašková, Andersen, Hovelsrud et al. and La Cour). Environmental issues and their perception evolving in time are analysed by Kavan and Halašková, Ezau et al. and Meyer. One contribution looks into the issue of security and risk perception (Duda et al.). More insights into how risk and security are lived from within are necessary, especially in the light of both growing geopolitical tensions (in the Arctic and in Norway–Russia relations), and further impacting climate change. Although this collection does include valuable perspectives from the Russian settlements on Svalbard (in the contributions of Olsen et al., Duda et al. and Kavan & Halašková), there is still a bias in Svalbard social science to focus on Longyearbyen. Our collection is also missing a contribution unpacking knowledge production in Svalbard. Building on existing knowledge (Hacquebord & Avango, 2009; Misund, 2017; Roberts & Paglia, 2016; Pedersen, 2021; Viken, 2011), we encourage our colleagues to pay closer attention to the realm of science and make the contribution of social science for the understanding of scientific endeavours in Svalbard more visible. The concluding commentary by Albert traces common threads and explores the thematic and epistemological landscapes of current social science, humanities and arts research focusing on Svalbard.

Understanding better the future path of Svalbard has a deeper value than knowledge about one particular locale. Climate change solutions and adaptation, greener business models, politics of power, state control and national interests will remain high on the agenda. Changes and transitions also hold potential for transformation. In Svalbard settlements, the ongoing changes are accompanied by a variety of visions and actions aimed at transforming into more environmentally, socially and economically sustainable communities. Our collection unpacks tensions, clashes and dilemmas accompanying these transformations stretching in time, which is necessary if the trends are to be understood and shaped further in desirable directions.

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Changing Svalbard: Tracing interrelated socio-economic and environmental change in remote Arctic settlements – CORRIGENDUM

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Publication II: Urban Development in Longyearbyen, Svalbard: Dealing with Local Challenges in a Town that Serves as a Tool for Svalbard Policies

PART II:
ASSESSING SUSTAINABILITY – SHAPING ENVIRONMENTS

Urban Development in Longyearbyen, Svalbard

Dealing with Local Challenges in a Town that Serves as a Tool for Svalbard Policies

Alexandra Meyer

Introduction

"Should people really be living on Svalbard? It is directly unnatural that people live on Svalbard" (Arlov 2001a: 11, translation by the author), a prominent historian of the archipelago has noted. Taking into consideration that Svalbard is a previously uninhabited, remote archipelago characterized as Arctic desert, situated roughly halfway between the Norwegian mainland and the North Pole, the question seems legitimate. Longyearbyen, Svalbard's largest settlement, can be characterized as "a community in constant transition" (Grydehøj et al. 2012: 104). Established as a coal mining camp, it developed into a mono-industrial company town, was then transformed into a "normal" Norwegian family town. Today it is often characterized as a "small metropolis," undergoing profound structural change as its mining industry is replaced by tourism and research/education, with an increasingly international population.

Arlov goes on: "Even in downtown Longyearbyen the winter storms remind us that people only live [on Svalbard] because Norwegian and Russian authorities want them to" (Arlov 2001a: 11). Whereas economic interests played a decisive role in the establishment of Longyearbyen, its development and maintenance are a direct result of Norwegian political interests on Svalbard (Avango et al. 2011). A main objective of Norway's Svalbard policies has been and continues to be to ensure a permanent Norwegian settlement on

Svalbard in order to legitimize sovereignty over the archipelago, an effort which is reinforced by Russian presence on Svalbard (Grydehøj et al. 2012; Ministry of Justice and the Police 1974–1975; Ministry of Justice and Public Security 2015–2016; Pedersen 2017). Throughout most of the twentieth century, this policy resulted in state support of the mining industry in order to sustain a viable Longyearbyen (Avango et al. 2011: 36). Today, the Norwegian government facilitates tourism and invests heavily in research and higher education on Svalbard for the same political reasons (Misund 2017). Longyearbyen itself thus becomes a "tool of diplomacy" (Hacquebord and Avango 2009: 36), an upholder of Norwegian presence on Svalbard.

Longyearbyen is furthermore a town impacted by climate change and undergoing profound structural change which both alters its social pattern and its identity. In this chapter, I examine urban development in Longyearbyen and discuss challenges to urban planning and development due to the combined impacts of globalization and climate change. How did urban planning develop and what are the frameworks for urban planning and development today? To what extent is planning determined by national Svalbard policies and to what extent does it attend to local needs and allow for participation? In a town profoundly impacted by climate change and undergoing economic, social, and cultural changes at high speed, what are the main issues in urban development and planning today? This article draws on existing literature, policy and planning documents, as well as ethnographic fieldwork in Longyearbyen, including numerous semi-structured and narrative interviews and participant observation. It is particularly based on eight semi-structured interviews conducted in 2018 and 2019 with planners and other employees of the local government, *Longyearbyen Lokalstyre*. It furthermore draws on focus groups conducted in 2020 as part of the project "Rett Plass Rett Form"[1] by the local architecture bureau *LPO Arkitekter*, in collaboration with the *Svalbard Social Science Initiative*[2].

Historical Developments

Svalbard never had an Indigenous population and was internationally recognized as *terra nullius* until the signing of the Svalbard Treaty in 1920. After its discovery by the Dutch explorer Willem Barents in 1595, different nations pursued both economic and political interests on the archipelago, which attracted whalers, hunters, tourists, and scientists (Avango et al. 2011). It was not until the development of coal mining at the turn of the last century that permanent settlements were established on Svalbard. Longyearbyen was established as a coal mining camp by the American businessman John Mun-

[1] https://lpo.no/prosjekter/rett-plass-rett-form
[2] https://svalbardsocialscience.com

ro Longyear in 1905; its location was determined entirely by the presence of coal deposits (Reymert 2013: 4, 8). In 1916, the mine and the adjacent camp were bought by a Norwegian syndicate that founded the corporation *Store Norske Spitsbergen Kulkompani AS* (Arlov 2003: 265).

Norway was granted sovereignty over Svalbard in 1920 with the signing of the Svalbard Treaty. In the following decades, Russia and Norway were the two actors left investing in industrial activities and settlements on Svalbard (Arlov 2003: 455; Tamnes 1991: 33–40). During those years, the physical infrastructure of Longyearbyen became more and more permanent. After World War II, Norway developed its Svalbard policies, a central element of which is the maintenance of a permanent Norwegian settlement on Svalbard for legitimizing sovereignty.

From its establishment until the mid-1970s, Longyearbyen can be characterized as a "company town" (Evjen 1996; 2001): "a settlement built and operated by a single business enterprise" (Garner 1992: 3), in this case *Store Norske*. It was a community intended for coal production (Arlov 2003: 359–372; Evjen 1996; 2001). The population consisted mainly of young Norwegian males whose families remained on the mainland and who came to Svalbard for seasonal work in the mines (Arlov 2003: 259–362). The coal industry thus directed urban development, and living conditions and welfare came second (Arlov 2003: 363–365; Arlov 2008: 18; Svendsen 2001: 148). The built environment was mostly provisional and not constructed with the aim of sustaining a long-term community. *Store Norske* was responsible for the planning and building, operation and maintenance of all buildings and infrastructure in town (Reymert 2013: 10).

After World War II, community and urban development in Longyearbyen was rather slow and determined by *Store Norske*'s needs and economic abilities (Arlov 2003: 365). This changed drastically in the 1970s (Arlov 2001b; 2003: 374–379; 2008: 19–20). During the Cold War, the presence of the Russians on Svalbard reinforced the need to constantly legitimate Norwegian sovereignty, resulting in increased state investments in Longyearbyen during the 1960s and 1970s (Arlov 2003: 378). As the European coal industry entered into a crisis in the 1960s, Norwegian mining on Svalbard could only be maintained through massive state support (Arlov 2001b: 31; 2003: 456). As a result, the state became more active in community development in Longyearbyen (Arlov 2008: 19). In the 1970s, the Norwegian state decided to leave the company town model behind and transform Longyearbyen into a "normal" town (Arlov 2003: 361; Ministry of Justice and the Police 1974–1975), consisting of families and with an adequate social infrastructure including school and health care. *Store Norske* was nationalized and state investments in infrastructure development in Longyearbyen increased drastically (Arlov 2008: 20). *Svalbardrådet*, the Local Svalbard Council, was established in 1971 and the local inhabitants obtained a – however limited –

say in the development of the community. The development of Longyearbyen as a family society is clearly reflected in the built environment of the town (Brekke 2001: 73). Family dwellings were built (Seltveit 2001: 81) and the school and kindergarten were expanded. Interior architect Grete Smedal was invited to design the coloring of the new houses (Brekke 2001), and the "Longyearby-pallet" can be seen as a first sign of urbanism in town. Throughout the 1980s a defined city center developed (Arlov 2001b: 35).

Societal Transformations and the Institutionalization of Urban Planning and Development

The politics of the 1970s laid the foundations for even greater transformations during the 1990s, the years of Longyearbyen's "modern breakthrough" (Arlov 2019). At the end of the 1980s, it became obvious that the mining industry, now largely dependent on governmental funding with grim future prospects, could no longer stand as a guarantor for Norwegian presence on Svalbard (Arlov 2003: 457). The state hence decided to facilitate the diversification of the economy, and defined tourism, research and higher education as the main future economic pillars in Longyearbyen, in addition to coal mining (Ministry of Industry 1990–1991). Simultaneously, there was a pressure to reduce the state funding of *Store Norske* (Arlov 2003: 456–457; Solend 2001: 41). The solution was to reorganize *Store Norske* into three sections: coal mining, business development, and societal services. The latter, *Svalbard Samfunnsdrift*, was established in 1989 and became responsible for the provision of societal services and the development and maintenance of infrastructure in town. It was organized as a corporation selling services and a fully owned daughter company of *Store Norske*, ensuring the company's continued control over large parts of urban development in Longyearbyen. Local inhabitants had only limited influence on *Samfunnsdrift*, through representatives of the *Svalbardrådet* on its board. At the same time as societal tasks were separated from the coal industry, the state began to invest heavily in community development in Longyearbyen. The aim was to stimulate and facilitate business development through providing a solid "societal floor" consisting of low taxes and state-funded infrastructure, business areas, and housing (Høifødt 2001: 51; Ministry of Industry 1990–1991: 53; Solend and Telebond 2001: 66). Infrastructure development and *Samfunnsdrift* thus constituted important government tools for the restructuring of Longyearbyen (Arlov 2003: 457).

In 2002, local democracy was instituted in Longyearbyen with the establishment of *Longyearbyen Lokalstyre*, Longyearbyen Community Council, operating much like a municipality on the mainland. It resumed the responsibility for the provision of public services, for area and community planning, building applications, as well as for roads, water and waste manage-

ment, renovation, installations, and housing. *Lokalstyre* was soon restructured to include a politically elected community council and administrative departments. The administrative position of a community planner was installed in 2003, and the planning department today consists of four people.

Planning in Longyearbyen: Between State (Geo-)Politics and Local Needs

Svalbard's special status and geopolitical importance makes for an interesting planning context in Longyearbyen. Urban planning and development are confined by the Norwegian Svalbard policies, whose main aims are: the consequent enforcement of Norwegian sovereignty; the enforcement and control of the compliance with the Treaty; the maintenance of peace and stability in the region; conservation and protection of Svalbard's natural environment; and the maintenance of Norwegian settlements on the archipelago (Ministry of Justice and Public Security 2015–2016). Historically, urban development and planning in Longyearbyen have constituted important tools for these Svalbard policies. In the 1980s, housing development and the construction of family dwellings (Seltveit 2001: 81) were important tools in the state-led "normalization" process of Longyearbyen. In the 1990s, infrastructure development played an important role in the restructuring of Longyearbyen (Arlov 2003: 457). Today, in the face of an (however slowly) increasing population that is becoming ever more international, urban development and planning still constitute important tools for the maintenance of settlements with a stable Norwegian population on Svalbard and hence for the enforcement of Norwegian sovereignty, which will be discussed in more detail below.

When urban planning and development was transferred from Store Norske to *Samfunnsdrift* and subsequently to *Lokalstyre*, it became both more democratic and more formalized and is today regulated through a set of routines and guidelines. Longyearbyen got its first plan for land use (Brekke 2001: 74), and the Ministry of the Environment launched the land-use regulation (*Arealplanforskriften*) in 1997, which became the first public regulation for planning and building on Svalbard (Brekke 2001: 74). In 2002, the Svalbard Environmental Act (Svalbardmiljøloven 2001) was passed and became the main framework for area planning and construction. With the establishment of *Lokalstyre* in 2002, the first community plan for Longyearbyen was developed (Longyearbyen Lokalstyre 2004). It corresponds to the social element of the mandatory municipal plan on the mainland, intended as a strategic document to steer the long-term community development of Longyearbyen, and was updated in 2013 (Longyearbyen Lokalstyre 2013). It provides the guidelines for the area plan, which again contains concrete definitions of how areas are to be used and steers further urban development

and growth. The planning guide for Svalbard (Ministry of Climate and Environment 2019) contains guidelines for how the areal plan and the sub-plans are to be used. In addition, a set of legislations are in place through which regulations for the mainland are adapted to the local context with some modifications. Through the Building Act for Longyearbyen, *Byggeforskrift for Longyearbyen* (Ministry of Justice and Public Security 2019), most of the Planning and Building Act is put into effect.

Within the limits set by the Norwegian Svalbard policies *Lokalstyre* administers the planning area of Longyearbyen. Even though it operates much like one, *Lokalstyre* is not a municipality. It is organized after the model of a municipal enterprise (Bøe Olssøn 2013: 4), and responsible for area planning and operational tasks, building regulations, culture and education. Notably, *Lokalstyre* does not have the responsibility to provide welfare services such as elderly care. Furthermore, due to the special tax regulations on Svalbard, *Lokalstyre* is financed directly through the Norwegian state budget. Talking to local politicians and administrative staff in *Lokalstyre*, it seems that they take these frameworks as a given that has to be accepted. For the most part, they experience that the central government acknowledges and understands local issues and challenges, and the frameworks do not create difficulties for day-to-day planning. It was, however, expressed that the dependency on state policies complicates long-term community planning, since it is hard to tell how the national and geopolitical frameworks and environmental regulations will develop in the future.

The Norwegian government hence sets the limits for *Lokalstyre*'s room for maneuver. This includes the realm of urban development, where *Lokalstyre* has to balance state incentives and international agreements with local needs. Within this planning context, to what extent can we speak of participatory and democratic planning in Longyearbyen? *Lokalstyre*'s power is limited, both in terms of subject matters (see above) and geographically (limited to the Longyearbyen planning area) (Solberg 2007). It is the Norwegian State, represented by the Governor of Svalbard (*Sysselmannen*), who administers the territory of Svalbard and is the planning authority outside of Longyearbyen. Local democracy in Longyearbyen was established with the intention that inhabitants and local politicians should decide over local matters but not co-determine national Svalbard politics, and it has not decentralized Norwegian Svalbard policies (Solberg 2007: 96). The overarching frameworks that define community and urban development are decided centrally by the Norwegian government, which limits the space for action and local participation in decision-making. Within the Longyearbyen planning area and *Lokalstyre*'s responsibilities, the same formal procedures for public participation in decision making as in mainland municipalities are in place. These are regulated through a formal system guided by the Planning and Building Act (PBA 1985). Public participation is installed through a formal procedure

where political authorities produce first planning drafts that are then subject to public hearings. Inputs from the public are played back to the planning authority, which can either inscribe them into the final plan recommended for political approval or attach them as a supplement. Participation is thus limited to giving input on plans (Pløger 2001). In Longyearbyen, a large part of the population is excluded from these processes because of language barriers, as planning processes are in Norwegian, which many do not speak. Furthermore, the short time of residence of many inhabitants also inhibits many from getting involved in local politics. As *Lokalstyre* follows the same formal procedures to ensure participation in planning as described above, public planning in Longyearbyen can be seen as a form of governance (Pløger 2001). However, *Lokalstyret*'s room for action is confined by state policies and neither *Lokalstyre* nor local inhabitants can influence the main frameworks that define the town's development. Local inhabitants often complain that Longyearbyen is "governed from afar" and that "they" – *Sysselmannen*, the ministries, and the central government – do not know this place and don't take into account local interests and needs. The sentiment is often expressed that even when public participation is granted, the matters have already been decided by the state.

Issues in Urban Development in Longyearbyen Today

Longyearbyen is today (again) a town in transition. The state has decided to fade out coal mining and the tourism and service industry are growing rapidly in what has become a post-industrial town[3]. The population is slowly increasing and becoming more international, with more than 30% foreigners in 2020 (Statistics Norway 2020). In addition to these structural changes, climatic changes place new demands on urban planning and development in Longyearbyen.

Environmental Pressures and Security Measures

A range of environmental stressors and natural hazards affect Longyearbyen today. The town's exposure is a result of its location: in a narrow valley, underlain by permafrost, with steep slopes and a river running through it. It was not the prospect of establishing a permanent settlement but the occurrence of coal that determined the location of Longyearbyen. This inheritance of Longyearbyen's past as a coal mining camp creates challenges for urban planners and developers today. Urban planning and development in Longyearbyen today is much about "understanding the landscape as a premise for

[3] In 2019, mining accounted for 7% of the total work-years carried out in Longyearbyen, research and higher education for 14%, and tourism and culture for 35% (Statistics Norway 2019).

the town" (Hemmersam 2017). The permafrost ground with its seasonally thawing active layer constitutes the main challenge. In order to prevent damages due to subsidence, buildings and infrastructure need to be constructed on piles or other foundations. Another challenge is the floodplain. The river *Longyearelva*, originally flowing through many channels throughout the flat valley bottom, has been artificially forced into one channel to make space for the settlement. The river occasionally overflows the channel, which is exposed to flooding, and the artificial riverbanks are prone to erosion. Surface water on the floodplain and elsewhere constitutes another challenge. The main threat to existing buildings and infrastructure, and the main limitation for urban development, are slope dynamics: snow avalanches, mudslides, slush torrents, and rockfall.

Climate change is altering these environmental premises for planning and development. In Longyearbyen, expected changes include the thawing of the upper layers of permafrost, increased events with strong precipitation, and more rain in winter. Increased precipitation and snow and glacier melt will result in more flooding, and river and coastal erosion are expected. There will be an increase in snow and slush avalanches. A thicker active permafrost layer in combination with increased rain events results in unstable slopes, increasing the risk for landslides and debris flows (Hanssen-Bauer et al. 2019; Norsk Klimaservicesenter 2019).

These changes directly affect the built environment in Longyearbyen. Due to the mild and wet weather, many wooden poles have to be replaced, and cultural heritage sites such as the cable car trestles start to rot. Permafrost thaw destabilizes structures, creates the need for longer poles, and threatens to damage the dam that contains the drinking water source. Increased flooding and erosion of the riverbank threatens existing and planned infrastructure on the floodplain, the town's main urban development area. Altered slope dynamics such as mudslides and debris flows threaten infrastructure and buildings located underneath the steep slopes on both sides of the valley, resulting in the occasional closing of parts of the road network. An increase in snow avalanches has already had detrimental impacts on the town and constitutes a main limitation for further urban development. In 2015 and 2017, two snow avalanches hit the residential areas below the slopes west of the city center. The first one hit 11 family dwellings and took two lives. The second hit one house consisting of three units. On the other side of the valley, Longyearbyen kindergarten was permanently closed due to avalanche risk.

During the past years, *Lokalstyre* in collaboration with *Sysselmannen* have planned and undertaken a number of security measures in order to adapt to these environmental pressures and mitigate future hazards. Planners and engineers view adaptation to these circumstances as feasible. The dominant view is that there are technical solutions to these challenges, but that the resources needed to implement them presents a challenge.

After the avalanches in 2015 and 2017, the main issue in urban development and planning has been to plan for safe homes, and secure and demolish homes in landslide and avalanche risk areas. On the East side of the valley, snow fences and supporting structures are partly already constructed, and catching dams and deflecting walls are planned. In 2019, the process of demolishing in total 139 residential units began. This measure was decided upon by the local politicians as part of securing the town against avalanches, and is not uncontested locally, where it is often viewed in critical terms as too invasive. Several houses are permanently evacuated while others are evacuated in cases of risk. On the Western slopes of the valley, security measures to protect the church are planned. A second major project concerns the securing of the river by reinforcing the riverbanks.

Climate change not only increases the risk of natural hazards in Longyearbyen, it also makes it more complicated to deal with them. A concern frequently expressed by urban planners and technicians is that climate change increases uncertainty and alters the knowledge base of planning, as in the case of the following example. In December 2018, the community council approved to go forward with a plan for securing the residential area underneath the Eastern slopes of town from avalanches and slush torrents. Two months later, the government published a new climate profile for Longyearbyen (Norsk Klimaservicesenter 2019) and a new climate report for Svalbard (Hanssen-Bauer et al. 2019). These reports presented expected changes as a result of the IPCC's so-called scenario RCP8.5[4], which the Norwegian government has chosen as basis for climate projections (Ministry of Climate and Environment 2012–2013). In the face of these new projections, the approved concept was no longer adequate, mainly because the permafrost may not be stable enough for the planned catching dam and deflecting walls and predicted thaw, requires to anchor the supporting structures much further into the ground than planned. As a consequence, the approved concept has to be revised and the construction of the safety measures was put on hold. If the RCP8.5 scenario becomes a reality, planners in Longyearbyen expect the necessary construction of adequate foundations for structures in all parts of town to be extremely challenging and costly. This example shows that climate change creates the need for adaptation and mitigation through urban planning and development, and simultaneously complicates adaptation and mitigation through altered natural conditions and by creating uncertainty.

[4] A Representative Concentration Pathway (RCP) is a greenhouse gas concentration trajectory adopted by the IPCC. RCP8.5 is the highest scenario (Wikipedia.org).

The access to safe, sufficient, and adequate housing in Longyearbyen is thus currently viewed as a challenge locally and many speak of a "housing crisis." This challenge is a result of several factors. The housing situation has to be seen in light of Longyearbyen's past as a company town. According to the mining code for Spitsbergen, historically the employer was responsible for providing employees with housing. Consequently, until the 2000s, there was little to no privately owned housing in town (Longyearbyen Lokalstyre 2019: 11). With the dismantling of the company town and the diversification of the economy, the private housing market grew slowly. Today, approximately 60% of the total housing stock is owned by the public through *Statsbygg* (the Norwegian Directorate of Public Construction and Property), *Store Norske*, *Lokalstyre* and *UNIS*, the University Centre in Svalbard (Longyearbyen Lokalstyre 2019: 11). Private enterprises own approximately 20% of the housing stock. Compared to the Norwegian mainland, where privately owned housing is extremely common, Longyearbyen stands out with less than 20% of the housing stock owned by private individuals (Longyearbyen Lokalstyre 2019: 12). Accordingly, Longyearbyen's housing stock is mainly composed of rental units, apartment buildings, and the size of dwellings is considerably smaller than on the mainland (Longyearbyen Lokalstyre 2019: 9). The housing standard in Longyearbyen is of varying quality. Part of the housing stock dates back to when the town was a mining society and before the *Byggeforskrift*, regulating the construction quality, was passed in Longyearbyen. It has outlived its intended life span and was never intended for long-term and high-quality living in the first place. The high turnover of the population reduces the demand for privately owned and high-quality housing and makes for a great demand for rental flats. However, as a consequence of increasing economic diversification and a growth in tourist enterprises, there is an increase in private enterprises that do not dispose over housing and a rise in employees not provided with housing through their employer (Longyearbyen Lokalstyre 2019: 21). In combination with a limited rental market, this makes for a tight housing situation. In addition, the avalanches and the following security measures led to a drastic reduction of the housing stock in town, which has only partially been compensated by the construction of new houses. Importantly, the housing crisis only affects part of the population. There is a sharp distinction in Longyearbyen between public sector employees and people working for the bigger and more established enterprises on the one hand, and people working on short-term contracts in tourism, the service sector, and small enterprises on the other. Whereas the former – mostly Norwegians – are provided with highly subsidized, good-quality housing by their employers, the latter – mostly foreigners – often struggle to find affordable housing and frequently have to settle for overpriced low-quality housing, if they manage to find housing at all.

In a town that is considered an upholder of Norwegian sovereignty, planning for housing is deeply intertwined with the Norwegian government's Svalbard policies and becomes a (geo-)political issue. *Lokalstyre* has to maneuver between top-down Svalbard policies and local needs resulting from the economic development in town. On the one hand, housing and infrastructure development are an instrument for "steering and stabilizing the population development in accordance with the Svalbard policies" (Longyearbyen Lokalstyre 2019: 4), which aims at a stable population in Longyearbyen with a considerable share of Norwegians and families. On the other hand, *Lokalstyre* considers it as its responsibility to facilitate access to housing to everyone who comes to Svalbard to live and work (Longyearbyen Lokalstyre 2019: 4), but also sees the need for the private sector such as the tourism industry to take more responsibility in terms of housing.

The political aim to maintain a stable Norwegian population in Longyearbyen is undermined by the state-led restructuring of the economy from coal mining to tourism and research/education, as the latter attract international workers on short-term contracts and dilute the share of Norwegian citizens in Longyearbyen. Pedersen (2017) has called this the "Longyearbyen dilemma." In the current context of increased business development and a housing market under pressure, planning for housing influences what kind of workers (sectors and nationalities) will be able to live and work on Svalbard in the future and becomes a potential means for controlling the town's population. The state has recently made clear attempts at gaining increased control over housing in Longyearbyen. In winter 2020 the Norwegian government announced that they want to gather the administration of housing units previously divided among different actors, including the University Center in Svalbard (*UNIS*) and *Lokalstyre*, under the state actors *Statsbygg* and *Store Norske*'s housing unit (G.S.S.O. 2020).

Furthermore, the Norwegian government has expressed clearly that further growth in Longyearbyen is not desired (Norwegian Ministries 2019: 6). The state will not invest in infrastructure development and enhancement of the housing stock in town (Ministry of Justice and Public Security 2015–2016: 38, 44; G.S.S.O. 2020). The main strategy in current urban development is thus to transform the existing housing stock and densify existing residential areas. This can be interpreted as a further measure for the Norwegian government to limit the uncontrolled growth in tourism and related service industries (Røsvik 2020). In interviews with foreign citizens working in tourism and the service industry in Longyearbyen, my impression was that many are aware of this situation and feel that they are not "wanted" by the Norwegian central government. Several interview partners even suspect that the demolition of housing in the avalanche zone is a way of reducing housing units and increasing control over who lives where.

Longyearbyen's Changing Identity

Longyearbyen is a town that has gone through great changes, reflecting shifting economic bases and policy regimes over time. The maintenance and production of an identity of the town in the face of change has thus been and continues to be an important issue in urban planning and development.

As the town is transforming and simultaneously being impacted by environmental changes, the town's heritage and identity are on the agenda of planners, architects, conservationists, and the tourist industry. In planning, the emphasis clearly lies on the physical heritage monuments from the mining period. The preservation of Longyearbyen's history and identity remains a priority in the community plan (Longyearbyen Lokalstyre 2013: 14). Whereas the first community plan emphasized the importance of a local identity for Longyearbyen's inhabitants, the current plan states the importance of communicating local history and identity to inhabitants *and* visitors, reflecting that the town has become a tourism destination. The maintenance and protection of cultural heritage are furthermore clear objectives of the overarching planning guide for Svalbard, and planning is emphasized as a main instrument in this regard (Ministry of Climate and Environment 2019).

Even if material cultural heritage is emphasized in planning, there are more factors defining the town's identity, and which aspects are emphasized depends on who one asks. In tourism brochures and media Longyearbyen's mining past is often presented as its main marker of identity. Both long-term residents and newcomers see mining as an important aspect of the town's identity, however a *historical* rather than a contemporary identity. The physical remnants of the mining period, such as the wooden trestles or the mine entrances in the hillsides, stand as prominent physical reminders of the town's mining past. The streets have numbers instead of names, and are numbered after the same principle as mine corridors (Lokalstyre.no 2020). That most streets are without sidewalks indicates that they were not planned for a family town, an impression further affirmed by the few single family dwellings in Longyearbyen. The apartment buildings of varying quality, with small dwellings not intended for long-term living, are the reason people sometimes refer to Longyearbyen as a "barrack town." The overall "messy appearance" of Longyearbyen, as one participant in the focus groups put it, is also part of its identity, and reflects both the temporality of the former mining town and that it was not meticulously planned, but rather grew as a result of developments in the mining industry.

However, the various transitions – most notably the "normalization" of the late 1970s, the modernization beginning in the 1990s, and the following restructuring of the economy with a shift towards tourism and research and higher education – have also shaped the town. Just as the cultural identity of the Longyearbyen as a (Norwegian) mining town is being contested as its economic base has shifted and the population is becoming increasingly in-

ternational, these same processes also shape its physical appearance and nuance its image as a mining town. In the focus groups the *Spisshusene*, the rows of pointed single-family dwellings painted in the Longyearby-pallet by Grete Smedal, were mentioned by several participants as an important part of Longyearbyen's identity. Especially this part of town looks like a "Norwegian small town," it is sometimes noted. Another important aspect of the town's identity that was identified in the focus groups is the town's proximity to nature. The hillsides and glaciers surrounding the town, the fjord, the waterfront, and the majestic mountains in front of it very much define the town.

Furthermore, the tourist industry has left its marks on the town. In the past years, there has been a substantial growth in hotels, bars and restaurants, and shops in town. In the focus groups it was discussed that "tourist town" is not a very positively connotated label, but that tourism nevertheless has become an undisputable part of the town's identity. The mining heritage is often presented as the most central aspect of the town's identity, and tourism can be seen as challenging this identity. In 2018, the national antiquarian, *Riksantikvaren*, expressed his concerns in the national media channel *NRK* regarding the changing appearance of Longyearbyen due to tourism. Historical sites are giving place to shops, he argued, and the town's character is lost to "gloomy signs and ads," giving it a "cheap and touristy appearance" (Andreassen 2018). The historical values are becoming less visible, which he considers a loss both for local inhabitants and for tourists, who expect quality. In this perspective, Longyearbyen is confronted with a common paradox of rural development: its "authenticity" is being threatened by commodification and staging for the tourist gaze (Bringslid 2014). At the same time, as the historical remnants of the mining industry become assets for the tourist industry, there are also new incentives for showcasing and conserving the town's heritage. While most tourists are drawn to Svalbard today in order to experience its nature and hopefully get a glimpse of a polar bear, local authorities and the tourist industry are cooperating to develop Longyearbyen's identity and cultural heritage as potential tourist attractions. A prominent example is the current project "Signs of Svalbard" where signs are developed to guide visitors and inhabitants to significant locations in town and communicate the history of the place[5].

Lately, environmental changes due to climate change are altering the appearance of the town. Climate change is increasingly considered a threat to physical heritage monuments in town, due to altered slope dynamics, permafrost thaw, and a warmer and wetter climate (Flyen and Mattson 2017). Simulta-

[5] https://www.visitsvalbard.com/informasjon-for-besokende/reiseinformasjon/signs-of-svalbard

neously, as one interview partner pointed out, the security measures constructed in the slopes to protect the houses against avalanches have also become part of the identity of a town that is located in an Arctic in profound transformation due to climate change.

Conclusion

"Should people really be living on Svalbard?" is an interesting question, indeed often posed by inhabitants in Longyearbyen, invoking philosophical reflections regarding environmental sustainability in the High Arctic. It seems that in the case of Longyearbyen, the question becomes obsolete: people have been and will be living here as long as the Norwegian government decides to maintain the settlement. Even though Longyearbyen was established as a mono-industrial resource town, classic models of "boom and bust" (Pretes and Robinson 1989) do not apply here. The town is not abandoned when the resource is depleted; rather, the state facilitates and invests in economic restructuring to ensure continued economic activity to maintain the settlement and ensure Norwegian presence on Svalbard. This political agenda has set the premises for urban development in Longyearbyen for most of its history.

Urban development and planning in Longyearbyen thus constitute important tools for maintaining a stable Norwegian settlement on Svalbard, which makes for a difficult planning context and complicates dealing with community development in a manner that includes broad local participation. The unintended consequences of the state-led restructuring of the economy and the subsequent socio-economic changes in town create inequalities in terms of housing, which have to be solved on a local level, but where the Norwegian state also has its part of responsibility. The specific issues and challenges related to community development discussed in this paper – the housing situation, the environmental challenges and the questions related to the town's identity – have to be seen in the light of Longyearbyen's special situatedness between national Svalbard policies and local needs. They are furthermore a result of the town's history as a company town and a consequence of climatic and socio-economic changes, which are altering the town's identity. As the economy is changing, Longyearbyen's identity as a coal mining town is being contested. In this regard, many inhabitants are searching and wishing for a new identity of Longyearbyen, and visions that are often mentioned in the field are Longyearbyen as a showcase for sustainable development and green energy in the Arctic, as a circular economy, and as an Arctic test arena for sustainable solutions and technology.

Looking from Oslo, Longyearbyen thus constitutes a political tool for presence. From the local perspective, however, it is much more than that: it is a town with its own needs and challenges, and, most importantly, a place

where people live and that people call their home, whether people *should* be living on Svalbard or not.

I want to thank the people that I have spoken to in Longyearbyen throughout my fieldwork, who have patiently shared their knowledge and viewpoints with me. I also want to thank the reviewers of this article who provided invaluable input that greatly improved the text.

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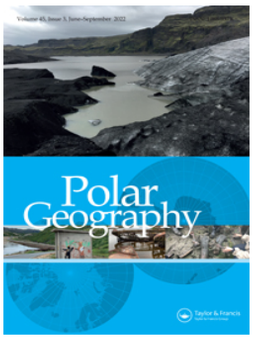
Publication III: “No longer solid”: perceived impacts of permafrost thaw in three Arctic communities



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‘No longer solid’: perceived impacts of permafrost thaw in three Arctic communities

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RESEARCH ARTICLE

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'No longer solid': perceived impacts of permafrost thaw in three Arctic communities

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ABSTRACT

Permafrost characterizes ground conditions in most of the Arctic and is increasingly thawing. While environmental consequences of permafrost thaw are under intense scrutiny by natural and life sciences, social sciences' studies on local communities' perceptions of change is thus far limited. This hinders the development of targeted adaptation and mitigation measures. We present the results of a survey on communities' perceptions of permafrost thaw, with a focus on subsistence activities, carried out between 2019 and 2020 in Aklavik (Northwest Territories, Canada), Longyearbyen (Svalbard, Norway), and Qeqertarsuaq (Qeqertalik Municipality, Greenland). Results show that the majority of the 237 participants are well aware of the consequences of permafrost thaw on the landscape as well as the connection between increased air temperature and permafrost thaw. The majority perceive permafrost thaw negatively although they do not perceive it as a challenge in all life domains. Permafrost thaw is perceived as a major cause for challenges in subsistence activities, infrastructure, and the physical environment. Different perceptions within the three study communities suggests that perceptions of thaw are not solely determined by physical changes but also influenced by factors related to the societal context, including discourses of climate change, cultural background, and land use.

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Community perceptions; permafrost thaw; subsistence activities

Introduction

Rapid shifts in the environment caused by climate change impact lives in the Arctic, challenging food availability, safety and security (Brinkman et al., 2016; Watts et al., 2015), and deteriorating human health (Omazic et al., 2019; Sharma, 2010; Waits et al., 2018). Arctic air temperatures are rising up to three times as fast as the global average, and autumn and winter temperatures are expected to increase by a regional average of 4 °C by 2050 in the Northern Hemisphere (AMAP, 2019). This causes dramatic changes to all components of the cryosphere, including permafrost. Permafrost is ground that remains at or below 0°C for at least two consecutive years (Van Everdingen, 2005). The permafrost region

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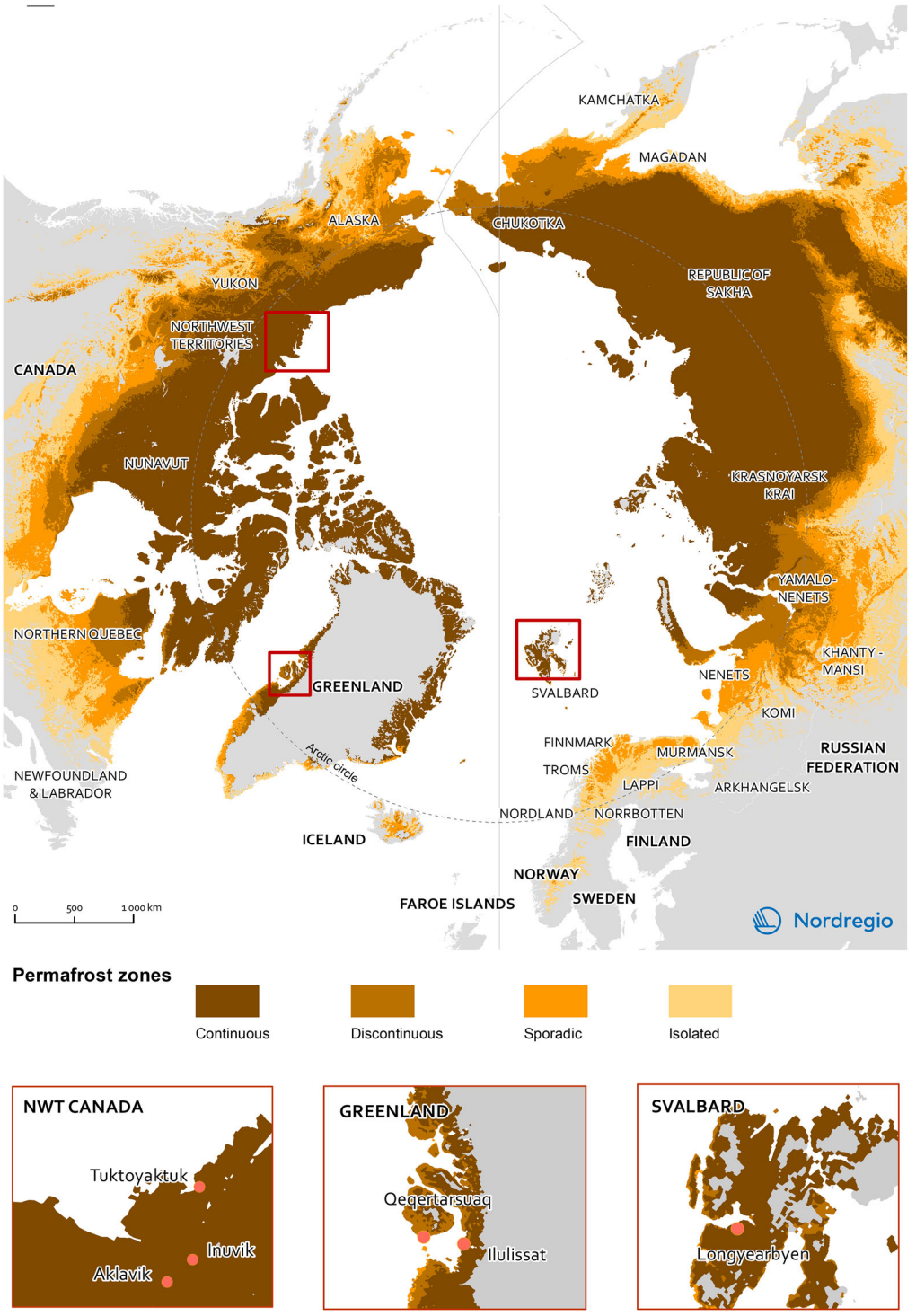

Figure 1. Location of the three focus communities located within the Arctic Circumpolar Permafrost Region.

covers about 24% of the land surface in the Northern Hemisphere (Gruber, 2012), including most of the Arctic (Figure 1). Permafrost defines the physical structure of the ground and modulates resource availability to organisms, including people (Schuur & Mack, 2018). Permafrost is warming (Biskaborn et al., 2019) and thawing in many parts of the Arctic. Thawing of permafrost raises global attention due its contribution to the release of greenhouse gases, and constitutes an increasing concern for permafrost communities that are directly impacted. Watt-Cloutier emphasizes that permafrost thaw is perceived as a major issue among the many challenges Indigenous Peoples, and other residents of the North, are facing: 'But perhaps the most shocking of all was that the very ground beneath our feet was no longer solid' (Watt-Cloutier, 2018).

Permafrost thaw modifies frozen landscapes as the ground becomes softer, increasing the susceptibility to erosion, ground subsidence, and landslides. People living on permafrost are sensitive to ground conditions as thawing impacts ecosystems and infrastructure on which they depend to sustain their lives and maintain their cultural identities (Crate et al., 2017; Doloisio & Vanderlinden, 2020; Istomin & Habeck, 2016; Krause, 2021; Schuur & Mack, 2018). Challenges are expected to increase for the people living on permafrost as by 2050 permafrost will degrade and ultimately disappear in many areas of the Arctic, impacting the life of 3.3 million inhabitants (Ramage et al., 2021). Accelerating permafrost thaw thus poses an increased challenge to people's livelihoods if the pace of change is too rapid (Krause, 2021). Vulnerabilities in Arctic communities are the result of inherent ecosystem features, rates of change, and the abilities of social systems to quickly respond to changes (Alessa et al., 2008). In turn, the ability to respond to changes partly depends on differences between perceived and measured changes. Assessing risks related to climate change therefore requires both measuring the physical changes that occur as well as understanding the experiences and perceptions of these changes by the people impacted (Alessa et al., 2008; Rogan et al., 2005; Van Gevelt et al., 2019). Due largely to a lack of empirical studies, perceptions as drivers of behaviors and social changes are scarce in the context of environmental changes, especially in the context of permafrost thaw and impacts on livelihoods.

This study presents results of a pan-Arctic survey on people's perceptions and experiences of permafrost thaw, with a focus on subsistence activities. Subsistence activities are crucial in many Arctic permafrost communities and are being challenged by rapid environmental changes, compounding the impacts of social, economic, and political changes. Hunting, whaling, fishing, trapping, herding, and gathering of berries, mushrooms and other plants not only significantly contribute to local economies and wellbeing, but also shape social relationships and cultural identity of residents of the Arctic. Such subsistence activities are tied to intricate knowledge of local land-, ice- and waterscapes and to wellbeing, and provide food and other raw materials for everyday life. The focus on subsistence was motivated by their central contribution in living a good life in the Arctic (Holen & Gartler, 2020; Kruse et al., 2008; Watt-Cloutier, 2018) as well as the need from permafrost communities to better understand perceived impacts of climate change on these activities (Knapp & Trainor, 2015). As the first of its kind, the survey addresses local awareness of permafrost thaw, related perceived challenges, and perceived impacts on subsistence activities in three permafrost communities: Aklavik (Northwest Territories, Canada), Longyearbyen (Svalbard, Norway), and Qeqertarsuaq (Qeqertalik Municipality, Greenland). These constitute three distinct communities in terms of social, cultural, economic, and political context, yet they share a common feature: their location on permafrost. Comparing three

different locales allows us to tease out different perceptions on permafrost thaw and provides an indication of how diverging perceptions are related to different societal contexts.

Material and methods

Study area

Aklavik, Longyearbyen, and Qeqertarsuaq are located on permafrost within discontinuous and continuous zones, where the probability of permafrost to occur is above 50% (Obu et al., 2019). Increasing occurrences of permafrost thaw have been reported in the three areas (Andrews et al., 2016; Burn & Kokelj, 2009; Hanssen-Bauer et al., 2019; Krause, 2021). The communities differ in their demography as well as socio-economic and cultural contexts.

Aklavik is a community situated along the Peel Chanel within the Mackenzie Delta, approximately 100 km south of the Beaufort Sea (Figure 3). Aklavik is located in the bioclimate subzone E with a daily mean air temperature in of −26.3 °C in January and 13.9°C in July. The community has a population of 623 inhabitants (2018), most of whom are Inuvialuit or Gwich'in. Similar to most communities in the Canadian Arctic, Aklavik has a mixed subsistence-cash economy composed of wage employment and subsistence harvesting.

Longyearbyen is located on the western coast of the Svalbard Archipelago. The Nowegian town is in the bioclimate subzone A with daily mean air temperature of −14 °C in January and 6.5 °C in July. The surroundings are dominated by barren soils. With its 2368 inhabitants (2019), Longyearbyen is the largest settlement on Svalbard and its administrative center. Svalbard never had an indigenous population, and its settlements developed as coal mining towns. Longyearbyen is today a highly modern 'urban village' with an increasingly international population. As coal mining is being phased out, the main economic pillars are tourism and related industries, as well as research and higher education.

Qeqertarsuaq is a community located in central West Greenland in the south of Disko Island. The landscape surrounding the town is mountainous with steep coastlines. Qeqertarsuaq is in the bioclimate subzone D, with a daily mean air temperature of −22 °C in January and 7.9 °C in July. Qeqertarsuaq has a population of 839 inhabitants (2020), the majority of whom are Kalaallit (Greenlandic Inuit). The community has a mixed subsistence-cash economy composed of subsistence hunters and fishers as well as wage employment. The wage economy of Qeqertarsuaq is based on commercial fishing, seafood processing, public administration, tourism, and seasonal labor. People living in Qeqertarsuaq use the land, sea, and sea-ice for hunting and fishing.

Community survey and data collection

To analyze and compare perception of impacts related to permafrost thaw, we developed a community survey. The community survey consists of 42 questions (both open and closed, see Appendix A). Heterogeneous physical and social dynamics between communities pose a challenge to developing a common survey measuring perceptions, therefore the survey was adjusted with local research assistants and partners to accommodate local peculiarities.

The first section surveys the perceptions of impacts related to permafrost thaw. The second section inspects the role of subsistence activities in participants' lives. The community survey was translated into three languages (English, Greenlandic, and Norwegian) and was carried out using a snowball sampling approach. In Aklavik and Qeqertarsuaq, local

Table 1. Number of respondents and their characteristics.

	Total	Men	Women	18–24	25–34	35–44	45–54	55–64	65+
Aklavik	53	23	30	5	9	8	7	18	6
Longyearbyen	84	45	39	15	29	20	12	6	2
Qeqertarsuaq	100	52	48	10	20	11	28	22	9
Total	237	120	117	29	58	39	47	46	17

field assistants were hired to conduct the survey. The research assistants were acquainted with the field of research and guided a total of 237 participants through the survey (Table 1), representing 11% of the population above 18 years old in Aklavik, 15% in Qeqertarsuaq, and 4% in Longyearbyen. A relatively even distribution across gender and age groups was achieved. The answers were collected between February 2019 and October 2020.

Results and discussion

Awareness of permafrost thaw

As Figure 2 indicates, participants associate permafrost thaw with climate change and relate it to local environmental impacts. *Warmer, landslides*, and *soft* are the three most recurrent words that participants associate with permafrost thaw in Aklavik. In Longyearbyen the most frequent words are *infrastructure damages*, *warming*, and *landslides* and in Qeqertarsuaq, *climate change*, *pollution*, and *warmer*. Two thirds of participants ($n = 156$) identify increasing temperatures as the main cause of thawing permafrost (Question 6). Others identify changes in snow thickness, not well-adapted infrastructure, and fires as further factors responsible for acceleration of permafrost thaw.

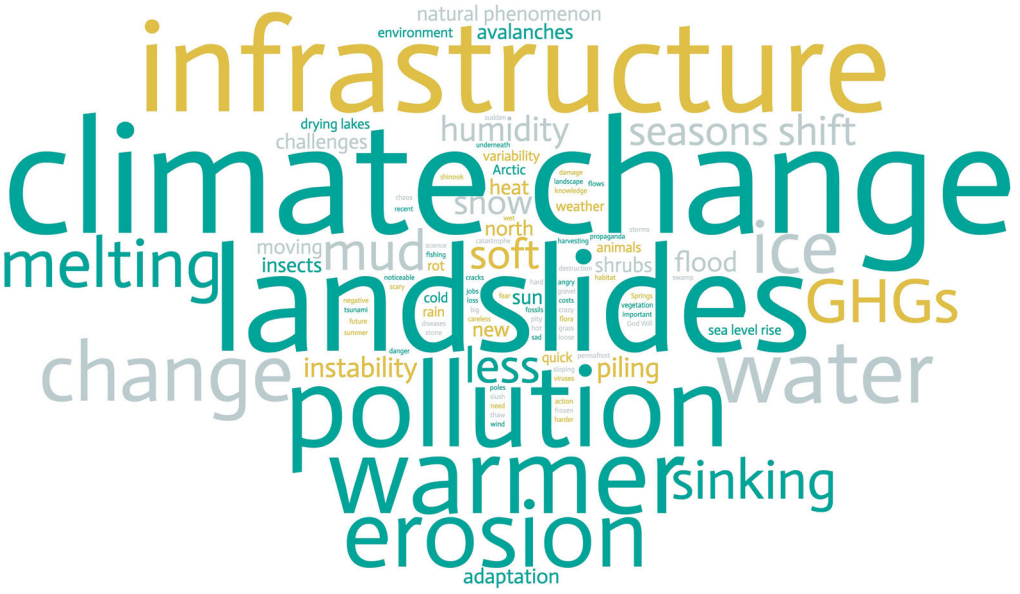

Figure 2. Word cloud illustrating the words associated by the respondents with permafrost thaw. Respondents answered question 1: Mention three words you associate with the thawing of frozen ground.

Study participants are well aware of the consequences of permafrost thaw on the landscape. The majority of participants in the three communities (71%, $n = 168$) perceive it as being an important or very important factor in explaining changes occurring in their physical environment (Question 5). Among all physical changes that participants observe, many are caused by permafrost thaw such as slumping of the ground, changes in hydrological conditions (drying or flooding of an area), and deepening of the active layer. This is more distinct in Aklavik, where most of the environmental changes observed are terrestrial changes associated with permafrost thaw (coastal erosion, slumping of the ground, and expansion of dried areas). In Longyearbyen and Qeqertarsuaq, most of the observed environmental changes are related to changes occurring at sea: sea ice conditions and storms. Participants also observe some changes associated to permafrost thaw such as an increase in the extent of wetlands, coastal erosion, and slumping (Figure 3).

The majority of participants indicate that thawing of permafrost has led to negative changes over the past ten years (Figure 4): 87% ($n = 46$) in Aklavik, 80% ($n = 66$) in Longyearbyen, and 65% ($n = 65$) in Qeqertarsuaq. There, 20% ($n = 20$) of the participants did not answer this question. While permafrost thaw is perceived as a negative change in all three study sites by three quarters ($n = 177$), the answers differ significantly across the study areas when asking participants whether permafrost thaw causes problems for them on an individual level (Figure 4). While it is perceived as a problem for a majority in Aklavik, (74%, $n = 39$), it is less of a problem for participants in Longyearbyen (46%, $n = 39$), and in Qeqertarsuaq (21%, $n = 21$) (Figure 4).

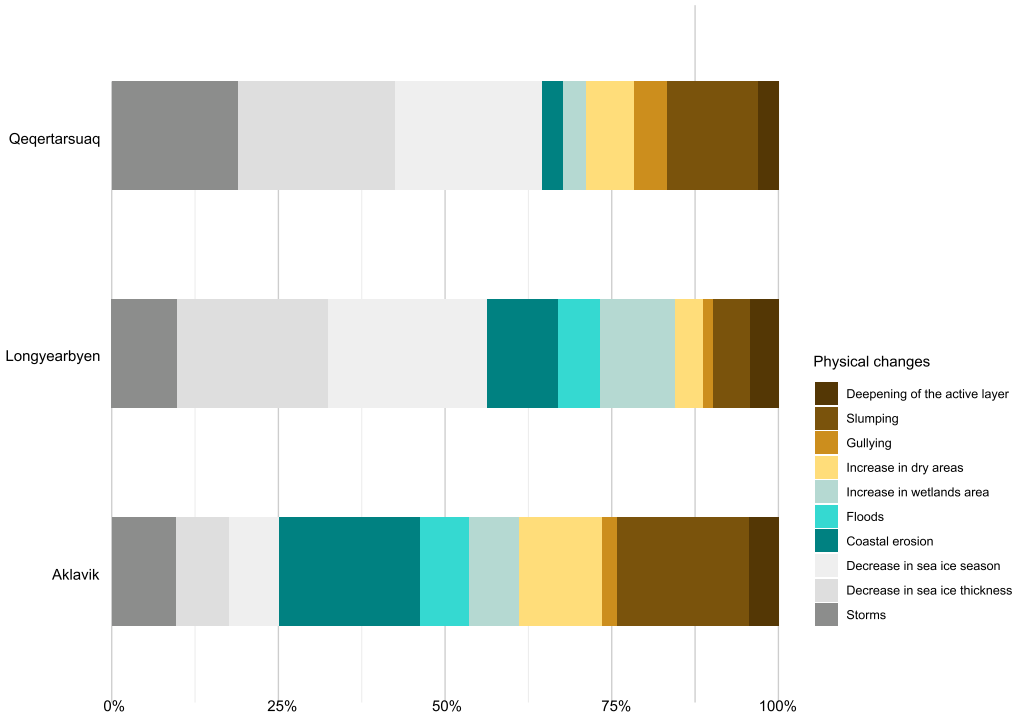

Figure 3. Observed environmental changes in the three permafrost communities. Respondents answered question 32: *'Have you been affected by some of these physical changes when traveling in your surrounding environment?'*

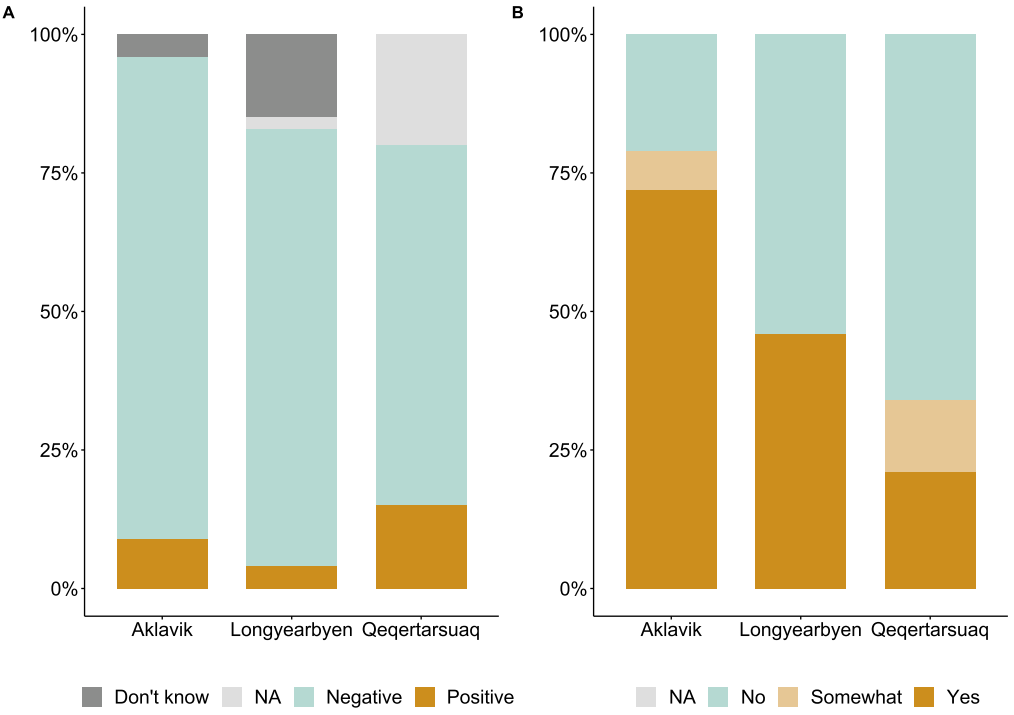

Figure 4. Perceived impact of permafrost thaw in the three permafrost communities. Respondents answered questions (A) 3 'Over the past 10 years, would you say that the thawing of the frozen ground has led to negative or positive changes?' and (B) 4 'Do you think that thawing of the frozen ground causes problems to you?'

Participants' awareness of permafrost thaw in their communities align well with current scientific knowledge reporting increased thaw in the three communities (Biskaborn et al., 2019; Daanen et al., 2011; Jaskólski et al., 2018; Kokelj et al., 2017) as well as with communities' observations (Inuvialuit Regional Corporation, 2018). Differences in the awareness and perceptions relate to the variability of permafrost conditions in the three communities as well as their various landscape features. While permafrost thaw is observed in all three study sites, its impacts differ depending on environmental specificities. The high Arctic conditions and barren soils in Qeqertarsuaq and Longyearbyen hinder abrupt impacts of permafrost thaw. Aklavik, by contrast, lies within a lowland area with subarctic climatic conditions, environments that are more susceptible to thaw. Differences in participants' observations of landscape changes also relate to the vicinity of the sea. Participants living directly at the coast in Qeqertarsuaq and Longyearbyen focus more on changes impacting sea and sea ice conditions compared to the ones living in Aklavik – located around 100 km south of the Beaufort Coast – for whom terrestrial changes have a greater impact.

Perceived impacts of permafrost thaw on subsistence activities

In the survey, subsistence is defined in a holistic way as any activity that serves material and immaterial human needs and is not primarily market-related (Gartler, 2018). However, the survey focuses specifically on hunting, fishing, and gathering practices, whether for provision or recreation. The food obtained through these activities is defined as country food.

In total, 60% ($n = 142$) of the participants engage in hunting and fishing and 57% ($n = 135$) gather berries, mushrooms, and medicinal plants. Most study participants in Aklavik and Qeqertarsuaq engage in hunting and fishing (74%, $n = 39$ and 64%, $n = 64$, respectively) and almost half of the participants (46%, $n = 39$) engage in these activities in Longyearbyen (questions 19 and 29, Figure 5). In Aklavik and Qeqertarsuaq, country food is essential in the daily diet: it is both valued and consumed regularly (questions 14 and 15, Figure 5). Country food represents half of the participants diet in Aklavik and 61% in Qeqertarsuaq. By contrast, country food is not essential in the diet of the participants in Longyearbyen, where it represents only 10% of their diet. These results suggest that while subsistence activities are perceived as essential for life in Aklavik and Qeqertarsuaq, it is mainly practiced as a recreational activity in Longyearbyen.

The survey also identifies differences in the type of species consumed throughout the year in the three communities (questions 24–27). Participants in Qeqertarsuaq mainly rely on marine resources throughout the year whereas terrestrial resources are the main source of country food in Aklavik. There, participants identify cervids (mainly caribou but also moose) and freshwater fishes as the main resources consumed throughout the year. In Qeqertarsuaq, the range of marine species consumed is diverse, with a predominance of sea fishes, whales, and seals. In Longyearbyen, antlers and sea fishes are the main resources caught when hunting and fishing.

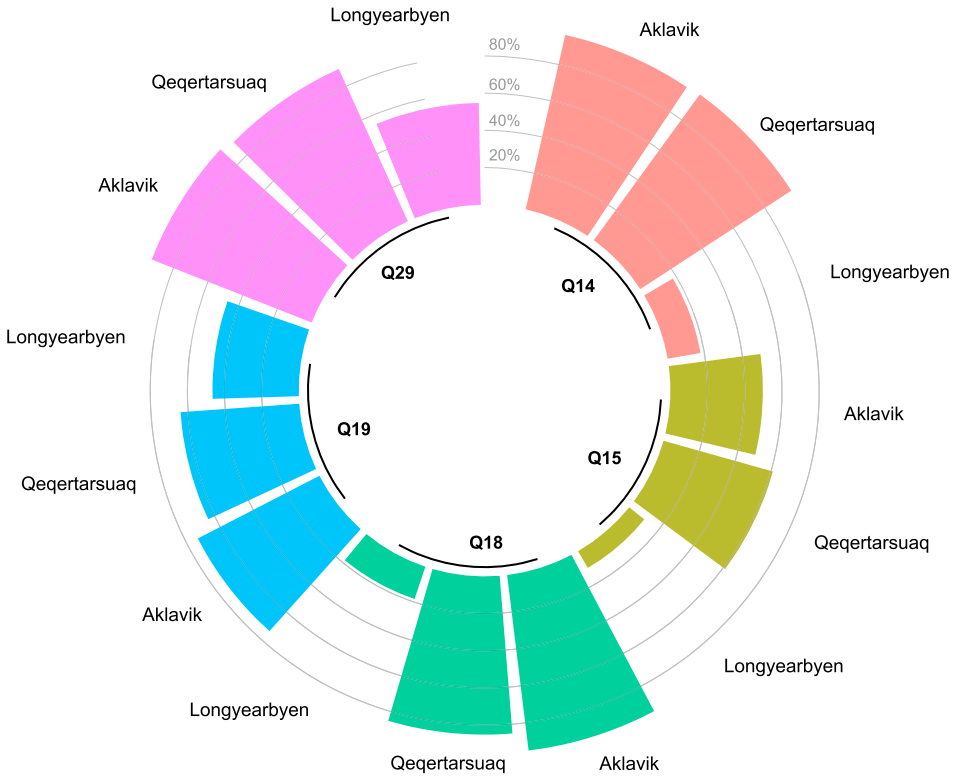

Figure 5. Respondent's engagement in subsistence activities and reliance on country food in the three permafrost communities. Respondents answered questions 14 '*Do you eat country food at least one time per week?*' – 15 '*What percentage of your diet is country food?*' – 18 '*How important is subsistence harvesting for your household?*' – 19 '*Do you hunt or fish?*' – and 29 '*Do you collect berries, mushrooms and/or medicinal plants/foods?*'.

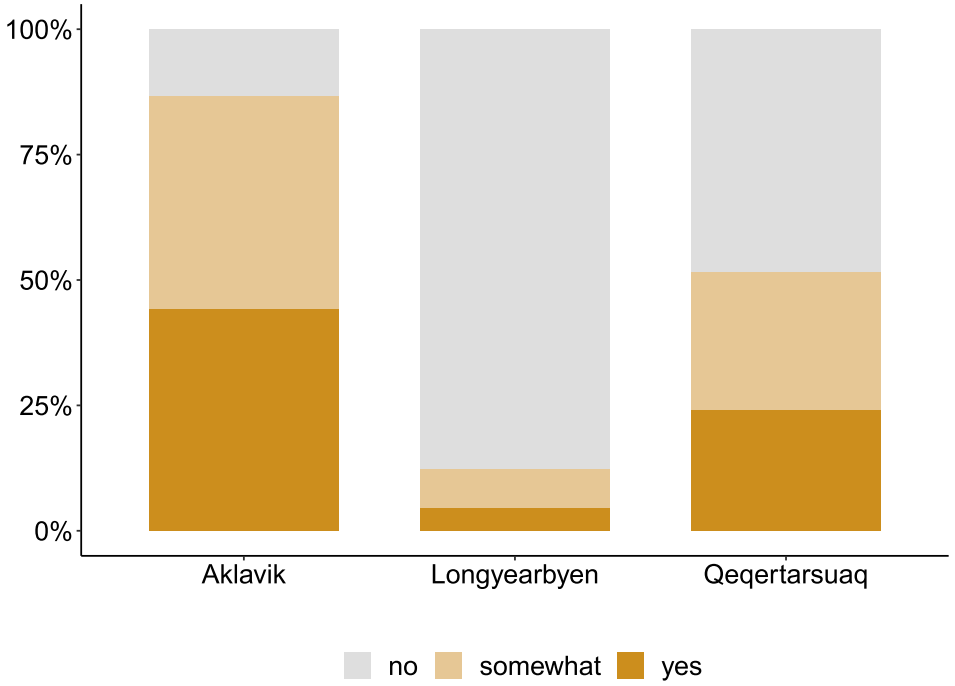

Figure 6. Impact of permafrost thaw on the respondent's ability to obtain food from the land. Respondents answered question 33 '*Do you feel that thawing of the frozen ground is having an impact on your ability to obtain food and other resources for daily use from the land?*'.

Survey results show that permafrost thaw alters land-users' harvesting practices (Figure 6). Close to 85% ($n = 45$) of the participants from Aklavik consider that permafrost thaw affects their ability to obtain food from the land although 42% ($n = 22$) only feel somewhat affected. Almost half of the participants (47%, $n = 47$) are affected in Qeqertarsuaq, among whom a quarter ($n = 25$) feel somewhat affected. In Longyearbyen, permafrost thaw does not impact the study participants' ability to obtain food from the land; and 68% ($n = 57$) do not perceive it as a threat for harvesting. Impacts of climate change on the ability for land-users to engage in subsistence activities have been reported for several other communities across the Arctic (Birchall & Bonnett, 2020; Brinkman et al., 2016; Gibson et al., 2018; Goldhar & Ford, 2010) where permafrost was listed among the most challenging impact (Inuvialuit Regional Corporation, 2018). These results show that the perceived impacts on the land-users' activities depends on their engagement in subsistence activities as well as the type of species caught, being marine or terrestrial.

Perceived challenges related to permafrost thaw

While participants perceive permafrost thaw as having a negative impact on their lives in a whole, they do not perceive it as a challenge in all life domains (Figure 7). Participants in Aklavik and Qeqertarsuaq perceive permafrost thaw as an important factor driving challenges related to their subsistence activities and to maintaining their culture. In Aklavik, 74% ($n = 39$) consider permafrost thaw as a very important factor for driving challenges that they encounter while engaging in subsistence activities. In contrast, participants in

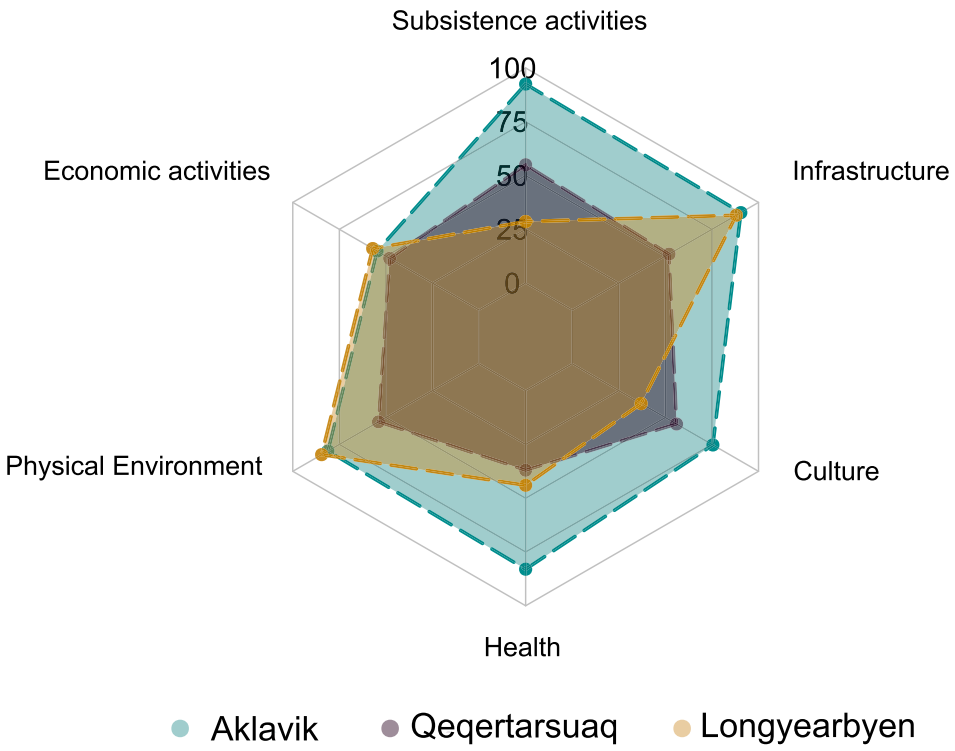

Figure 7. Communities' perception of challenges related to permafrost thaw in six domains: subsistence activities, infrastructure, culture, health, natural environment, and economic activities. Respondents answered question 5 '*How important is frozen ground thaw in explaining each of the following challenges?*'. Results show the percentage of respondents who answered important and very important.

Longyearbyen consider permafrost thaw as an unimportant factor in driving challenges related to hunting and harvesting, and 36% ($n = 30$) indicate that they are unaware of such a connection. Similarly, permafrost thaw is not perceived as important in driving cultural challenges in Longyearbyen. These results highlight the strong links between subsistence activities and culture in indigenous communities where subsistence plays a pivotal role in people's cultural ways and livelihoods.

Results from question 5 reiterate that participants are well aware of the impacts of permafrost thaw on the physical environment. Permafrost thaw is considered in the three communities as important or very important in explaining challenges associated with the physical environment. However, 37% ($n = 37$) of study participants in Qeqertarsuaq indicate that they are uncertain in replying to this question (reply '*do not know*'). Challenges of permafrost thaw on health are perceived by 81% ($n = 43$) of the participants as important or very important in Aklavik (Figure 7). Less than half of the participants in Qeqertarsuaq (37%, $n = 37$) and Longyearbyen (44%, $n = 37$) perceive permafrost thaw as a challenge to their health and a quarter of the participants in Longyearbyen ($n = 21$) and half ($n = 51$) in Qeqertarsuaq are unaware of challenges posed to human health by permafrost thaw. Focusing on the links between permafrost thaw, health, and well-being, Timlin et al. (2021) show that permafrost thaw is not perceived as a direct risk for health in Qeqertarsuaq. Challenges to infrastructure are perceived as important or very important by 73% ($n = 174$) of all participants (Figure 7). In Longyearbyen permafrost thaw is considered

by a majority (69%, $n = 58$) as a very important factor for challenges posed to infrastructure. In all three study sites, permafrost thaw is considered important for explaining challenges related to economic activities although not crucial (Figure 7). Economic activities, mainly seen as employment and financial issues, are not perceived as directly impacted by permafrost thaw. This relates to the type of employment in the three communities that are not directly affected by changes in permafrost conditions. A large number of participants in Qeqertarsuaq (between 36 and 51%) and in Longyearbyen (between 8 and 36%) replied 'I don't know' for several of the questions about perceived challenges, suggesting that many are unsure and lack knowledge about the connections between society and permafrost change. These results show that while a majority of participants perceive permafrost thaw negatively, perceived impacts on everyday life activities vary greatly between individuals, both within and between the three communities. There are however trends; while permafrost thaw is perceived as an equal challenge for all domains of the participants' lives in Aklavik and Qeqertarsuaq, participants in Longyearbyen identify challenges related to the physical environment and infrastructure as more important. Social perceptions of permafrost thaw are not solely determined by physical impacts and experiences, but also by immaterial factors such as culture and land use. The interconnection between physical, material, and immaterial impacts has been reported for several other Arctic regional contexts in numerous studies (Andrachuk, 2008; Crate, 2014; Crate et al., 2017; Doloisio & Vanderlinden, 2020; Karjalainen & Habeck, 2004; Timlin et al., 2021). Environmental perception is linked to a large number of factors, including past experiences and current value orientations (Zube, 1999). Perceptions also rely on some measure of change that are linked to the time one lived in a specific environment, as well as to the transmission of information from others and the type of their experience (Alessa et al., 2008; Davidson-Hunt & Berkes, 2003; Ford et al., 2006).

Conclusion

This article presents the results of community surveys on perceptions of permafrost thaw on the life of permafrost inhabitants. The results indicate that participants are well aware of the consequences of permafrost thaw on their surrounding landscapes. Differences in observed physical changes emerge due to various permafrost conditions and environmental changes in the surroundings of the three communities. Participants perceive permafrost thaw negatively and indicate that changes have impacted their lives in the past ten years. In Aklavik and Qeqertarsuaq, where subsistence activities are important, permafrost thaw affects the participants' ability to engage in these activities. Participants' perceptions of specific challenges within different life domains are diffuse and diverse. While participants in Aklavik and Qeqertarsuaq perceive permafrost thaw as a challenge in all life domains, participants in Longyearbyen identify specific challenges in the domains of infrastructure and environmental changes. Social perceptions of permafrost thaw are not solely determined by physical impacts, but also by immaterial factors such as culture and land use. The survey adds new perceptions of the impact of permafrost thaw, which are critical to understand adaptation needs as the capacity to answer to changes depends both on the available knowledge as well as the perceptions toward these changes. Effective adaptation measures will be well received if communities perceive and understand the changes occurring in their surroundings. In communities where subtle changes is ongoing, communities will take longer to react. There, it might be crucial for researcher to focus on modeling and presenting

projections of change to accelerate the design of adaptation measures. Considering the differences in social and political structures as well as cultural behaviors is also key to design and prioritize adaptation measures to permafrost thaw at the community level. As permafrost is or becomes inevitably no longer solid in many communities, adaptation will stand on solid ground when perceptions will be accounted. Further research could aim at disentangling the specific factors influencing perceptions of permafrost thaw within and between different permafrost communities in order to pinpoint specific domains of adaptation strategies.

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Publication IV: Physical and feasible: Climate change adaptation in Longyearbyen, Svalbard

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Physical and feasible: Climate change adaptation in Longyearbyen, Svalbard

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Research Article

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Abstract

Longyearbyen, Svalbard, has become showcase of Arctic climate change. However, we know little about how these changes are dealt with locally. This article aims to fill this gap by examining climate change impacts and adaptation in a non-Indigenous "community of experts" and sets out to 1) describe observed changes and perceived societal impacts of climate change and 2) discuss adaptation measures and related understandings of adaptation. The research consists of ethnographic fieldwork and interviews with planners, engineers, architects, scientists, construction workers and local politicians. The research finds that climate change impacts the built environment in Longyearbyen, and that there is vast awareness of and concern related to these impacts. There is a substantial knowledge base for adaptation, and a special trust in scientific knowledge, skills and experts. The interview partners consider adaptation as necessary and feasible. Adaptation is understood and implemented as technical responses to physical problems, rooted in a modernist understanding of the environment as separated from humans, who can control it through technical means. This suggests a narrow understanding of adaptation that might fail to address more socially transformative processes.

Introduction

Svalbard has in recent years turned into somewhat of a showcase of a changing Arctic, and Longyearbyen at 78° North has become renowned as the town "on the front line of climate change" (Fraser, 2019). Both the media and science feed this narrative, and climate change has become a powerful discourse in the local and state governance of Svalbard. Indeed, temperatures on the archipelago have risen substantially since 1900 (Vikhamar-Schuler, Førland, & Hisdal, 2016). These changes occur simultaneously with profound economic restructuring as coal mining is being dismantled and tourism is booming. The associated uncertainties regarding the town's economic future go hand in hand with a changing social structure as Longyearbyen's population is becoming more international and increasingly transient. While the environmental consequences of climate change on Svalbard are well-documented, research on the societal impacts and responses to these changes is scarce (Tvinnereim, Angell, Kolstad, Brekke, & Mortensen, 2016). In a recent study, Hovelsrud et al. (2020) studied adaptation to multiple changes, including climate change, in Longyearbyen, finding that the complex policy and institutional context of Svalbard affect and limit local actors' ability to adapt. This study aims to complement our knowledge about the societal impacts of and responses to climate change in Longyearbyen.

It has been established that climate change adaptation takes place on the local level (IPCC, 2007). This article examines perceived societal impacts of climate change in Longyearbyen, and how experienced and projected impacts are dealt with locally. The focus lies on climate change adaptation, including both meanings and practices. Talking to citizens in Longyearbyen throughout my fieldwork in 2019 and 2020 about whether and how they experience climate change, it became evident that impacts on buildings and infrastructure are considered a main concern. In this article, I thus focus on the built environment, which constitutes a critical link connecting humans to their natural surroundings. I draw on interviews and conversations with those involved in one way or another in adaptation of the urban environment in Longyearbyen. The aim is to provide an in-depth empirical description and analysis of locally perceived climate change impacts, as well as local adaptation practices, meanings and challenges. Four interrelated questions guide this article: What are the perceived societal impacts of climate change in Longyearbyen? How is the town being adapted to climate change? Which meanings and understandings of adaptation guide these practices? What are the challenges to adaptation?

Lately, the "anthropology of climate change" has developed into a well-established field of research (e.g. Barnes et al., 2013; Crate & Nuttall, 2009; Fiske et al., 2014; Hastrup, 2013), and the Arctic has received considerable scholarly attention in this regard (e.g. Hovelsrud & Smit, 2010; Krupnik & Jolly, 2002). Simultaneously, there has been a veritable explosion of interdisciplinary research on the "human dimensions" and the "societal impacts" of Arctic climate change

(e.g. Ford, Bolton, Shirley, Pearce, Tremblay, & Westlake, 2012; Stephen, 2018). While in the Norwegian context climate change adaptation has been studied in municipalities, institutions and economic sectors (e.g. Hovelsrud, Dannevig, West, & Amundsen, 2010), the anthropological research on climate change in the Arctic typically focuses on small-scale Indigenous societies that are strongly dependent on their local environments for subsistence and at the margins of national economies. Longyearbyen presents quite a different picture: its population has high levels of income and formal education, it is non-Indigenous, transient and international and the town lies at the centre of the economic and political interests of an industrialised, affluent nation. With this article, I thus hope to add knowledge about how an Arctic society far removed from a local, traditional and place-based community in the classical anthropological sense (Sokolíčková, forthcoming), and with a greater amount of resident experts, deals with climate change and understands adaptation.

The article begins with a brief introduction to the theoretical framework that has guided the research questions and the analysis. In the second part, I describe from the point of view of my interview partners which climate change impacts they observe in Longyearbyen, with a focus on the built environment. I then move on to analyse how these impacts are dealt with locally, which discourses guide adaptation and where there are challenges to adaptation. I conclude with a discussion of the findings, relating them to adaptation and environmental anthropological literature.

Methodology and research design

This study draws on 14 months of ethnographic fieldwork between 2018 and 2021, with the aim to study how Longyearbyen is impacted by environmental and socio-economic changes, and how inhabitants experience, live with and adapt to these. This article is based on 22 semi-structured, in-depth interviews, for which I used a flexible and evolving interview guide, including questions about perceived climate change impacts on society, related concerns and opportunities, whether and how these can be/are dealt with, about other changes the interviewee saw impacting and about the future of Longyearbyen. Here I draw on a specific sample, namely on interviews with people I identified (primarily through recommendations of previous interview partners) as involved in climate change adaptation in Longyearbyen: urban planners, engineers and administrative staff in the local government *Longyearbyen LL* (hereafter LL); elsewhere employed engineers, architects and consultants; workers and administrative staff in the building and construction sector; scientists, and local politicians. Twenty-one of the interview participants were Norwegian, which indicates the considerable share of Norwegians in public administration, among politicians, and engineers and consultants in Longyearbyen, where 36% of the population is non-Norwegian (Statistics Norway, 2020a). This specific sample is thus not representative of the population in town, and – as will be argued throughout the article – represents a certain view on adaptation. Most interviews were conducted during working hours at the interviewee's workspace, a handful were conducted in the afternoon/evening at the interview partner's home. The interview data are contextualised by informal interviews, participant observations and local media, including social media. The presented findings are based on the categories that emerged using qualitative content analysis (Mayring, 2014).

Theoretical perspectives

A central premise of this study is that climate change has physical and cultural dimensions, acknowledging both its material and discursive realities (Moore, 2015). Whilst avoiding "the simplistic environmental determinism of an earlier era", climate change research must recognise that "environments play a vital role in shaping cultures and providing possibilities and setting constraints on what they are likely to do" (Baer & Singer, 2014, p. 60). The way climate change is approached here is inspired by recent developments and "turns" in anthropology that re-actualise and further develop more traditional environmental approaches in anthropology, such as the spatial and material turn (e.g. Ingold, 2012). What these approaches have in common is what makes them suited for the study of climate change: their concern with the physical world and environments, whilst rejecting the nature-culture dichotomy, and an insistence that humans cannot be seen but as mutually constitutive of these environments. Moving away from post-modern linguistic approaches, they reflect a renewed interest in peoples' material surroundings as well as interactions and entanglements of the human and the non-human, resulting not only in a focus on environmental issues but also in landscapes, dwellings, buildings and spaces (Stender, 2017).

As part of this broader interest in the material and materiality (Ingold, 2012) there is a recent growth in the anthropological interest in infrastructure and the built environment (e.g. Carse, 2016; Larkin, 2013; Schweitzer, Povoroznyuk, & Schiesser, 2017). Human–environment relations are mediated by technology and infrastructure (e.g. Dourish & Bell, 2007), a problem that has been central to environmental anthropology (Carse, 2016). The built environment thus becomes a critical link when studying the societal impacts of climate change. A focus on climate change impacts on the built environment however does not exclude the cultural dimension of climate change. Anthropologists focus on cultural meanings and values related to climate change (Strauss & Orlove, 2003) and emphasise that "culture frames the way people perceive, understand, experience, and respond to key elements of the worlds which they live in" (Roncoli et al., 2009, p. 87). As pointed out by Hulme (2009), climate change itself is also a social construct, a cultural idea, which influences the way people think, feel and act in relation to environmental changes.

This cultural dimension is crucial when considering climate change adaptation. Adaptation refers to "the processes by which individuals and groups of people adjust their behavior and organization in response to changes in their environment" (Thornton & Manasfi, 2010, p. 134). The concept is at the same time a powerful policy term and an analytical concept. It has a long history in anthropological theory and is now revisited and applied in the context of climate change (e.g. Barnes et al., 2013; Crate, 2008; Fiske et al., 2014; Nelson et al., 2009; Oliver-Smith, 2017; Thornton & Manasfi, 2010). The related concept of vulnerability describes the extent to which a system is susceptible to harm from environmental impacts. It implies that societal climate change impacts are determined by the social, economic and cultural conditions of the affected society (e.g. Ford & Smit, 2004; Turner et al., 2003). The concept thus allows to study environmental impacts in specific societal contexts, with a focus on the social factors that shape vulnerability (Oliver-Smith, 2017), stressing that vulnerability is "produced in and by society" (Ribot, 2014, p. 667).

Anthropologists call for a holistic definition of adaptation, including both material and cultural, objective and subjective aspects

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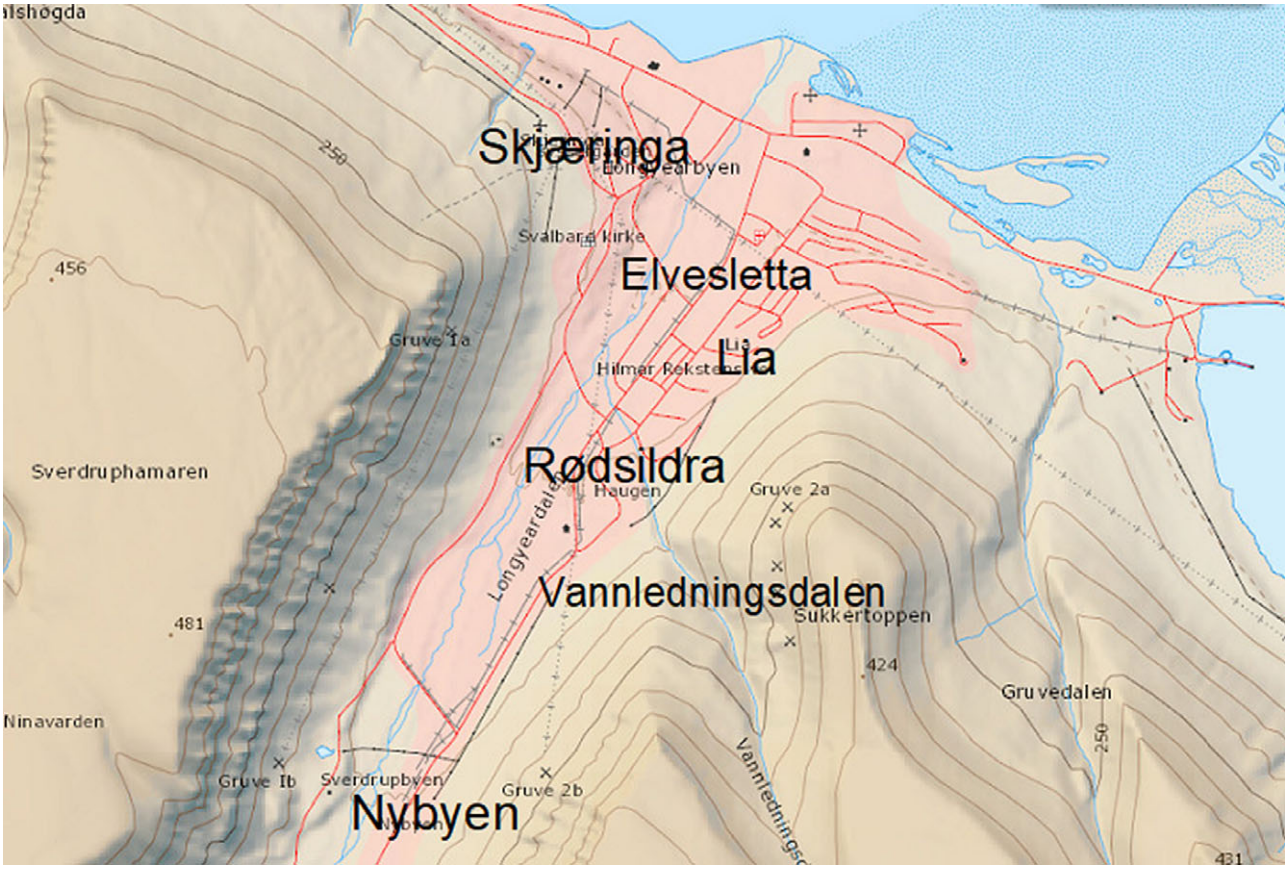

Figure 1. Map over Longyearbyen. Source: https://toposvalbard.npolar.no.

of adaptation (Oliver-Smith, 2017). Importantly, anthropological accounts have established that adaptation is more than a "techno-fix" (Thornton & Manasfi, 2010), as in technological solutions to specific risks. Rather, it is constituted through diverse, intersecting processes, taking place on multiple scales in response to multiple climatic and non-climatic stressors (Thornton & Manasfi, 2010). This concept of adaptation entails a critique of conventional climate-change debates "focused on technologies and the elusive search for large-scale, cookie-cutter solutions, leaving aside the important role that individuals, cultures, and societies play in constructing and living out an adaptation dynamic" (Nelson et al., 2009, p. 272). A holistic concept of adaptation moreover entails to attend to both practices and meanings of adaptation (Oliver-Smith, 2017). As emphasised by Hulme (2010), climate change is not merely "'a problem' waiting for 'a solution'. It is an environmental, cultural and political phenomenon which is re-shaping the way we think about ourselves, about our societies and about humanity's place on earth" (ibid., p. 171). Whether and how individuals and groups respond to climate change thus "depends importantly on what the effects of climate change mean to those affected" (O'Brien & Wolf, 2010, p. 232), and values and worldviews have been found to shape adaptive responses (ibid.). Thornton and Malhi (2016) have identified different major epochal "Anthropocene narratives" which frame adaptive responses. Whereas the "Moral Jeremiad" narrative emphasises the urgency of the planetary crisis, the "March of Progress" narrative naturalises human domination of the planet. The "New Genesis" narrative seeks a vision of "re-enchantment emerging from the Anthropocene in which humans reconnect with Earth systems" (ibid., p. 1), and the "Techno-fix Optimist" narrative views global problems solvable through human ingenuity and technology.

Observed changes and experienced impacts

The main takeaway from the recently published climate report for Svalbard (Hanssen-Bauer et al., 2019) and the climate profile for Longyearbyen (Norsk Klimaservicesenter, 2019) is that annual air temperature will increase, as will annual precipitation. Thawing of the upper layers of permafrost is expected, as are more frequent events with strong precipitation, and more rain in winter. Increased precipitation and snow and glacier melt will result in more flooding, and river and coastal erosion is predicted. There will be an increase in snow and slush avalanches. A thicker active permafrost layer in combination with more frequent rain events will result in unstable slopes, increasing the risk for landslides and debris flows. The data collected throughout my fieldwork indicate that people observe climatic changes and connect these to a range of environmental changes in an around town already today, observations that to a certain extent reflect the scientific observations. These include warmer temperatures; changing precipitation patterns, which are associated with landslides and avalanches; changes in permafrost, which people relate to coastal erosion and landslides; and less sea-ice in winter.

Vulnerability: The inheritance of the coal mining company town

The societal impacts of climate change in Longyearbyen are defined by the town's history as a coal mining company town. Firstly, the presence of coal determined the town's location (Fig. 1). "Longyearbyen is the worst place on the island to have a town, and it is just because of one reason, the coal in the mountain", an architect told me. The location – in a narrow valley

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between steep slopes and with a river running through it, confined by a glacier on the one end and by the fjord on the other – creates major challenges for the maintenance and development of the town today, challenges that are enhanced by climate change:

> "We live in a scree slope. It's a bit hard to deal with that, everything is supposed to be a hundred percent secure and then you live in a scree [laughs], it goes without saying that there are some expectations that you cannot fulfill. [. . .] Of course, the steep areas we have here, things [avalanches, landslides, etc.] have always happened there and they will continue to happen and probably a bit more now when there will be more thawing."

Furthermore, the town developed in response to where the mines opened, and exposure to avalanches and landslides did not define urban development. As a result, several of the existing neighbourhoods are exposed to geo-hazards such as avalanches. A geologist told me: "If you look at where those houses [*Lia*] are built, they are built on avalanche paths. They would never have been built there today" Another neighbourhood – and also today's main area of urban development, *Elvesletta* (literally "riverbed") – is located upon an embanked riverbed, prone to flooding and erosion, with masses that are less than ideal for construction. Moreover, the former company town is characterised by temporariness: "The town is built on a temporary idea. It was kind of built around the mines and not for developing a long-term society", an architect explained. This also includes the buildings and infrastructure in town, which often have a short lifespan: "What was built before was not supposed to last for long, it was never intended to last for 30–40 years", she continued. Many buildings are moreover of poor structural quality. Part of the present housing stock has outlived its intended life span and was never intended for long-term and high-quality living in the first place. Longyearbyen's built environment is thus susceptible to impacts of climate change, and these vulnerabilities are very much related to its history as a coal mining company town.

Observed physical impacts

The societal impacts of climate change my interview partners identified are tangible and visible impacts on the built environment, and these are the impacts that are considered most pressing. Avalanches came up in almost every interview. Longyearbyen was hit by two major avalanches in December 2015 and February 2017. The first hit ten houses in the neighbourhood *Lia* and killed a child and an adult. The second destroyed houses in the same neighbourhood. These traumatic events mark a great rupture in the recent history of the town (*reference anonymised*) and have become a powerful symbol of climate change impacts, playing a decisive role in climate change adaptation. Avalanches threaten infrastructure and buildings in *Lia*, in *Nybyen*, and on the other side of the valley, above *Skjæringa*. In *Haugen*, the main problem identified is slush avalanches, which threaten a bridge and technical infrastructure. Another concern literally underlying many challenges is the permafrost ground, inherently unstable, always on the move and with a deepening active layer as temperatures rise. This may destabilise existing buildings and structures. The unstable permafrost also impacts the road network, an impact that is reinforced by precipitation. This also raises concerns for the local freshwater reserve, *Isdammen*, which is dammed up by a road. The unstable ground conditions furthermore create challenges for the airport strip. Outside of town, a related concern is coastal erosion, which has led people to move their cabins away from the coastline, and is damaging the road. Another challenge related to thawing permafrost is that it might release pollution locked in the ground around town. Several interview partners pointed out that many of these challenges exist already under normal conditions, due to seasonal thawing and general movement in the ground, and that a deepening active layer due to climate change only adds to this. Ice patches constitute another challenge, as they pop up unexpectedly and can damage infrastructure and buildings: "the past years a lot of ice patches have appeared, probably because we have these mild periods and then the water gets pressed up", an engineer explained. Permafrost thaw is furthermore considered a problem in terms of landslides. Moreover, old constructions, including the wooden trestles from the mining industry, declared as cultural heritage, and wooden piles are starting to rot as a result of a warmer and wetter climate.

The built environment in Longyearbyen is thus put under pressure by different, often interrelated, environmental processes. The interview partners are acutely aware of climate change and directly relate experienced challenges and observed impacts to a changing climate. This knowledge and awareness of the situation indicates strong adaptive capacity (Marshall et al., 2013). Interestingly, these impacts are often described by the interview partners as not concerning them personally, but rather to be a challenge for society. In the words of an urban planner: "They [environmental changes] do not impact me directly, but I see that they affect society as a whole". The interview partners frequently distinguished between impacts on society (and nature) and impacts on their personal life, which indicates a perceived disconnection between the self and the natural environment and society. This notion has been described by Ingold (2008) as a "view of the environment as a globe", which the detached human views from the outside, representing separation of humanity from nature. The "globe view" is rooted in modernity and implies a view of nature as manageable, which we will see is also reflected in the interview partners' understandings of adaptation.

Uncertainty and unpredictability

> "There is great uncertainty in knowledge that we used to rely on. [. . .] So climate change challenges us quite a lot, because it changes the conditions. When you can't build on the knowledge you had, then what are you supposed to build your knowledge on? That is what is difficult and that is what we don't know yet in many cases."

This quote by a bureaucrat in the technical department of LL illustrates what many of my interview partners emphasised: that in addition to the mere physical impacts, climate change creates uncertainty and unpredictability, which pose major challenges for urban development, planning and construction in Longyearbyen. The avalanche in 2015 came as an extreme shock to the community and marked the beginning of rapid development of security measures against geo-hazards. However, it was the avalanche in 2017 that clearly indicated that the environmental conditions were changing and that previous knowledge in many cases no longer could be trusted. In the words of an engineer from the technical department in LL:

> "In 2017, when the second avalanche hits, NVE [the Norwegian Water Resources and Energy Directorate] is in town. So they sit here at *Næringsbygget* [the premises of LL] and discuss avalanches with LL, there are observers out in the field and they cannot predict the avalanche, because they rely on old assumptions, old parameters, old history. So climate change has been there and changed these premises, and then you can't see the whole picture, you cannot predict the avalanche and then comes the second avalanche. [. . .] If the avalanche is a direct consequence of climate change

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> or not, that can be discussed, but there is no doubt that climate change alters the suppositions."

Climate change thus alters the premises of knowledge used to be considered sound. This creates uncertainties and may ultimately result in risks. A local architect expressed that the knowledge base changes at a fast pace: "And just during the time that I have been up here, we have changed the avalanche zones twice. So what is the truth today, and what is the truth in 5, 20, 50 years, that is very hard to predict".

This confirms that what has been claimed regarding local knowledge elsewhere in the Arctic – namely that unpredictability due to climate change threatens to erode traditional knowledge and skills (e.g. Krupnik & Jolly, 2002) – also applies to Western, science-based knowledge and competencies.

Adaptation measures

The avalanches in 2015 and 2017 marked a decisive turning point in climate change adaptation in Longyearbyen and continue to shape climate change discourses and adaptation. My interview partners narrate that the avalanches "gave climate change a face". After 2015, climate change adaptation was put higher up on the local and central political agenda for Longyearbyen and the work against geo-hazards was greatly intensified. Climate change became a serious factor to consider in this work and in urban planning, which is increasingly based on climate projections.

Responsibilities in climate change adaptation

The interview partners consider climate change adaptation a *public* responsibility, to be managed by the local administration and supported by the state. This is related, on the one hand, to LL's responsibility for the entire infrastructure of town. The big projects, such as the securitisation of the river and avalanche protection measures, are decided upon and carried out by LL, and smaller-scale adaptation measures, for example the implementation of new building regulations, are a political decision. This is not unique for Longyearbyen: in Norwegian climate policies, the municipalities are given great responsibility for adaptation (Ministry of Climate and the Environment, 2012-2013). However, in Longyearbyen, the state also plays a decisive role in adaptation. This is related to ownership: the state owns practically all ground in Longyearbyen, and most housing is owned by the state and larger companies, with only 13% of the housing stock owned by private individuals (Longyearbyen Lokalstyre, 2019). This, in combination with a high population turnover, makes individuals less inclined to feel responsible for climate change adaptation of the built environment. Furthermore, the resources that the local government has at their disposal for hazard security measures stem directly from state transfers. Moreover, the central government recently redefined "which level of climate change" must be used as a "premise for planning" locally, as a planner at LL explained: "It is the government, through their *Stortingsmelding* [white paper], that decides that we must be precautionary and use RCP8.5 [the highest greenhouse gas emission scenario] as the basis for projections. So that defines our work concretely".

The state also plays an active role in carrying out the adaptation measures. In the implemented and ongoing projects for securing the town against hazards, the local government is responsible for planning and implementation, while the state assists with expertise through the Norwegian Water Resources and Energy Directorate (NVE) and funds most of the projects. However, the state is sometimes criticised locally for not contributing enough, as an employee in the administration of LL pointed out: "It is a problem that the state does not provide the needed financial means for adaptation". Also the Local Council has expressed its concern that it is overwhelmed by changes that require action. In 2018, the leader of the Council said to *Svalbardposten* that it "might seem that one forgets that the Local Council also has large expenses related to natural hazards", criticising the state for prioritising state-owned infrastructure in climate adaptation (Engås, 2018).

Physical adaptation: urban development, construction and security measures

"In 2015, the avalanche, that changed things. After that, they built all these new houses. It had an impact on where things have been built since then and where they will be built in the future", a participant in a focus group on urban development in Longyearbyen described (LPO arkitekter, 2021). Adapting the town to a changed risk picture has become a main driver behind urban development in Longyearbyen. A planner told me: "Before, the town moved after the mines. Now we move it away from natural dangers". Since the avalanches, the areal plan has been revised and new risk zones have been defined. The current areal plan includes a transformation of the town, where housing is moved out of the avalanche zones, existing neighbourhoods are densified and new ones developed (Longyearbyen Lokalstyre, 2020). As a result of the new risk zones, in 2019 the work with demolishing 139 housing units within these zones in *Lia* began. On the other side of the valley, a kindergarten and a road are permanently closed due to risk of avalanches and landslides. Permanent and temporary evacuations, such as the closing of the kindergarten expansion *Rødsildra* which was built as late as 2019, are implemented as new risk evaluations develop. As the state has made it clear that it would not invest in avalanche protection in *Nybyen*, also this part of town is being emptied, as the student housing, the art gallery and the crafts centre are relocated to the city centre. The guiding principle behind these developments is to "get people out of the avalanche zones", in the words of a planner. This is a challenging task: the area for urban development in Longyearbyen is very restricted, both due to topography (limited area to build on) and because the state has made it clear that further growth and infrastructure development are not desired (Norwegian Ministries, 2019, p. 6). Hence, compromises in urban development are made: moving houses out of the avalanche zones seems to be the main priority, and considered worth the risk of constructing on the riverbed (*Elvesletta*), an area with unstable ground conditions, prone to flooding.

The interview partners explained that also building practices are starting to change in response to a changing climate. In general, constructions in Longyearbyen today need to more strictly follow building codes and regulations than during the town's company town past. According to several interview partners, construction in Longyearbyen is done more "properly" today, and buildings are intended to be built with higher quality materials and a longer lifespan. This includes building foundations more suited to unstable ground conditions and an increasingly active upper permafrost layer, by digging deeper pile foundations and using steel piles. As an engineer told me: "Much has changed from when I was a student here ten years ago. The attitude towards the depth of piles and foundations, before it was just like 'drill a six meter hole and it will work anyway'." Whether this increased focus on higher building standards better suited to thawing permafrost actually results in greater quality and longer lifespan of buildings remains to be seen.

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Security measures to protect the town against environmental hazards are considered another main adaptive strategy to deal with climate change in Longyearbyen. The largest projects in this regard are the securitisation of the river *Longyearelva* and the avalanche protection measures in *Lia* and *Sukkertoppen*, as well as the measures to protect against slush flows in *Vannledningsdalen*. Permanent physical measures include avalanche fences, snow-catching fences and a dyke, as well as erosion prevention along the shores of the river, in addition to different forms of monitoring, by the use of sensors, cameras and field observations, a local avalanche forecast, and a regional public avalanche warning system. Temporary security measures include evacuations and emergency preparedness, as well as regular bulldozing of the snow masses to prevent slush flows in *Vannledningsdalen*.

Previous research has shown that in order to take action against climate change, people need to feel that climate change is a relevant issue (Aitken, Chapman, & McClure, 2011), and the need to adapt must be recognised (Dannevig & Hovelsrud, 2016). In Longyearbyen, the avalanches of 2015 and 2017 put climate change and adaptation on the local and state political agenda, and the "issue salience" (ibid.) of climate change adaptation is currently significant. The avalanches served as "focusing events" for reactive adaptive strategies, which has been found to be typical in Norwegian municipalities (Amundsen et al., 2010). Urban development and planning, changing construction practices and physical securitisation measures are today the main adaptive strategies for dealing with climate change in Longyearbyen. Efforts to deal with avalanches have become a top priority of LL in this regard. Like in other municipalities (Dannevig et al., 2013), adaptation competes with other, sometimes considered more pressing, tasks, and issues that were once considered crucial, such as fire security, receive less attention. A local scientist described the situation as follows: "Avalanches have become the main buzzword. Put 'avalanche' on any application and it will go through". In urban development, other risks, for example flooding or unstable ground conditions on *Elvesletta*, are accepted in order to avoid building in avalanche zones. Furthermore, the extensive security measures against avalanche risks are often viewed critically locally. The demolition of 139 residential units was initiated in the middle of an already hot housing market and contributed to what was locally referred to as a "housing crisis" in Longyearbyen (Røsvik, 2018). This decision has been criticised by many, who feel that demolishing houses in addition to constructing avalanche fences and a dyke in the same area was invasive and unnecessary. The critique is further fueled by the fact that the demolishing serves increased state control over the housing stock in Longyearbyen, as the new houses that were constructed thereafter are state owned. This fuels local criticism against the security measures and speculations regarding the intentions behind them, even by people well aware of the avalanche risks. A local scientist I interviewed called the demolishing of houses "a sneaky way for the government to gain more control", an interpretation which might undermine local acceptance of physical security measures and ultimately climate change adaptation.

Adaptation in a "community of experts": The role of experts and scientific knowledge in adaptation

Longyearbyen can be described as a "community of experts". Research and education are defined as Longyearbyen's main economic "legs" in addition to tourism (Ministry of Justice and Public Security, 2015-2016), and the town has become a hub for Arctic climate change research. The research and education sector accounted for almost 15% of the total person-years in Longyearbyen in 2019 (Statistics Norway, 2020b). Local research institutions include The University Centre in Svalbard (UNIS), the Norwegian Polar Institute and the Arctic Safety Center. Moreover, several consulting firms have local offices in town, and LL employs several engineers, planners, etc. in its administration and technical department. The population of Longyearbyen thus consists of numerous "experts" in the sense of holders of Western scientific knowledge about the environment and technical skills for how to deal with it, including how to build and maintain a town within this environment, whereas expert communities normally are not localised but connected through their expertise, in Longyearbyen the experts are residents. My interview partners clearly consider formal, Western scientific knowledge and expertise the key to dealing with the impacts of climate change, a view that is reflected in local and State policy documents regarding the town. Moreover, not only formal knowledge but *local* formal knowledge is considered key for climate adaptation. It was often emphasised that Svalbard requires specific solutions, and that "*fastlandsløsninger*", mainland solutions, mostly do not do the trick.

The local government increasingly draws on this bundled local formal knowledge and expertise for adaptation, after the avalanches there has been increasing collaboration between different actors to deal with environmental challenges, such as the group for developing avalanche security measures. There is collaboration between the local government and UNIS, and good dialogue between members of both institutions, especially regarding permafrost. There is a newly implemented effort aimed at increasing the transfer of knowledge between UNIS and LL, including student projects that can be of direct use for the latter. Still, some interview partners pointed out that there is room for improvement of this collaboration, and that gaps between research and practice persist. Furthermore, the private building and construction sector is not very much integrated in this knowledge exchange, and neither are knowledge holders outside of institutions, such as retired or former employees of the local government or the mining company *Store Norske*, responsible for running the town before the instalment of the local government.

Not only are there many relevant knowledge holders in Longyearbyen, the knowledge base for climate change adaptation is also at a high standard. There is a growing body of publicly available research and reports about environmental conditions on Svalbard and in Longyearbyen, of which much is produced locally. There is an increase in projects on environmental changes that include local actors such as the local government or the Governor as partners, to ensure local relevance of the research, and that draw on a more diversified and participatory way of knowledge making. Climate projections form a central aspect of the knowledge base for adaptation in Longyearbyen today and are by my interview partners considered crucial for dealing with uncertainties. In the words of a representative of the technical department of LL, climate projections define "the level of climate change that we must use as a premise for planning". The work with climate projections and how different climate scenarios might result in changing local environmental conditions for Svalbard and Longyearbyen, in particular, was intensified after the avalanche in 2017. They have been central in the development of the local avalanche warning system, in defining new avalanche risk zones, and provide the base for public construction projects. Also architects and construction firms in town are adapting their projects to these projections. An employee in one of Longyearbyen's

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larger construction companies told me that climate projections are important "steps towards better control" and crucial for dealing with changing conditions.

This and similar quotes also indicate the importance my interview partners attribute to scientific knowledge and skills, and consequently of experts who encompass these, in dealing with climate change and for "controlling" a changing environment. Decisions are made on the basis of scientific reports and projections, and there is a profound trust in "experts" and scientific knowledge. Adaptation is thus approached in what is considered a rational, evidence-based way. There is a broad localised knowledge base available to inform adaptation, indicating a great capacity for rational, planned, knowledge-based adaptation. As much of this knowledge is produced locally, and many of the experts are locals, in the case of Longyearbyen the dichotomy often referred to in climate change research between "locals" and "scientists" or "experts" becomes blurred.

Understandings of adaptation

Adaptation: Physical, necessary and feasible

> "When I refer to Longyearbyen as a window for climate change, I mean that the world needs to understand that these changes, and this transformation, will happen in other places soon. And we need to be able to transform, if not, this society will not make it and be shut down. [*Name of author anonymized for peer review*]: *What do you mean, how would this transformation look like?* "If they wouldn't be willing to invest in the society, by building avalanche protection, then we would have to close down large parts. If they would not be willing to invest in securing the river, then we couldn't have built any of the buildings that stand there today. And then half of the society would've been gone. So if we want to maintain a society, we need to be willing to invest, and transition into something else. Because if not, climate change catches up with you, that's the way it is." [*Name of author anonymized for peer review*]: *What do you mean by transition into something else?* "That we find a way to make stable foundations."

This excerpt of a conversation with a representative of the administration of LL is telling for the way that climate change adaptation is talked about and conceptualised by many of my interview partners. When asked about climate change adaptation measures, they mainly spoke about physical measures, in the realm of urban planning, development and construction, as well as the protection against environmental hazards. The impacts that are considered needed to be dealt with are physical impacts of present and projected environmental changes on the built environment. This approach to adaptation is closely related to the impact of the avalanches, and the perceived pressing needed to secure the town against geo-hazards. Climate change adaptation is thus first and foremost understood as something physical: finding technical solutions to physical problems, as expressed in this quote by an engineer in the technical department of LL: "We just drill the piles further down to get them to stand. Yes, things like that, we just have to adapt to the reality we live in. Put on masses from the mainland; make sure we handle the over-water well, stuff like that".

The quote above also illustrates another trend in the various interviews: that climate change adaptation is considered as necessary. Adaptation is furthermore considered a pressing issue, to be dealt with already today:

> "I feel that we have to deal with them [climatic changes] today. The society is kind of not made for the weather we have today, so it has already arrived full force it seems. It is not something we can prepare for fifty years up here. It is pouring outside now, in December. [. . .] And when the buildings are starting to fall down around us . . . The society is not made for this. So, yes, you kind of have to plan already today."

The engineer in the technical department of LL who this quote stems from referred to "the society" as the built environment, and went on to explain how much of the infrastructure and houses in town are not suited for a warmer and wetter climate, how they are built in exposed places and built with a short lifespan and with bad quality. He and others expressed that there is a strong need for adaptation if Longyearbyen is to be maintained. Even those doubting human influence on climate change and irritated by the constant focus on climate change in Longyearbyen talked about adaptation as something that is simply necessary. An employee in the construction sector, who minutes before had expressed his doubts about anthropogenic climate change, said to me: "We will have to equip a bit more for extreme weather, all kinds of things, rain, warmer weather, storms . . . ".

Adaptation to climate change is furthermore considered as feasible. A point the interview partners repeatedly emphasised was that technical solutions to deal with the changes exist, and that infrastructure and housing can be adapted to changing environmental conditions. In the words of an engineer at the technical department of LL: "From an engineering standpoint, most problems can be solved. [. . .] So, the infrastructure itself, it will survive. It is man-made, so we can adapt it". They also expressed confidence that it will be possible to build and live on Svalbard in the future, as this quote by a planner illustrates:

> "We will be able to live here in the future. But there are things that will happen in town, so we will have to do something in the meantime. [. . .] I don't believe that they [climatic changes] impede life here, then the changes would have to be larger. [. . .] One can still live here, but maybe not build in the slopes."

The discourse of safety and rhetoric of fear

As can be observed in Local, National and International media, as well as in policy documents and political statements, adaptation measures implemented after the traumatic avalanches in 2015 and 2017 have been accompanied by a discourse of fear and safety. This discourse, also voiced by local politicians and in state policies, expresses the assumption that climate change (i.e. the avalanches), threatening people in the place where they are supposed to be the safest – their homes, triggered fear among the population. Consequently, to make people feel safe (again) has become a top priority in the governance of Longyearbyen. A local politician explained the situation from his perspective:

> "This is another consequence of ignoring environmental change, then you have fear in society. You have a local population that is afraid. And then you have a huge challenge. [. . .] If the government does not acknowledge this we will have big consequences. [. . .] And all of a sudden there is something that makes the city unattractive. People seek safety and if you don't have safety, you don't have people. And that is a huge consequence of climate change. [. . .] So what I'm saying is that the government needs to take climate change seriously and they need to be able to adapt."

Here, climate change is portrayed as creating fear among the inhabitants of Longyearbyen, which ultimately is considered as making the city unattractive to live in. There is a particular focus both in the local government and in governance policies related to Svalbard on "*bolyst*", the will to live in Longyearbyen, in particular by Norwegian families. As this quote illustrates, safety, installed through security measures against geo-hazards, is by the local government considered a major factor contributing to "*bolyst*"

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(Longyearbyen Lokalstyre, 2021, p. 17), and to ensure safety has thus become a matter of utmost political importance. Safety has become a guiding principle in the administration and governance of Longyearbyen, as well as a main premise for planning and urban development, as stated by another representative of the LL administration: "Safety comes first and everything else needs to adapt". In this discourse, safety legitimises measures that are by many considered as extensive, invasive or even unnecessary, like the demolition of housing in addition to fences and a dyke *Lia*. These measures are in the official discourse portrayed as necessary to re-install safety, or, in the words of a local politician, to "create safety": "Here we took it extremely seriously and adopted a high standard to implement and create safety". To demonstrate power of action, through extensive security measures, demolition of houses, evacuations, etc. is considered key to safeguard the feeling of safety in town. As expressed by a bureaucrat in the technical department in LL: "Generally I would say that people feel safe, because they see that the government acts, they see that measures are taken, they see that the town is moved, they see that we build avalanche protection. But you have to do something. [. . .] It is very important to take measures before something happens, because the consequence of not doing it is fear". This focus on safety, and accordingly, risk acceptance, is a political decision in Longyearbyen. At a meeting in 2020 of the local council where the security measures in *Lia* and *Vannledningsdalen* were discussed, the technical department presented the progress of the project and a plan proposal for further work. After presenting the facts, the sectoral manager turned to the local politicians and said: "Which level of risk is accepted is a political decision. Risk acceptance, that's up to you to decide". The political goal of making Longyearbyen a (Norwegian) family community has great influence on the politically defined risk acceptance. My interview partners often pointed out that when the town was built, the demands for safety were completely different than today: "It was a much higher risk to work in a mine [. . .] So they did not think about that there was a high avalanche danger, the risk is much higher at sea or in the mine", an LL engineer told me. Today, both the local government and inhabitants have a lower risk acceptance, and different demands and expectations regarding safety.

Interestingly, several of my interview partners voiced criticism against this strong focus on safety and the low risk acceptance. A planner expressed her concern that strict precautionary measures sometimes complicate planning and urban development:

> "The government has said that we must assume RCP8.5 for projecting. And this creates great challenges in terms of what we must account for. And it will be expensive. I'm not saying that it is wrong, but I see the consequences of this, it is almost so that it is not feasible. Or, it is feasible, but it becomes disproportionately costly. I feel that in all reports they just put buffer upon buffer all the way and in the end it's almost impossible to implement, and that is challenging. That you're supposed to be so sure always that in the end it just stops."

The central political decision to assume the worst-case emission scenario as a basis for projections and planning is described as challenging and costly, and what is implied as being an exaggerated precautionary principle is criticised.

The official discourse surrounding climate change adaptation in Longyearbyen thus draws on the assumption that environmental changes create fear among the population, and that safety can be re-installed through the demonstration of action through implementation of extensive physical security measures. This strong emphasis on safety regarding avalanches, and the consequent strong precautionary measures must be seen as an attempt by local and state authorities to restore trust in their ability to safeguard the town against avalanches, after the avalanches in 2015 and 2017, through acting fast and resolutely. In the field, I often heard criticism against the local authorities and their perceived shortcomings for preventing the avalanche hazards from occurring. A long-term resident criticised LL for "not listening to those of us who knew that there have been avalanches in these slopes before", and that regular avalanche monitoring came to a halt when LL took on the community services from the coal mining company *Store Norske*. For context, the parents of the girl that lost her life in the 2015 avalanche sought compensation from LL, the Governor and *Store Norske*, thus holding them accountable for the accident. In this light, it is understandable that LL is looking to prevent another disaster from happening.

The key to understanding the critique of the strong emphasis on safety and the rhetoric of fear might lie in the emphasis on "creating safety" through demonstrating power of action in the face of climate change. In the field, I often heard the comment that demolishing the houses *in addition* to constructing avalanche fences and a dyke is invasive and exaggerated, and that the decisions involved were made too hastily. The measures are sometimes perceived rather as a demonstrative act than actually necessary, which stirs criticism. The same applies to the critique stemming from those involved in urban development and construction: the applications of very precautionary measures are sometimes perceived to be *too* precautionary ("buffer upon buffer", "That you're supposed to be so sure always"). Furthermore, there is limited evidence that power of action actually enhances feelings of safety, and that feeling safe contributes to "*bolyst*" – the will to live in Longyearbyen – but this would have to be investigated further. Another aspect of the critique of these measures is that they are often suspected to serve other interests than solely climate change adaptation. Especially, the demolition of houses is by some interpreted as part of a larger strategy for increased state control over housing in Longyearbyen. The process of demolishing 139 residential units as part of the avalanche securitisation was begun in the middle of the abovementioned housing crisis, and the new houses that were built to compensate for them are on state hands. These speculations fuel mistrust in climate change adaptation actions and narratives of local and state authorities and may ultimately be a hinder for successful adaptation.

Challenges to adaptation

As demonstrated above, the interview partners agree that adaptation is possible, and that the technical solutions to dealing with climate change exist. However, there are several non-technical challenges to adaptation. As an engineer in the technical department of LL pointed out: "Most can be solved technically, but it is the economy it depends on, and the priorities regarding what is important for society".

Long-term place attachment is often emphasised as crucial for communities' capacity to deal with environmental changes, as it entails environmental knowledge and skills (Amundsen, 2015). In Longyearbyen, however, the high turnover of the population results in a lack of memories, observations and stories about past events that could inform current risk assessments and documentations of change and thus represents a main challenge for adaptation. The present turnover rate of the population in Longyearbyen is about 20%. Numbers from the local tax office

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show that in 2020 over 60% of the population had been living in Longyearbyen for less than five years, and only 6% have been living there for longer than 20 years. A short collective memory might hinder that previous events, such as avalanches or landslides, are taken into account in the development and maintenance of the town.

In this regard, several of my interview partners emphasised institutional discontinuity as a challenge for adaptation. When local democracy was instituted in Longyearbyen in 2002, LL resumed the responsibility for the provision of public services, including infrastructure, housing, and area and community planning, from the coal mining company *Store Norske*. New people took on the new positions, and there was limited knowledge transfer. A similar challenge is found today, as people typically occupy positions only for a short time. As people go in and out of positions, knowledge gets lost. Interview partners from different sectors explained that it typically takes at least a year before people are acquainted with their job and the specific challenges and topics. One interviewee working in the local government added another nuance, describing the turnover as "scary" in the sense of potentially dangerous:

> "On the mainland you often have a solid political memory, people are sitting in the local government for ages, they are passionate about their parish and have their agenda, right, they are there with a purpose. Here we have a big turnover in politics, and that means that we have neither administrative memory nor political memory and the combination of those two is what makes this scary."

Not only memories about past conditions and events but also formal data that are crucial for climate change adaptation are lost due to turnover, a local geologist emphasised:

> "As things get turned over you lose some of that more abstract knowledge. But then there's also probably datasets that we don't even know about, that sat on somebody's computer, that they forgot to dump onto the LL server or something and then they walk off and you lose a couple of winters of some weird snow data and just nobody knows about it."

My data suggest that this is a challenge in all sectors: administration, research, politics and consultancy, with exception to parts of the construction sector. As place-based knowledge is crucial for successful adaptation (Nelson et al., 2009), high turnover, limited knowledge transfer and institutional discontinuity present challenges for adaptation.

Another challenge to adaptation, which was emphasised in several interviews, is the steep costs involved in adaptation and construction according to the climate projections. Especially, future costs involved with adapting existing infrastructure and buildings to permafrost thaw, which will require new foundations, were highlighted. As a member of the administrative staff of the LL explained, the institution now finds itself in a situation where different environmental pressures require action simultaneously, and the sum of several projects becomes a challenge:

> "When we first get a [invoice] down at the river and then a [invoice] up here in the slopes, and then a [invoice] for securing the energy station, and then some millions because we're demolishing our houses and build new ones... Suddenly all these portions involved with the transformation become so big that a small community cannot carry it. So it is the sum of all these changes that make us struggle."

It was mentioned by several interview partners that the agency of the local government is limited by the fact that it does not receive an income from taxes, but is directly reliant on yearly state transfers, which in some cases also complicates long-term planning.

Another challenge to adaptation identified by my interview partners is the limited space for urban development in Longyearbyen. Hovelsrud et al. (2020) have identified this "adaptation dilemma", which they relate to a complex institutional and policy context, where "climate change creates hazardous conditions which require the local spatial planners to develop new safe housing areas, but the strict environmental protection limits the action space" (ibid., p. 1). To this I would add that the state has emphasised that further urban growth in Longyearbyen is not desired, which in combination with an environmentally circumscribed town and areas defined as cultural heritage, gives urban planners limited space for urban development, thus having to deal with less-than-ideal environmental conditions.

Social science climate change literature suggests that challenges to adaptation are often of social, economic, cultural or political nature, rather than technical (e.g. Ford et al., 2015). This is also the case in Longyearbyen, where challenges to adaptation – turnover, limited knowledge transfer, institutional discontinuity, steep costs of adaptation and limited space for urban development – are of a non-technical nature.

Discussion

My data (Fig. 2) show that the interview partners observe physical changes in the environment which they relate to climate change, and impacts on the built environment are their main concern. Climate change impacts on the built environment in Longyearbyen have to be seen in relation to underlying vulnerabilities, related to the company town past. Since the avalanches in 2015 and 2017, the awareness and issue salience (Dannevig & Hovelsrud, 2016) of climate change is notable in Longyearbyen and adaptation has been added to the local and state political agenda, which in other contexts has been found to be an important precondition for adaptive capacity (e.g. Marshall et al., 2013). The avalanches have created awareness about climate change and were "focusing events" (Amundsen et al., 2010) for adaptation. What is often portrayed as proactive adaptation measures can thus be said to be rather reactive attempts to adapt a town not constructed with a long lifespan to a challenging location in an increasingly changing environment. These events have a substantial impact on urban planning and development, resulting in a strong focus on physical securitisation measures, as well as the consideration of climate projections and the development of monitoring systems. The latter might indicate that climate change adaptation in Longyearbyen is becoming more proactive (ibid.), and that adaptation to *future* climate change is becoming a priority in Longyearbyen.

Climate change adaptation in Longyearbyen is considered a public responsibility, to be managed by the local government in collaboration with experts and supported by the Norwegian state. Several of my interview partners consider adaptation ultimately a responsibility of the state, and that the ability to adapt the town to a changing climate depends on the state's willingness to invest in the town in the future. In the words of a planner: "It is the state that decides if we will adapt in the future, if Longyearbyen will exist a hundred years from now". This assumption also implies a certain disclaimer and reflects a common sentiment in Longyearbyen that "everything" locally is ultimately decided by the state. Adaptation in Longyearbyen thus forms part of Norway's Arctic policies, and from today's viewpoint, there are reasons to assume that the (geo) political aim of a Norwegian political presence (Pedersen, 2017) on

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Section	Findings	Implications
Observed changes and experienced impacts	The interview partners observe a variety of environmental changes that reflect scientific findings.	Environmental changes in Longyearbyen are observed locally.
	The interview partners point to various underlying vulnerabilities of the built environment of Longyearbyen that are related to its past as a company town, which make it susceptible to climate change impacts.	Climate change impacts on the built environment in Longyearbyen are a result of the combination of climate change and underlying vulnerabilities.
	The interview partners observe and experience a range of climate change impacts on the built environment, and these are the impacts that are considered being of most concern.	Climate change impacts are considered a physical challenge.
	The interview partners distinguish between impacts on personal life and on nature and society.	The interview partners express a modernist conception of the environment which is perceived as separate from humans.
	The interview partners are concerned about unpredictability and uncertainties brought about by climate change.	Climate change challenges urban planning, development, and construction.
Adaptation measures	The avalanches in 2015 and 2017 put climate change adaptation on the agenda and define urban development today.	High issue salience of climate change and adaptation. Adaptation has to date been reactive.
	Adaptation is considered a public responsibility.	Adaptation is top-down and planned.
	Adaptation practices are physical and directed towards impacts on the built environment and the protection against geohazards.	Adaptation is approached as a physical challenge to be solved by technical means; narrow approach to adaptation.
Adaptation in a "community of experts": the role of experts and scientific knowledge in climate change adaptation	There is a broad knowledge base for adaptation in Longyearbyen.	Considerable adaptive capacity for knowledge-based, rational adaptation.
	The interview partners consider scientific knowledge and expertise as crucial for climate change adaptation.	Knowledge-based, rational adaptation; limited use of informal knowledge in adaptation.
Understandings of adaptation	Adaptation is considered necessary and feasible, adaptation is considered a physical process.	"Techno-fix optimism" approach to adaptation.
	Adaptation is accompanied by a discourse of safety and fear.	Adaptation understood as a reaction to risks.
Challenges to adaptation	Turnover, institutional discontinuity, limited resources, and limited space for urban development challenge adaptation.	Social, economic, and cultural challenges to adaptation (rather than technical challenges).

Figure 2. Summary of findings and implications.

Svalbard will ensure the necessary investments for adapting the town to a changing environment at 78° North.

A main aim of this article was to examine current adaptation practices and how adaptation is understood by those involved. Physical impacts on the built environment were seen as the main challenge to deal with locally. The interview partners often distinguished between impacts on the self and impacts on nature and society, which indicates a worldview rooted in a Western, modernist understanding of the human as separated from the environment (Ingold, 2008). They expressed a "view of the environment as a globe" (ibid.) in which humans can manage and control nature from which they consider themselves as detached. This understanding underlies adaptation concepts and practices in Longyearbyen. Adaptation is about finding technical solutions to physical problems, with a focus on adaptation in urban development and planning, and construction. The focus lies on security measures against natural hazards, with a strong emphasis on avalanches. Adaptation is understood as technological interventions and the bolstering of infrastructure in response to specific risks, whereas research often highlights the role of traditional ecological knowledge and skills as crucial for adaptation (Nakashima, Galloway McLean, Thulstrup, Ramos Castillo, & Rubis, 2012); in Longyearbyen formal, Western scientific knowledge and expertise are considered the key to dealing with the impacts of climate change. Problems are to be solved by technological solutions exerted by experts in the sense of holders of formal knowledge and skills, informed by a broad scientific knowledge base. Adaptation is thus understood and practiced as a "techno-fix" (Thornton & Manasfi, 2010), informed by a Western approach to nature as something that can be dealt with by the means of science and technology. As shown above, adaptation is considered as feasible: The technical solutions exist, it is rather a question of priorities and resources. This can be interpreted along the lines of a "techno-fix optimist" Anthropocene narrative, according to which human ingenuity and technology are the solution to climate change (Thornton & Malhi, 2016). This modernist interpretation of the environment implicates a view of nature as "manageable", and even a changing environment can be dealt with by the means of science and technology, through intervention (Ingold, 2008). This understanding is heavily dependent on the sample of this research, those responsible for climate change adaptation in Longyearbyen: representatives of the local administration and politicians, engineers, technicians and planners, people from the construction sector. They largely match the category of "hierarchists" identified by Dannevig & Hovelsrud (2016; see also O'Riordan & Jordan, 1999), working in a hierarchical system that provides social control and with a general acceptance of scientific knowledge, requiring predictability, tending to see problems as structured and accepting state intervention as long as it is legitimised. There is thus strong adaptive capacity in Longyearbyen regarding a specific form of adaptation: planned, rational, knowledge-based adaptation in the form of technical solutions to physical problems. As priority is given to scientific knowledge and experts, informal knowledge and skills – which are crucial for adaptation (Nakashima et al., 2012) – are often not considered. Notwithstanding the high turnover, there are individuals that have been living for a long time in Longyearbyen and have an environmental memory spanning back in time, as an architect emphasised: "*Gamlekara* [long-term residents] sit on a lot of valuable knowledge. If you ask them, they tell you where something has happened in the past, they remember all the past avalanches. [. . .] But no one asks them". Especially in the context of extreme turnover, adaptation could contribute a lot from integrating local and informal knowledge.

Concluding remarks

Technological measures to prevent physical impacts on the built environment are obviously an integral part of dealing with a changing climate. Without repudiating the importance of such efforts, this focus however runs the risk of downplaying other aspects of adaptation. The "techno-fix" understanding of adaptation and the related practices in Longyearbyen indicate an "adaptation bias" (Thornton & Manasfi, 2010), including "a reliance on bolstering existing infrastructure through 'techno-fix' measures and a neglect of more socially transformative adaptation processes" (ibid., p. 149). Current adaptation concepts and practices in Longyearbyen imply a narrow understanding of adaptation and are not addressing the far more challenging task of transforming society as a whole. Although the local government, as well as the state, increasingly promotes the green transition in Longyearbyen, these efforts are more discursive than actually implemented. There are, however, various voices and efforts –both informal and institutionalised –that express a more holistic understanding of adaptation. These include a local sharing and recycling economy, collective clean-ups and indeed the search for a clean energy source to replace coal after the scheduled closure of the local coal mine and the coal-fueled energy plant. These visions point towards a broader approach to adaptation in terms of societal transformation: a vision of Longyearbyen not as a showcase for climate change but for sustainable living in the Arctic. There is a pressing need for social science research to follow Longyearbyen on its envisioned transition into a "green" future.

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Publication V: ‘Melting Worlds’ and ‘Climate Myths’: Diverging Stories of Climate Change in Longyearbyen, an Arctic ‘Frontline Community’

‘Melting Worlds’ and ‘Climate Myths’: Diverging Stories of Climate Change in Longyearbyen, an Arctic ‘Frontline Community’

Abstract

Climate change is a powerful story in Longyearbyen, the largest settlement on Svalbard in the high Arctic. While most natural science agrees on accelerating climate change with profound environmental impacts, this article unpacks the multidimensionality of the topic locally. By approaching climate change as a discourse, we explore the reception and reproduction of the dominant climate change discourse locally, and compare it to other stories about climate change and adaptation. With this we aim to contribute to the growing field of reception studies in anthropology (De Wit & Haines 2021, Rudiak-Gould 2011). Our data gathered through ethnographic fieldwork including interviews and informal conversations include counter-stories that nuance and contest the dominant climate change discourse. They point to over-simplification, sensationalism and the (mis)use of the climate discourse for other purposes. Such counter-stories must be listened to in order to move in the direction of fair, inclusive, and transparent climate change politics.

Keywords: climate change narratives; reception studies; Longyearbyen, Svalbard

Vignette: The Only Story in Town?

‘Here we live with climate change every day.’ Former editor-in-chief of the local newspaper Svalbardposten made this statement during the book launch of Our Frozen Water (Helgesen, Holmén & Sjøbu 2020) in September 2020 in Longyearbyen's public library. Earlier the same day, a journalist assured us that ‘climate change is the only story in town’. The dominant media story, backed up by a growing body of research, depicts Longyearbyen on Svalbard in the high Arctic as the hotspot of climate change. The archipelago attracts journalists, film crews, politicians, artists, tourists and other visitors who are keen on learning what it feels like when climate change is happening fast, in front of your eyes. It is portrayed as an alarming example of a heavily impacted place (e.g. Watts 2019), often creating a sensationalist doomsday mood. Also locally produced and more nuanced accounts of how climate change is impacting life in Longyearbyen, like the book ‘My World is Melting’ by local journalist and writer Line Nagell Ylvisåker (2022), contribute to painting a picture of Longyearbyen as a ‘climate-change frontier’ (Fraser 2019).

The Svalbard Global Seed Vault (seedvault.no) embodies this narrative in a powerful visual way. It is a unique and costly infrastructure built by Norway in order to secure safe and free storage for seed duplicates world-wide, with the purpose of globally protecting vital crop seeds in case of urgency. It is a spectacular project that has received massive media attention and several awards, becoming a cultural meme, with the most recent representation in the latest book of Maja Lunde's world best-selling environmental dystopia quartet, *The Dream of a Tree* (2022). The Seed Vault was opened in 2008 with great expectations of endurance, but had to close temporarily due to water intrusion. The leakage was explained by impacts of permafrost thaw combined with rising average temperatures and abundant rainfall. Both national and international media reported about the calamity within the climate change framework, implying that Svalbard was once cold and therefore safe as an eternal storage spot from melting away (e.g. Carrington 2017).

The local voices, however, presented a different view. One of those heard also in the media was Arne Instanes, at the time she was an adjunct professor in geo-technology at UNIS (University Center in Svalbard). Instanes refused the climate change narrative about the Seed Vault leakage as ‘a climate myth’ (Skjæraasen, Helledal & Klausen 2021). While according to NRK (the Norwegian national broadcaster), immediate reparations due to climate change impacts required 193 Norwegian kroner, there was a different problem causing the unexpected investment: ‘Bad planning and construction was the cause of the necessary maintenance after only 10 years, according to experts’ (ibid.). The Norwegian government reacted with surprise to the news about planning and construction issues, but we – the writing anthropologists – were not astonished. In interviews with knowledge holders such as researchers,

construction industry workers and building engineers, a view similar to the one of Instanes' was often present:

> Climate change did not really help the situation but it was certainly not the most important factor. [...] It is a known issue that construction activity causes damage in permafrost, which makes it behave differently than if we had left it in peace (ibid.).

Introduction: Ethnography opening up for multiple Stories

The story, or rather the stories introduced above lead us to this article's main aim: to explore multiple stories about climate change and adaptation in an Arctic climate-change 'frontline community' (Rudiak-Gould 2013). The dominant linear discourse depicting Svalbard as either a climate change victim or a showcase of technological solutions, both locally produced and projected onto the place, contrast with the multidimensionality of climate change narratives that we encountered in Longyearbyen. Not only are local stories more nuanced and complex than the dominant stories suggest, they sometimes also question and contest these narratives. While myth in anthropology refers to collective explanations of origin and conceptions of reality and have important social functions (Barnard & Spencer 1998: 386-389), Instanes ' 'climate myth' signifies a half-truth: blaming climate change for damaging buildings while leaving out other contributing factors, such as engineering mistakes or maladapted constructions. Here we thus listen for those minor stories (Cruikshank 2005, Katz 1996), in order to understand local climate change discourses in their complexity and multivocality. In so doing, we build on anthropological and related perspectives that approach climate change not only in its material but also in its discursive dimension as a social construct (e.g. Hulme 2009, Strauss & Orlove 2003), distinguishing between the physical processes of climate change and 'the patterns of interpretation related to these processes that find resonance in society '(Brüggemann & Rödder 2020: 3). In particular, we draw on and wish to contribute to what has been termed 'reception studies' (Rudiak-Gould 2011) in anthropological climate change research (see De Wit & Haines 2021 for a comprehensive review). Reception studies treat climate change as a 'scientific narrative, discourse, or idea' (De Wit & Haines 2021: 2) and examine how this narrative is received/rejected/reproduced locally. Here we take this approach to the local level and explore the reception of the dominant climate change discourse and compare it to other, more minor stories. Our aim is not to deem either narratives as true or false. Rather, we try to adopt a 'listening disposition' (Farbotko & Lazrus 2012) with the goal of bringing dominant and minor stories about climate change in Longyearbyen into critical conversation. The relevance of this endeavor is given by the urgent need for societal transformation in the face of climate change. As human action depends on interpretations of the challenge at hand, 'it is not only of academic interest, but also of practical importance to study local

discourses about climate change' (Brüggemann & Rödder 2020: 3). By reproducing one-sided climate change and adaptation narratives in places like Longyearbyen, we risk climate skepticism and a low level of trust in adaptation and mitigation measures. We thus follow Hulme's (2010: xxvi) prompt: 'If we are to understand climate change and if we are to use climate change constructively in our politics, we must first hear and understand these discordant voices, these multifarious human beliefs, values, attitudes, aspirations and behaviours.'

There is scientific consensus that climate change is pronouncing itself ever faster in Svalbard (Hanssen-Bauer et al. 2019), which justifies labelling the archipelago a climatic 'canary in the mine' (Rudiak-Gould 2013: 128). Our participants mostly agree on witnessing climate change related processes such as warming up, wettening, melting (glaciers), thawing (permafrost), disappearing (sea ice, coastal line, cultural heritage), appearing (new species in water and on land, old species in higher numbers), and threatening (avalanches, landslides, extreme weather events). Here we go beyond the description of these observations, and explore the dominant and minor narratives associated with these physical phenomena, colored by emotions, personal trajectories and values, or on a higher level by economic and (geo)political interests.

Drawing on long-term ethnographic fieldwork, we explore the dominant and minor stories about two main 'characters 'of climate change in Longyearbyen—avalanches and glaciers. Our results show that there are multiple and often diverging stories about climate change and adaptation in Longyearbyen. There are minor stories that contest the official climate change and adaptation discourse, and the latter are often perceived locally to be influenced by and working to support certain values and interests. The minor stories about the avalanches reveal the perception that the climate change and adaptation discourse works to support increased state control over housing and population in Longyearbyen, and those about the glaciers contain critiques of the dominant climate change discourse as being over-simplifying and sensationalist. Both indicate that climate change is not the only story in town. We contextualise these minor stories by relating them to the other stories going on in Longyearbyen, and show how they make sense when seen in relation to the bigger picture of changes that the town is undergoing. Climate change and adaptation in Longyearbyen is deeply intertwined with the structural changes from a mining to a service economy, as well as Norwegian authorities' efforts to maintain state control and a Norwegian settlement on Svalbard.

Longyearbyen, Svalbard: A fast-changing Town at 78 Degrees North

The stories we investigate were collected in Longyearbyen, a town with about 2400 inhabitants (Statistics Norway 2021) from more than 55 countries located on 78 degrees North. The town is currently undergoing major structural changes (Sokolíčková, Meyer, & Vlakhov 2022) that we argue constitute a

crucial context for understanding current climate change and adaptation discourses. Longyearbyen was founded as a mining camp in 1906 and was run as a Norwegian state-funded and state-controlled coal mining company town until the late 1980s. Its economy has since then been diversified and liberalised. Unstable coal prices and a strong political will of the Norwegian government to cease coal extraction has led to a sharp decrease in mining and the last operating Norwegian coal mine is scheduled to close in 2023. Tourism and the service industry, and research and education are now the main economic 'legs' (Hovelsrud, Kaltenborn, & Olsen 2020). Longyearbyen is the administrative center of the archipelago of Svalbard, which is part of the Kingdom of Norway through the international agreement signed in 1920 (in force since 1925) known as the Svalbard Treaty. The main aim of Norway's Arctic policies is to exercise sovereignty over Svalbard through Norwegian presence on the archipelago. Maintaining a 'Norwegian family society' (Meld. St. 32 (2015–2016): 39) in Longyearbyen, is seen as a main tool for this 'politics of presence' (Pedersen 2017). The term 'family society' (familiesamfunn) originates in white papers about the 'normalization' of Longyearbyen, depicting the transition from an almost all-male mining settlement to a community resembling those on the mainland in terms of demography, welfare, and public services (Arlov & Holm 2001, Evjen 1996). With the phasing out of coal mining and the growth in tourism, research, and the service industry, the share of non-Norwegian inhabitants in Longyearbyen is increasing, reaching 30% in 2021 (Statistics Norway 2021). These structural changes can be perceived as a challenge for Norwegian sovereignty over Svalbard (Moe & Jensen 2020, Pedersen 2017). We interpret direct and indirect signals such as increased state control over housing, stricter environmental regulations, and the proposed restrictions of voting rights for non-Norwegian inhabitants of Longyearbyen, as efforts to increase state control over and strengthen the Norwegian profile of Longyearbyen.

While Longyearbyen is often portrayed as a showcase of climate change, the Norwegian state and private entrepreneurs are making efforts to turn it into a showcase of the green transition and a hub of sustainable solutions in the Arctic. An important aspect of this is to transcend Svalbard's fossil past. The state is currently spending almost 250 million NOK on a gigantic remediation project returning the former coal mining community of Svea to its 'most untouched' original state (Store Norske 2022), creating a 'social drama' and marking Norwegian presence by human absence (Ødegaard 2021). Mine 7 in Longyearbyen that produces coal for the local energy plant and exports coal for industry, is scheduled to close in 2023. The decision was made by the local government and the state with the aim of establishing a 'more climate friendly' energy source for Longyearbyen (Regjeringen.no 2021). These efforts by Norway to present itself as a 'climate nation' impact on both the production and reception of the climate change discourse in Longyearbyen.

[Figure 1 near here]

From Observations to Reception: Theorizing Climate Change as a contested Idea, a Discourse, and a Story

Anthropological research on climate change and the Anthropocene has established that climate change has material and cultural dimensions (e.g. Baer & Singer 2014; Barnes & Dove 2015; Crate 2011; Crate & Nuttall 2009; Hastrup 2013; Moore 2015). Studies exploring the latter have focused on perceptions of change and their related cultural meanings and values (e.g. Crate 2008; Cruikshank 2005; Roncoli, Crane, & Orlove 2009; Strauss & Orlove 2003), and are increasingly exploring the discursive dimensions of climate change. Here we draw on research that approaches climate change as a (scientific) narrative, a discourse, or an idea that is constructed, imagined, and applied (e.g. De With & Haines 2021; Hulme 2009; Rudiak-Gould 2011; Thornton & Mahli 2016).

This framing directs attention to how the powerful climate change discourse is received locally, an approach that anthropologist Rudiak-Gould (2011) has termed 'reception studies' (De Wit & Haines 2021). While most anthropologists do 'observation studies', focusing on how communities 'become aware of global warming through first-hand observation of local impacts' (Rudiak-Gould 2011: 9), reception studies 'have contributed to understanding contextual factors through empirical examples and ethnographies of the uptake, translation, and/or rejection of scientific climate change discourse' (De Wit & Haines 2021: 1). They include the examination of 'patterns of interpretation about climate change' that 'might depart from the frames provided by elite sources that populate media coverage' (Brüggemann & Rödder 2020: 6) and' why locals choose to trust or distrust the scientific discourse of global warming' (Rudiak-Gould 2011: 9). This approach emphasizes the 'localness of global-warming discourse' (Rudiak-Gould 2011: 10), and there is empirical evidence that the climate change discourse is impacting local environmental observations and perceptions (Rudiak-Gould 2014). In addition to examining local understandings of climate change, anthropologists and other social scientists thus turn their attention to how these understandings engage with and vary from transnational and scientific discourses, how 'aspects of the travelling idea of climate change are well-received, integrated, transformed, or rejected' (Brüggemann & Rödder 2020: 1). Case studies show that people locally evaluate and make sense of the idea of climate change and the related discourses in different ways. Reception spans from general acceptance (Engels et al. 2013) and belief to incredulity (Rudiak-Gould 2011), to ignorance (Norgaard 2011) and rejection (De Wit 2020). The climate change discourse has also been found to be criticised and contested by 'those it seeks to name' (Farbotko & Lazrus 2012). Importantly, the rejection of the climate change discourse does not necessarily equal ignorance. Rather, it has been found to be an expression of *resistance*: 'an attempt to remain faithful to one's own set of norms, values, beliefs, principles of causality and "cosmological configuration"' (De Wit 2020: 164). Climate change denial among white, conservative

men in the United States for instance, has been found to be an expression of protecting group identity and justifying a societal system that provides desired benefits (McCright & Dunlap 2011), possibly as 'part of a larger attitude complex expressing resistance against changing societal conditions' (Krange et al. 2019). Social inertia, the 'failure of societies to respond in a concerted, meaningful way to climate change' (Brulle & Norgaard 2019: 1), can thus be understood as resistance to large-scale social changes to avoid the threat of cultural trauma (ibid.).

Reception studies make sense in Longyearbyen not only because it is a prominent 'frontline community' (Rudiak-Gould 2013), but also since it is a locale where climate change discourse is produced through science and media. When we speak about 'climate change discourse', we refer to the scientific consensus that the world's climate is changing because of anthropogenic influence, which has a direct impact on the natural environment. People outside the scientific community are exposed to this discourse through media and policies. As the discourse is being reproduced by governments and intergovernmental bodies it has attained an 'almost hegemonic status' that tends to exclude the voices of other stakeholders and alternative discourses (Taylor 2013).

In their comprehensive review of reception studies, De Wit & Haines (2021) identified as one major theme anthropologists 'efforts to 'pluralize reception', focusing on alterity, refusal, and change (ibid. 9-11). We share the premise of these studies: that 'different ways of being and knowing should be taken seriously, and that caution is warranted when hierarchies and purifications of knowledge and truth are pursued, often based on singular claims to scientific objectivity.' (ibid.: 10) Whereas anthropologists have tended to focus on non-Western societies and emphasize the need to recognise different ontologies in the study of climate change, we examine counter stories to the dominant climate change discourse in a Western context. Together with O'Reilly, Isenhour, McElwee, & Orlove (2020), we see anthropology as a discipline that reflects in a realistic way over 'relationships among scientists, publics and decision makers' (ibid.: 17), and ourselves as 'concerned with the possibility of different worlds' (ibid.: 18). This notion of multiplicity of worlds (and thus also perceptions and interpretations) is rather unusual in Longyearbyen where some ways of 'making sense' are much more politically powerful than others. Here, as in many other contexts, the transnational climate change discourse is embraced by most and influences how local weather and climate related phenomena are interpreted. It is one of the key tasks of anthropology today to explore 'uneven histories, discourses and political economies' related to the encounters of local societies concerning climate change (Whitaker 2020: 846), and we will thus explore dominant discourses in relation to other, minor stories.

We use the concept of 'discourse' in a Foucauldian sense (Foucault 1972) referring 'to the ways in which social practices that frame events draw on particular sets of ideas, concepts or categories that are then produced, reproduced or altered, informing how people relate to each other and the non-human

world' (Farbotko & Lazrus 2012: 383). Discourse is closely related to 'narrative', which in the social sciences mostly refers to 'constructed, formal, and official cases, e.g. what institutions generate and reflect in general discourse about an issue.' (Moezzi, Janda & Rotmann 2017: 3) They 'are often present in printed form and written or told by professionals, often in public, versus the less formal stories that everybody exchanges more privately orally or in personal correspondence.' (ibid.) Stories, in this sense, tend to be more local and ephemeral than narratives (ibid.). Inspired by Katz' (2017) invitation to look for the '"whole other stories vibrating within" the claims and arguments of major theory' (ibid.: 598), we give voice to those other and minor stories about climate change in Longyearbyen.

Methodology

Longyearbyen is framed both from the outside and from within as a scenery of change (see the collection of articles 'Changing Svalbard' in *Polar Record*). We, too, arrived to research how it feels to live with these changes, how they are perceived and how they impact locally. We soon realised how much focus and attention the phenomenon of climate change indeed attracts. Climate change is often used as a buzzword in scientific applications and project descriptions, including our own. We became aware of our own looking for the object of desire, the excessive devotion and commitment to studying and understanding (climate) change. What we met in the field, though, was far from the alarming and straightforward story one would expect. The picture we paint, based on ethnographic documentation, is more nuanced, complex and messy. First, there were more 'stories 'to cover and the one about climate change was not the most urgent for many of our informants. And second, there are multiple perspectives to look at climate change in Longyearbyen; while some are loud, others are silent. A word about our own positionality is in its place here. We do not doubt that climate change is human-induced. However, as anthropologists, we need to take seriously and try to understand perspectives that counter the dominant climate change discourse. We believe that in order for climate change policies to be fair and successful, they must be aware of and try to understand also those discordant perspectives.

Our projects were developed independently, but as we found ourselves studying the same issues in the same community simultaneously, we soon began collaborating on a variety of projects. For this article, we draw on independently gathered data, partly already analyzed. The advantage of this approach was that we could draw on a broader sample and validate each other's analyses. We then picked interview passages and fieldwork experiences which contained various counter stories of climate change, and analyzed them together. We structured the analysis around diverging views about two prominent topics, avalanches hitting the town and melting glaciers. The writing was also done in collaboration and the text evolved as we discussed our findings and received external feedback.

Our interviews were qualitative and open-ended, structured around topics of personal background and relationship to Svalbard, community, and experienced changes. Whereas in other locales it might make sense to avoid talking about climate change (Marino & Schweitzer 2008), in Longyearbyen this topic is so omnipresent that it came naturally to address it when asking about change, and addressing the topic opened up for conversations and critical reflections about the climate change discourse. A typical interview lasted 90 minutes and took place in the home of the interviewee or in one of the local cafés. The multifaceted stories of change we gathered is also a result of our diverse pool of conversation partners. In addition to the usual 'stakeholders', we reached out to the population across the categories of job, age, gender, education, country of origin, or position in power structures. Even more importantly, we met our participants without any presumption of relevance or validity of their perception and interpretation of climate change. Over the course of long-term fieldwork (2018-2021) we took part in the town's life, engaged in unnumbered informal conversations and built relationships, and conducted more than 300 audio-recorded meetings in the form of formal expert, semi-structured and narrative interviews, and focus groups.

Character 1: Avalanches

The dominant Discourse: Climate Change causes Risk and Fear; Adaptation through security Measures creates Safety

> On Saturday, December 19, 2015, an avalanche crashed down Sukkertoppen, one of the mountains above Longyearbyen. It was late morning—the town was still waking when the mass of snow smashed into the houses. A two-year-old girl and a father died. On February 21, 2017, another avalanche came down the same mountain and destroyed two apartment buildings. During a period of heavy rain in the autumn of 2016, there was a landslide near the graveyard and another affecting the town dog kennel. Time and again, the residents of Longyearbyen have had to leave their homes: when floods warned of mud slides, when torrential rain increased the risk of devastating flows of slush from the mountainsides, when winter winds threatened to send avalanches into town. (Ylvisåker 2022: 7)

The opening lines of *My world is melting: To live with climate change in Svalbard* written by local journalist Line Nagell Ylvisåker explain the author's urgency to find out what is happening with her home place and to address the sorrow and puzzlement of Longyearbyen's residents whose feeling of safety was shattered. The fatal avalanche of 2015 is a powerful meme reproduced in the ephemeral collective memory of the town that we encountered multiple times in the field. On 22 March 2019, a large group of UNIS students and pupils at Longyearbyen school joined in on the international climate strike and

arranged a march and speeches on the town's main square. The initiative gained attention in national and international news as 'the world's northernmost climate strike' (Gulliksen Tømmerbakke 2019), and was even re-tweeted by Greta Thunberg. The message from the representative of the school pupils, who gave a passionate speech, was clear and in line with the Fridays for Future argument: His generation will suffer most from climate change, and the politicians in charge have to take action to stop it. He emphasised that on Svalbard, his generation is already living with climate change. Alluding to the avalanches, he exclaimed that 'Two lives taken by climate change is enough!', a quote that made headlines in the local newspaper Svalbardposten the same day (Solberg 2019).

The avalanches of 2015 and 2017 mark a great rupture in the recent history of Longyearbyen. They brought about a strong discourse of risk and safety, the latter becoming a top political priority. The dominant discourse depicts natural hazards as a consequence of climate change, and securitization measures through engineering and technical solutions as necessary climate change adaptation measures. This discourse is visible in state White Papers, produced and reproduced by the Municipality Council, and picked up by both local and national/international media.

> All of a sudden we have a huge avalanche that kills people. Of course climate change is a substantial part of that, even if there were avalanches before. But in 2017, when the second avalanche hits, […] they cannot predict it, because they rely on old assumptions, old parameters, old history. So climate change has been there and changed the premises. […] And here, we touch on another consequence of not considering environmental change, then you have fear in society. […] And people seek safety and if you don't have safety, then you don't have people. […] So what I'm saying is that the government needs to take climate change seriously and be able to adapt. […] If they were not willing to invest in society, by building avalanche security measures, then we would have to shut down large parts [of society]. [...] Generally I would say that people feel safe, because they see that the government acts, they see that measures are being taken, they see that the town is being moved, they see that we build avalanche security measures and things like that. (Interview with employee in the administration of Longyearbyen Municipality Council, 12 April 2019)

The discourse on risk and fear as a consequence of climate change is used to legitimate 'taking measures' through substantial avalanche protection. Monitoring and warning systems have been established, and evacuations from risk zones occur regularly. Houses in the avalanche risk zone have been demolished, snow drift and avalanche fences are being built, as well as a protection wall (Sydnes, Sydnes & Hamnevoll 2021). Although generally portrayed as successful climate change adaptation (Albrechtsen, Indreiten & Wickström 2022), locally we find minor stories that contest this dominant narrative.

Minor Stories of State Control and Norwegianisation

In our search for understanding of how people in Longyearbyen are impacted by climate change, both authors repeatedly came across concern and frustration related not as much the natural hazards themselves, but to the security measures taken against them, labeled as climate change adaptation. Different criticisms are repeated: the measures are an ‘overkill’ (too many), they are too extensive and expensive, destroying the visual identity of the town, or a hysterical reaction to a phenomenon ‘that has always existed’. People criticise that houses were demolished in the avalanche zone in addition to the construction of avalanche fences and a wall. Digging deeper, a minor story about state control and the Norwegianization of Longyearbyen emerged.

When exploring how the avalanche has been portrayed in the media but also in the local collective memory, it is noticeable that some layers in Longyearbyen's population are marginal or even not visible at all. People remembering the event first-hand often recall the spirit of solidarity that emerged in the community immediately after the avalanche. Representatives of some ethnic minorities, however, have a different take on the disaster. For example, our Thai and Filipinx participants, sharing otherwise rather general concerns about climate change, often also included a notion of threat related to the avalanche rooted in fearing something else than altered weather patterns. As the zone where the snow mass hit was identified as risky, numerous housing units were demolished and their inhabitants (many of them from Thailand and the Philippines) were forced to move out, the already critical housing market became even tighter: They are chasing us away!’ (Interview with a Thai woman, 29 March 2019)
In our fieldwork diaries, we documented how our non-Norwegian participants made sense of the climate change discourse and the avalanche risk, and relate it to the government's wish to norwegianise (fornorske) Longyearbyen.

> I sent my friend Christian a picture of my screen with responses to a survey about permafrost impacts, with an answer that had amused me. Christian did not comment on the passage I had highlighted. Instead he commented on another passage where the interviewee stated that ‘Buildings have to be torn down in Longyearbyen because of climate change and permafrost thaw. ’He wrote: ‘No houses on Svalbard are torn down because of thawing permafrost. That is a myth. They are torn down in order to get people out of here. ’Later I picked him up on this, asking him to explain. In his view, tearing down these houses is a means for ‘getting rid of foreigners’, and for the government to gain control over housing. (Author's fieldnotes, 13 May 2020)

Again, the notion of 'myth’ was used to describe what was perceived as a climate-change related misconception. The avalanche security measures are thus by some interpreted as—in the words of a local scientist—’a sneaky way for the government to gain control’ over the housing stock in Longyearbyen, an

effort closely related to the current tendency to curtail the ratio of non-Norwegian inhabitants in town. To make sense of this minor story, we have to consider the avalanches in their larger societal context. Longyearbyen has in the recent decades undergone drastic structural changes, from a coal-mining company town to a post-extractivist economy based on tourism, research and education. These sectors, as well as the related service industry, attract an international workforce, and thus the economic restructuring has resulted in profound demographic changes (Moe & Jensen 2020). In the perspective of Norwegian Svalbard policies, in which Longyearbyen constitutes a 'tool of diplomacy' (Hacquebord & Avango 2009: 36) for maintaining and legitimizing Norwegian sovereignty over Svalbard, the increasingly international population of Longyearbyen constitutes a dilemma and even a security issue (Pedersen 2017). In addition, the private housing market is very limited, and most of the housing stock is owned by the big employers, making it difficult for people working in smaller companies in the tourist and service industry to find housing. The situation worsened significantly when in 2018 the local government decided to demolish almost 140 housing units due to avalanche risk, a decision officially presented as a measure of climate change adaptation (e.g. Rapp 2019/2020). The lost housing stock was only partially replaced by new state-owned housing in the neighborhood of Gruvedalen. Our fieldwork data contains interview passages and observations indicating that avalanche risk adaptation got entangled with the state's strategy on how to (re)gain control over housing. Our interviewees working in public administration and science or volunteering for non-governmental organizations involved in the evacuations after the 2015 avalanche remembered the migrants from Asia living in the endangered houses e.g. as follows:

> As long as people speak English it's ok but if they don't it's a problem. I have seen that when we had the avalanche here. People were hiding [...] when we were coming to get people out of the houses [...] we tried to talk to them and they didn't get it. (Interview with Magnus, 10 October 2019)

Not only was there an issue with a language barrier; there were also more people actually living in the housing units than what the population register could tell. When the Norwegian prime Minister Erna Solberg paid a visit to Longyearbyen in early 2020, shortly before the outbreak of the pandemic making the housing situation even more urgent than before, she voiced her concern to the local newspaper of Svalbardposten: 'When it comes to housing policy, we first make large investments related to protection against avalanches and landslides. Then it is important that we have good control over housing construction, in addition to having good control over who lives here.' (Wiersen 2020) It became clear that housing policy is part of the state's strategy developed to increase the ratio of Norwegian residents without allowing for the settlement's growth. Considered in this context, we begin to understand the minor stories about how the demolition of houses is an expression of efforts to increase state control over housing and to curtail the non-Norwegian population in Longyearbyen. This interpretation became more

widespread in the course of our fieldwork, when state efforts to increase control intensified. Also during the first phases of the pandemic safety was used as an argument for measures that ultimately increased Norwegian state control over Longyearbyen (Brode-Roger, Zhang, Meyer, & Sokolíčková 2022; Sokolíčková & Soukupová 2021).

Character 2: Glaciers

The dominant Discourse: Svalbard's melting Glaciers as a Showcase for rapid Climate Change

In 2019, a glacier photography project by a glaciology student and a guide on Svalbard made headlines in the public broadcasting NRK: 'Watch how the glaciers on Svalbard have retreated during the past 100 years' (Hirsti & Digernes-Nordström 2019). The pictures show Svalbard glaciers, photographed from the same spot, approximately one hundred years apart, and depict impressive glacial retreat. The glaciology student, Erik Schytt Holmlund, who has been living on Svalbard for almost four years said to NRK he is 'being reminded of climate change every day'.

As Julie Cruikshank elaborates in *Do glaciers listen?* (2005), glaciers are emblematic of climate change, since their retreating is so powerfully visual. They are popular examples in climate change visibilism (Rudiak-Gould 2013), and often referred to as the image and visible proof of climate change on Svalbard. One interview partner who moved back up to Longyearbyen after many years on the mainland described how she experienced the retreat of the glaciers Longyearbreen and Larsbreen right outside of Longyearbyen, a story she had also told a journalist who asked her about the societal impacts of climate change:

> It has melted a lot, ice is very visible, and the glaciers and stuff have melted, a lot. I remember when we were students [starting in 1996] and went up to Larsbreen, that glacier was right behind Brakke 13, it was right there. Now you have to walk very far. And the same with Longyearbreen. You just drove right up the hill and then you were on the glacier, right. And now… I got a huge shock when I came up in 2018 and was driving up there, hadn't driven there for many years, and then we were supposed to drive up and then like [pause] 'where is the glacier?! '[laughs]. Really crazy. Many hundreds of meters have melted. That journalist asked how people are impacted [by climate change] in town, and that's it. It is also that when we go up towards Larsbreen, we always used to walk below that cliff, and this year the whole side slid out. That is the first time. (Interview with meteorologist, 13 July 2020)

This dominant story is found in our field notes and in countless media reports about Svalbard, and is important in defining Svalbard imaginary. As elaborated by Brode-Roger (2021), the Arctic is often

portrayed as a vulnerable place defined by climate change, through projected and romanticised images of starving polar bears and melting ice, an uninhabited terra nullius (Steinberg, Tasch, & Gerhardt 2015; for a comprehensive critique of the discursive hegemony over the Arctic as an endangered place that marginalises locally lived realities, see Tam, Chew, Carvalho, & Doyle 2021). Often these reports depict retreating glaciers in an aesthetic way, inspiring last-chance tourists (Johnston, Viken, & Dawson 2011) to visit Svalbard before they disappear. Svalbard guides we have spoken to confirm that tourists are interested in seeing this proof of climate change: ‘Of course I see changes in glaciers, that is the most common question of the guests: "The glaciers, are they retreating?" Yes, we can see that even in this short time.’ (Interview with tour guide, 15 June 2019)

An important aspect of this dominant discourse is the risk melting glaciers pose to people who travel in the Svalbard landscape. ‘Don't rely on “safe glaciers”’ a Svalbardposten headline in January 2021, where four researchers with local experience informed about recent trends in the development of Svalbard glaciers (Kohler, Moholdt, van Pelt & Luckman 2021). Some of the massive newly discovered crevasses were indeed recent, some got exposed due to snow cover loss, induced by extreme temperatures in summer 2020 when it was almost 22 degrees in Svalbard (Kubny 2020). The chronicle shows graphs documenting the negative glacier mass balance, together with a map of surging glaciers that also pose a threat to the safety of skiers, mushers or snowmobile drivers crossing areas that in the collective memory are seen as safe.

The stories about Svalbard glaciers to communicate climate change range from sensationalist, simplistic depictions to attempts to use local stories and data to communicate change without hiding the complexity of the issue, what Rudiak-Gould (2013: 128) has called ‘constructive visibilism’. However, there is a tendency to emphasise the clear-cut data series, to highlight the instances where change is unequivocally visible, at the expense of more complex and ambiguous examples. Consider this passage from an interview with a meteorologist:

> It is like they say, that it has gotten warmer and warmer. So it was almost a shame that March was under the normal [temperature average], because if not we would’ve had more than 111 months over the normal, and then came the 0,5 under the normal, right. ‘Oh, now there is no global warming after all! ’[laughs], and then came the next month and was over [the normal] again. So it has been many months, a very long warm period. That is what we have seen since I came in the 1990s. Back then there was ice on the fjords, we just drove straight out to Forlandssundet and up to Ny-Ålesund on snowmobiles. (Interview with meteorologist, 13 July 2020)

In this case, the Svalbard temperature trend is referred to as a showcase for climate change which is easily communicated; a perfect example, had it not been for the one month that broke the rule.

Minor Stories criticising the Climate Change 'Hype'

> I was out at a dinner and sitting next to a Norwegian construction worker who has lived on Svalbard for 13 years–let's call him Leif–that I had interviewed several months ago about permafrost thaw. We were talking about my research when he told me: 'You know what, here's a story for you, Fridtjovfbreen in '96. That glacier surged 3 kilometers. But no one speaks about that! 'He went on sharing his frustration over researchers that come up to Svalbard 'like dayflies, taking only one picture and saying that this is climate change'. He said that there is no doubt that it is getting warmer, but it irritates him that so many people–scientists and journalists–come up here to look for climate change, a story that in his opinion is too exaggerated by the media. (Author's fieldnotes, 18 June 2021)

Alongside the dominant story about melting glaciers as the showcase for climate change, we find minor ones that contest, criticise, or even reject this discourse. We find expressions of annoyance and irritation in response to these dramatic depictions of a melting Svalbard, and counterstories of surging that attempt to relativise them. What Cruikshank (2005) writes about glaciers thus applies well to the Svalbard context. They are both a visual indicator of climate change and interpreted in ambiguous ways:

> Concerns about global climate change are giving glaciers new meaning for many people who may previously have considered them eternally frozen, safely distant, and largely inert. Most of the world's glaciers now seem to be melting rather than reproducing themselves, becoming a new kind of endangered species, a cryospheric weather vane for potential natural and social upheaval. Encounters with glaciers during times of rapid environmental change produce diverse interpretations. (Cruikshank 2005: 7-8)

Interestingly, these counterstories are hardly ever about climate change denial; melting glaciers are obvious to most. Scientists agree the glacier-mass balance on Svalbard is negative and it is unlikely the trend will change anytime soon (Geyman, van Pelt, Maloof, Aas, & Kohler 2022). There are even studies showing that surging glaciers also can be caused by processes related to climate change (Sevestre et al. 2018). In our interpretation, the stories about surging glaciers or about natural cycles causing both glacial surge and retreat are rather about relativizing what some perceive to be a sensationalist and alarmist story. There are different nuances and motivations behind this apparent need to relativise. While scientific reports are nuanced, the way glaciers are being portrayed in the media is often one-sided; attention is being paid to the retreating, not the surging process. This tendency to simplify depictions of climate change on Svalbard is expressed in the quote by the meteorologist above. An uninterrupted Svalbard temperature trend would have contributed to an even more powerful example of climate change visibilism. However, if a one-sided story of climate change does not match the locals 'complex and often ambiguous perceptions of changes in their immediate environment, many feel a need to counterbalance the alarmist story. This is what Leif does by highlighting a surging glacier. He also resorts to visibilism,

but to prove the opposite point. We interpret this not as an expression of climate change denial (even though we have spoken to deniers who use that exact example), but rather to break the one-sided sensationalist climate change narrative, pointing out that things are more complex, that there are exceptions and variations, but that these are rarely represented in the media and in dominant stories about a changing Svalbard.

The frustration over the constant focus on climate change in media representations of Svalbard is expressed in this quote by a long-term resident:

> Yes, there is a lot of focus on [climate change]. Much ink has been spilt over climate change up here. Because you notice it especially well up here. So one gets tired of reading and hearing about it, one really does. (Interview with miner that grew up and still lives on Svalbard, 10 July 2020)

Not only do people get tired of media reports of Svalbard as a 'climate change victim'; some are also tired of being asked about climate change by journalists and researchers, like this construction worker we interviewed:

> Regarding what you were asking about, climate change and our challenges with construction and such, it is less than what people think. Because you are not the first one here to ask about these things. People come and are looking for the big bomb, but no, I don't have it. (Interview with construction worker, 3 March 2020)

In general, research fatigue in relation to climate change among Longyearbyen residents is common. The slight impatience regarding the constant focus on climate change in Svalbard is related to a sentiment shared by many: That the climate change victim story often overshadows other issues and changes going on in Longyearbyen:

> We are having a lot of visits of politicians and other groups that are coming to see… But they are more interested in going up to see the glaciers calving and saying like 'oh, that's climate change'. (Interview with miner, 3 September 2019)

Especially for long-term residents, and people who are either connected to the fossil industry or 'just' the town's previous era, the radical transformation of Longyearbyen from a coal mining company town to a post-industrial, international tourist hub, and the social and cultural changes accompanying this shift, are often perceived as more life-changing than climate change. In the quote above, the miner expresses that politicians coming to Longyearbyen are more interested in witnessing climate change than addressing other issues that are affecting life in Svalbard. As the journalist quoted in the vignette expressed, climate change is often portrayed as 'the only story in town'. This (mis)representation neglects other stories that many locals feel impact their lives equally or more, such as the termination of the mining industry, the

pre-Covid housing crisis (Meyer 2022: 94), or growing social inequalities (Sokolíčková 2022). Portraying Svalbard in a reductionist, 'simplified, mono-story way' (Brode-Roger 2021: 497) makes it part of a wider tendency to represent the Arctic as a climate change victim in need of protection. Such a story casts shadow on the particularities of places and complexities of the region, disregarding the lived experience of its inhabitants.

In Longyearbyen, another layer adds to this. The coal mining industry is currently being phased out, a political decision legitimated by referring to climate change and the need to transition towards a fossil-free society (regjeringen.no 2021). People connected to the mining industry in Longyearbyen express the feeling that the fossil industry and thus their livelihood is being blamed for climate change. The climate-change counter stories we encountered in our conversations with miners could thus be interpreted as a form of resistance to the transformation of a societal system that has provided desired benefits and an attempt to protect group identity (McCright & Dunlap 2011). Another facet of the negotiation of the dominant story about the melting glaciers is expressed in the following interview passage with a long-term resident:

> I have a bit of a problem with what I perceive is a hype about it [climate change], like going to a calving glacier and say that 'wow, there is a polar bear that has to swim'. There are some silly things as well when it comes to Svalbard and climate change. […] I am maybe a bit more concerned that we live more environmentally friendly and more in tune with nature, and if Svalbard can contribute to strengthen our awareness in that regard then I think that it is worth it, but rather not in the form of the polar bear on an ice floe and the calving glaciers… (Interview with architect, 29 April 2020)

In this quote, the interviewee expresses frustration over the tendency to focus on climate change instead of addressing the unpleasant question of how to live more environmentally friendly locally. In this perspective, the dominant glacier story contributes to a climate change 'hype', while environmental issues not related to climate change and possible to solve locally, such as the garbage or waste water disposal, receive less attention.

Discussion

The dominant climate change discourse surrounding Svalbard is both binary (either-or) and linear: Longyearbyen and its inhabitants transition from being climate victims to climate pioneers, as Norway puts its coal mining industry behind and propagates a green and emission-free Svalbard future. Our ethnography, however, shows that the story is not black-and-white but rather messy: Our participants narrate complex perceptions of change, and we find a multitude of other stories that sometimes contest the dominant discourse. Treating climate change not only in its materiality but also as an idea (Hulme

2009) that is constantly negotiated, and embedded in politics, values, worldviews, and agendas opens up for investigating these multiple minor stories we find in our data. Considering not just which changes people perceive, but how they receive the climate change discourse (Rudiak-Gould 2011; 2014) allows us to treat the dominant discourse as one story next to diverging others. It enables us to look at this discourse as something both 'coming from the outside 'and 'produced from within'. Climate change is a global phenomenon with amplified regional impacts, used by national governments, supported by both local and international science, and lived by local inhabitants. As we have shown in this article, local inhabitants in Longyearbyen narrate diverging stories of climate change.

Regarding the avalanches and subsequent security measures, the dominant discourse is one about climate change risks and the related need to restore safety (presented as climate change adaptation) through physical adaptation including avalanche fences, a wall, and the demolition of houses in the avalanche zone. While the counter stories do not dispute the avalanche risk and the need for security measures, they point to how these measures lead to increased state control over housing in Longyearbyen and can be interpreted as part of a larger effort to diminish the international feature of Longyearbyen. Recalling Hulme (2011), the juxtapositioning of these diverging stories thus demonstrates how the (dominant) climate change discourse can serve certain purposes. Listening to these counter stories enables us to understand the climate change and adaptation discourse in its larger political context. It points to how seemingly apolitical climate change adaptation measures are related to sovereignty politics, as the state expresses it is crucial to regain state control over housing and who lives where, rendering the non-Norwegian segment of the population vulnerable.

The dominant discourse surrounding Svalbard glaciers is a story of glacial loss as the visible image of rapid climate change, and the symbol of Svalbard as a climate change hotspot. The counter stories do not deny glacial retreat or climate change, but express irritation regarding the sensationalist and often simplifying tone of this dominant climate victim story, echoing similar findings from other 'frontline communities' such as Greenland (Eriksen 2020). They express the widely shared sentiment that the climate change 'hype' surrounding Svalbard tends to create an image of the archipelago that is far removed from peoples' lived experiences, which are shaped by other changes and processes in addition to climate change.

Rather than interpreting the counter stories as climate change denial, we read them as a form of resistance to the related discourse and policies (De Wit 2020; Brulle & Norgaard 2019). Longyearbyen is undergoing profound societal changes and climate change is brought forward as an argument by local and national authorities to close down the mining industry and transition to a 'sustainable society'. Rejecting the dominant climate change discourse can thus be read as an expression of resistance to profound societal changes threatening societal positions, jobs and identities (Krange et al. 2019; McCright &

Dunlap 2011), a transformation that is locally perceived as initiated by bureaucrats far away and with little knowledge of local conditions and consequences (Sokolíčková et al. 2022). These counter stories show that climate change is not the only story in town. As expressed by an artist in residency working on issues of climate change in Longyearbyen in spring 2022, the dominant climate change discourse works as a canvas that depicts one story of Svalbard while fading out others. In the eyes of many, because of the strong focus on climate change in dominant representations of Svalbard, topics such as growing social inequalities or local environmental problems (such as the lack of a clean sewage solution or the extreme use of cars) receive less attention. This is also a lesson for us who research climate change: Our preoccupation with—sometimes bordering on obsession with—climate change can make us highlight dominant stories and veil other issues. To be aware of this does not mean to diminish the importance of climate change, but contributes to ethnography more sensitive to complex life worlds. Furthermore, this climate change 'canvas' is very much represented as apolitical. From the counter stories we learn, however, that the dominant climate change and adaptation discourses are intertwined with other stories in town, and might function to serve political purposes, whether intended or not. Our findings thus show that even in a place like Longyearbyen, where the impacts of a changing climate are most pronounced, there is not one single story about climate change. They demonstrate that living with environmental change neither results in the same perceptions of the phenomenon, nor necessarily in concern about climate change. Rather, the data indicate that people directly experiencing climate change in some cases downplay and relativise the alarmist tone that often accompanies the climate change discourse projected onto Svalbard from the outside.

Our research furthermore shows that there are certain climate change discourses that are more likely expressed by parts of the Longyearbyen population than others: For instance, long-term residents connected to the mining industry are often more skeptical than local scientists. To carve out more clearly these 'archetypes' would, however, require further research. Also the phenomenon of climate change denial in Longyearbyen, and to what extent it is linked to threatened ways of life due to the closing of the mining industry, is a phenomenon worth exploring further. A thorough analysis of the dominant climate change and adaptation discourses and the politics they are embedded in is an exciting, yet controversial, endeavor. Exposing the politics and worldviews underlying climate change and adaptation policies could be misread as efforts to cast doubt on the reality of anthropogenic climate change, by fuelling skeptical claims of 'elite' knowledge spreading untruths about climate change to serve left-wing political agendas. Political correctness should, however, not stand in the way of critical inquiry, and while maintaining that anthropogenic climate change is real, anthropologists can critically examine how humans use and make sense of this phenomena, without, in the words of Hochachka (2022: 519) 'getting stuck in the cul-de-sacs of epistemological relativism and post-truth politics.'

Conclusions

The story about the seed vault threatened by climate change, propagated by mainstream media as the image of a melting Svalbard, is by others debunked as a 'climate myth' and criticised as part of the 'climate cliché' often projected onto the place. This and the other examples presented in this article illustrate that the dominant climate change discourse is one story among many. By pointing to over-simplification, sensationalism and the (mis)use of the climate discourse for other purposes, these minor stories imply a contestation and critique of the dominant climate change discourse, which may ultimately lead to skepticism and a rejection of the discourse altogether. The official climate change discourse loses credibility by people who feel their versions are suppressed in the dominant narratives. This feeling of being neglected is paired with a feeling of not being part of the solution, either. Reproducing a one-sided (re-)presentation of places like Longyearbyen thus might lead to a low level of trust in and even rejection of adaptation and mitigation measures. Propagating one dominant discourse without listening to the multiplicity of stories, lived experiences and perceptions of climate change may thus ultimately harm the sustainability cause. The minor stories furthermore reveal unequal power relations and social inequalities, showing that also 'climate victims 'like Longyearbyen have other problems in addition to climate change that need to be solved. Combating climate change in isolation from social inequalities is not a solution. The implication is that both the official climate change discourse and the related transition towards a more sustainable society cannot be 'owned' by just a few, and certainly not by those far away from the places where transitions are to be implemented. To Hulme's (2010) call to listen to diverse voices in developing climate change policies we thus add that different perspectives must be part of shaping transition policies. The climate change discourse and related measures must be honest, transparent and inclusive, allowing for multiple stories. This is also where we see anthropology's contribution to climate change science. We have shown how personal perceptions intertwine with the official discourse and how multiple perspectives exist in the studied locale. We agree with Milton (1997: 486) that 'at the level of perception, truth is not an issue. Perceptions cannot be false; people simply perceive what enters their consciousness. What they make of it, through interpretation, is a different matter'. Yet we are reluctant to claim that our research ought to point out who 'owns the truth 'about climate change in Longyearbyen. In her seminal article 'Thinking like a climate', Hannah Knox (2015) discusses possibilities for a shift from the struggle for the truth to actual climate change politics. In her statements that 'in climate science, society itself is visible in climate data', (ibid.: 97) and 'all climate science is necessarily political' (ibid.: 98) we recognise our own commitment to do justice to those we met in the field. We may conclude that in order to move towards climate change politics in Longyearbyen, all the economic, social and political entanglements must be taken into consideration. Silencing some voices and (re-)creating myths can hardly be seen as

constructive in the painful process of moving towards ‘seeing ourselves as part of the very dynamic that visualizations of predictive climate models were describing’ (ibid.: 95).

While our results are place-bound and context specific, they are relevant for an understanding of how the idea of climate change is being understood, used and indeed also misused in different contexts around the world. Often not given the chance to express their opinion on the matter, communities impacted by climate change are portrayed as victims in a simplified way (Farbotko & Lazrus 2012). We believe that listening carefully to local voices and for local stories (Cruikshank 2005) and presenting a more complex picture of climate change impacts and perceptions is crucial for understanding and ultimately moving in the direction of fair and transparent climate change politics, in the Arctic and beyond.

Declaration of Interest Statement

The authors report there are no competing interests to declare.

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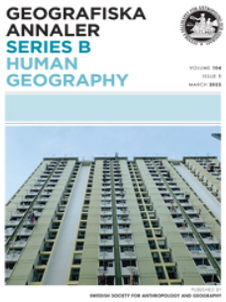

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ORIGINAL ARTICLE

Caught in between and in transit: forced and encouraged (im)mobilities during the Covid-19 pandemic in Longyearbyen, Svalbard

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ABSTRACT

When Europe shut down due to the Covid-19 pandemic in March 2020, Longyearbyen, the main settlement of Svalbard, was moving from a coal-based economy to one based on science and tourism. The remote location of the Svalbard archipelago in the High Arctic makes it an isolated, secure haven from the chaos worldwide. But this renders its population vulnerable should the virus come since there are neither facilities to care for the sick nor other nearby communities to help in case of need. Svalbard, with its special territorial status, is in a unique geopolitical situation where people are free to come and go. Longyearbyen is an inherently transient space with a highly mobile population. Based on interview narratives of participants' lived experiences in Longyearbyen during the pandemic (both in-person and online), this paper explores how forced and encouraged (im)mobilities impacted their individual life choices during the pandemic. Participants' stories revealed systemic inequalities and vulnerabilities in Longyearbyen that were heightened and exacerbated by the Covid-19 pandemic. By combining minor theory with politics of mobility, this paper aims to add to the discussion within mobilities studies on how the personal, emotional responses to these situations are linked to decisions about mobility.

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Introduction

The Covid-19 pandemic put the world on hold, bringing with it disruption and uncertainty. The pandemic's impacts on peoples' mobility have brought research interest and attention to mobilities studies. Jensen (2021) invites us to 'think with Covid-19 (…) as a catalyst for bringing about more nuanced and deep descriptions of "banal everyday practices"' (67), further challenging the already questioned sedentarist view on mobility (Sheller and Urry 2006). We take up this invitation and explore what happened with mobilities when the Covid-19 pandemic unfolded in the High Arctic through a case study of Longyearbyen.

Longyearbyen is a place of extreme mobilities located in the Arctic Archipelago of Svalbard, where a high turnover of the population and a mobile lifestyle are accepted norms (Viken 2008). It is a place where everyone lives in a state of 'intermediaries and circulation in-between places' (Jensen 2009, 154) between departures and arrivals. As was the case worldwide, the pandemic triggered a series of government-level measures. In Svalbard, the Norwegian government implemented

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restrictions on travel and the free flow of people. Although it is tempting to see travel restrictions and lockdowns as examples of how the town became immobile in contrast to the previous situation where 'the stability of Longyearbyen is its mobility' (Viken 2008, 147) there were also cases of forced mobility – at least at the beginning of the lockdown – for some residents of Longyearbyen. It is therefore not a lineal shift from mobility to immobility. However, the pandemic did disrupt the 'mobile and modern society' (Moxnes 2008) view of Longyearbyen and exposed the underlying vulnerabilities and emotions linked to individuals' relationship with mobility.

In this article, we aim to contribute to the ongoing discussion within mobilities by showing how emotions and affects 'are part and parcel of all the landscapes, atmospheres and trajectories of mobility' (Glaveanu and Womersley 2021). We do this through semi-structured interviews with residents in Longyearbyen with the following questions in mind: How does a forced or encouraged mobility generated by the pandemic affect how people feel about Longyearbyen or their own (im)mobility? What can analysing these emotions and affects reveal in terms of understanding mobilities, in particular in the context of a place like Longyearbyen which is inherently mobile?

Longyearbyen and its mobility

Svalbard has been described as a fluid landscape, where different histories have marked the land into a terrain of 'politics, architectural preservation, arctic exploration, whaling and hunting settlements, coal mining, science and technology, and ecological material and energy flows' (John-Alder 2019, 21). As Viken (2008) points out, 'mobility is more or less institutionalized on Svalbard' (144). The Spitsbergen Treaty of 1920 – often referred to as the Svalbard Treaty locally – grants Norway full and absolute sovereignty over the archipelago. The treaty stipulates the territory be open to nationals of the signatory parties without need for a visa. This ease of access makes Longyearbyen an attractive place to live for many non-EU/EEA citizens. It also means that Norway, as stated in the 2016 White Paper on Svalbard (Meld. St. 32 2015–2016), wants to maintain Norwegian presence – even while transitioning Longyearbyen from a coal-based community to a tourism- and research-based community. Paradoxically, this shift has also changed the workforce from a predominantly Norwegian one to an increasingly international one.

Located at 78 degrees north, Longyearbyen is the Norwegian state's administrative centre for Svalbard. Longyearbyen was established as a mining company town by the American-owned Arctic Coal Company in 1906 and was purchased by the company now known as Store Norske (SNSK) in 1916. Over the years, the Norwegian government has secured its sovereignty by supporting Store Norske's presence and the town of Longyearbyen with significant subsidies. As Grydehøj, Grydehøj, and Acrén (2012) have discussed, although Svalbard is a part of Norway, it is governed by international law. Because of this inherent double bind, the Norwegian state continues to support Norwegian presence on the archipelago. Currently, the State is trying to increase the Norwegianness of the population and the level of control it has over mobilities within the archipelago. Examples include the current propositions to remove local voting rights from non-Norwegian nationals (Government.no 2021a) and restrictions on access to nature (Government.no 2021b; NEA 2021). The shift in voting rights would fortify the position of the Norwegian residents over the non-Norwegian residents[1] while the restrictions in access to nature would reduce mobility for all residents and visitors, no matter their citizenship.

Initially, the mobility of residents was linked to their work contracts with the mining company. Although Longyearbyen is no longer a company town, housing is still linked to their employment for the majority of residents and the town's population continues to be transient and mobile in nature. In the last two decades, as mining has decreased, Longyearbyen has focused on developing tourism (and its concomitant service sector), research and education as its main economic pillars. These sectors attract a mobile, and often international, labour force. As pointed out by Pedersen (2017), this presents a dilemma for the Norwegian state: Longyearbyen, the intended Norwegian settlement, is becoming increasingly international. In 2020, almost 37% of Longyearbyen's

population was non-Norwegian[2] (SSB 2020a). Longyearbyen is now one of the most easily accessible towns in the High Arctic, with regular flights from Oslo and Tromsø. It is a convenient and comfortable place from which one can experience the Arctic with a wide range of tourist products such as dog sledding, hiking, glacier climbing, skiing, snowmobiling, cruises, etc.

There are also other structural foundations for Svalbard's inherent transience, defined by the Norwegian state. Longyearbyen is supposed to be a family community but not a life-long community, and there is no elderly care. Less than 15% of the real estate is privately owned and the Governor's website states, 'it's hard to get housing if you do not have a job' (Sysselmesteren.no N.d). Furthermore, social benefits are limited and many can only be accessed on the mainland. There is an official requirement to 'have the means to be able to reside on Svalbard' (Sysselmesteren.no N.d), creating a space where all who come are, de facto, deterritorialized: Longyearbyen is home only as long as it is also a place to work.

Longyearbyen is not a 'non-place', such as an airport, a railway station, or a high-speed road in Augé's (2009) description, but it is a place of transit. As one local saying goes, everyone leaves 'in the end'. The turnover of population in Longyearbyen, which can be as high as 25% (SSB 2020b), is often taken as demonstrating that change and transition are an inherent part of the town's culture and identity. Those who move to Longyearbyen are prepared for hyper mobility as normality and have made the choice to live with it. What is less discussed is what happens when this normalized transiency is disrupted, as was the case for those living in Longyearbyen during the lockdowns and periods of restricted travel due to the Covid-19 pandemic.

Worldwide, the tourism sector suffered from the pandemic-related reduction in mobility. In Longyearbyen, the ensuing economic crisis for tourism and the related service industry highlighted the role of mobility as an aspect of this sector that is often taken for granted. Not only was the number of tourists impacted but so was the seasonal, lifestyle mobility of many of those working in the sector. In addition, the restrictions on entering or leaving Svalbard in 2020 and 2021 were maintained even when tourism within Norway was allowed at various times.

Longyearbyen, a place of easy-access and high mobility, changed overnight when the pandemic restricted mobility: gone were the tourists, gone were the jobs connected to tourism. At the same time, there were no recorded cases of Covid-19 and many of the restrictions in micro-movement that were felt elsewhere worldwide, as for example described by Jensen (2021) in Denmark, did not apply to the archipelago. People could still go out in nature (although cabin use was restricted) and many would meet for walks or skiing or snowmobile trips, a kind of 'locavist' tourism (Houge Mackenzie and Goodnow 2021) in the surrounding nature. Given that there is no public transport in Longyearbyen, nor roads between Longyearbyen and the Russian-owned company town of Barentsburg (the only other town on the archipelago), the restrictions that were so sorely felt elsewhere were less evident here. As a minor but meaningful daily impact, no face masks were worn in Longyearbyen until Svalbard once again opened up (intermittently) and tourists could come in the beginning of 2021, bringing with them the possibility of infection. In many ways, being in Longyearbyen during the pandemic was like being in a safe haven – for those who had jobs and a secure income. In the case of Longyearbyen, how can we understand people's experiences during this time of rupture in the heretofore established rhythms of mobility and immobility?

Politics of mobility and minor theory

Our theoretical position is developed alongside our individual experiences of Longyearbyen, the unfolding narratives from the interviews, and the ongoing discussions in the new mobility paradigm. Through the politics of mobility (Cresswell 2010, 2021) we see how people's reactions to the enforced (im)mobilities exposed certain pre-existing systemic issues that are part of Longyearbyen's situatedness.

The theoretical framework of politics of mobility (Cresswell 2010) allows us to turn to the ways in which mobilities are productive of, and produced by, social relations that are inevitably

influenced by power production and distribution. As we consider the differentiated access to mobility, the normalized (questions of 'should' in moving, travelling or transporting) or moralized (what are good practices or motivations behind one's mobility choices) meanings attached to mobility, and the embodied and lived experiences of mobility, we start to see the ways in which mobility becomes political. Through this analytical lens we can understand the systemic issue of how mobility is inherently embedded in Longyearbyen's daily life and why people's mobilities patterns changed during the Covid-19 pandemic in Longyearbyen.

Our focus on people's emotional responses to the changes in mobilities derives from but also reinforces the need to understand mobility within an emotional and affective landscape. Simply seeing emotions as situated in the social and political constitution of mobility will risk losing sight of people's actual experiences. A focus on emotions also reveals how they are entangled within the web of power relations. We thus turn to Katz' minor theory (Katz 1996, 2017).

Minor theory was inspired by 'minor literature' (Deleuze and Guattari 1986), which refers to the literature written 'in a major language in ways that subvert the language from within' (Katz 1996, 489). By using this approach, we were able to get a deeper reading of interviewees statements. Subtexts and subversions became apparent. We were able to see how people weren't just passive reactants but also active participants in their own situation. By looking at individuals' emotional responses to their loss of control and the actions they took to regain it, we can see how people 'reworked and recomposed the major from within' (Katz 2017, 596). The analytical lens is, therefore, an 'analytical crack', through which we may see how mobility structures the affective terrain of Longyearbyen in a different way. For instance, while many start to discuss a 'new normal', exploring participants' narratives through the lens of minor theory points to how Covid-19 has exposed 'part of what has long been normal – a highly connected and often unstable networked world' (Cresswell 2021, 55).

Minor theory helps us to see emotional reactions that highlight individuals' responses to the loss of control of their own mobilities. Such reactions point to a micropolitics that 'valorizes the immediate and the individual, and acknowledges the interconnections between all scales, from the singular to the cosmic' (Wolfe 2020, 608). It is developed from within and leads to an affective approach to the political: peoples' mobilities are deeply and personally connected with their emotional state. This approach aligns with Thrift's (2008) Non-Representational Theory where mobility is the expression of an individual's practice of everyday life, and there is an affective dimension of interlocking mobility and immobility. With minor theory we aim to show how the pandemic-related restrictions impacted and disrupted individuals' chosen mobility practices, bringing to the fore their emotional connections to mobility, and thereby showing how mobility can be seen as a practice. The analysis opens up a new register of understanding where the performance of mobility, rather than the unifying norm/generalized view, is what is important. This deeper, more fluid and non-representational understanding of the town's specific situatedness would not have been possible without including an analysis of the underlying minor expressions of people's everyday lived experience in Longyearbyen during lockdown.

Methods

This article is based on interviews conducted by three of the co-authors who were living in Longyearbyen during the pandemic. Caught in uncertainties about the global situation and its local implications, they decided to conduct semi-structured interviews using the same collaboratively developed interview guide with a set of five major interest areas: (1) impacts on personal life; (2) impacts in terms of job/company; (3) societal impacts; (4) change in perception of place; (5) futuring.

People in key institutions such as the local administration, hospital, and business association were contacted, as well as individuals representing different facets of the town's inner diversity – such as international migrant workers, freelancers, artists and students. The empirical material

discussed in the paper displays a range of perspectives without claiming to cover the full scope of lived experiences in Longyearbyen during the pandemic. Eleven interviews were conducted in July, August and September 2020. Nine were in person and two were done online since the participants had already left the island. Of the eleven people interviewed, three were Norwegian, two were European, and six were non-European.

The analysis of the interview materials was done first individually and then collectively. Based on discussions and comparative notes, themes and categories emerged from the empirical materials. Through this process, the range of responses began to fall into patterns corresponding to how participants described their experiences between March – when the lockdown happened – and when the interviews took place the following summer/autumn. Although the responses are in many ways entangled, we grouped the emerging themes in the analysis as follows: (1) reactions based on their initial situation with a direct impact on their mobility, soliciting highly emotional reactions; (2) longer term impacts on their situation (from March to when the interview was done) causing high levels of stress as they navigated the uncertainties of the pandemic; (3) issues of (in)security caused by the pandemic; (4) underlying systemic issues that were causing many of the situations the participants were facing. In each of these groupings, the participants expressed emotional reactions that were directly related to their situation of forced or encouraged (im)mobilities. It is these reactions that we have tried to bring forward here in order to shed light on how disrupted mobilities has exposed the deeply personal, minor stories embedded in their individual choices, thus revealing the affective and political aspects of mobilities.

Forced and encouraged (im)mobilities

Analysing the interview materials with politics of mobility and minor theory helps us to see the multiple dimensions and layers of people's responses toward the change of mobilities in Longyearbyen. Following Cresswell's (2010) politics of mobility and thinking about mobilities in terms of constellations of movements, representations, and practices, we see how local institutions' restrictions on people's mobilities in Longyearbyen stem from the historical specificities of Svalbard. Additionally, politics of mobilities brings up aspects of immobility that are sometimes overshadowed by the normative discourse of Longyearbyen as a place of extreme mobilities.

Without knowing how long it would take before it was safe to travel again, the short-term solution/tool varied from encouraging some people to leave, to forcing others to return, to putting other people's life plans on hold. In each of these situations, the participants felt that they were not in control. This loss of control was destabilizing and impacted their emotional state. But instead of reading these emotional responses with dualistic slippage of control/controlled, minor theory helps us to engage with the emotions that emerged, bringing out a more nuanced understanding of how participants responded to the (im)mobilities they were faced with.

First responses

In stories that participants shared with us about the first month of the pandemic, the inability to be an active agent in their own mobility had a deep impact on how they responded emotionally. As Jessie, a non-EU student at the University Centre in Svalbard (UNIS) who felt obliged to leave because of an edict recommending students return to their home country, explained:

> I thought I had to go. I booked my plane ticket and I left two days before the deadline. That's why I left. I didn't want to. It broke my heart. *[crying]* I booked my ticket one day and then next day I was in the plane. I had to borrow money to buy it because I didn't have it actually. (Interview with Jessie, 1 September 2020)

The act of being forced to leave made Jessie feel a deep loss. This loss was then amplified by her vulnerabilities – the lack of finances to pay for the ticket to her home country and then, as she explained later in the interview, the lack of understanding from her family. For Jessie, the only

way to cope with the situation was to try to hang on to the memories: 'The nice thing is that if I (want) to go back there, I just have to close my eyes. And I remember. *[crying]* That's pretty cool'. Even when back in class online, Jessie felt isolated. There was no easy way to exchange with her fellow students, a common situation for many during the pandemic. In Jessie's case, her isolation was increased by the physical distance from the place she wanted to be in, reinforcing her sense of loss and anchoring her in a liminal place where she was neither 'home' in Svalbard nor at home in her 'home country'.

This deep sense of disruption was also experienced by Anne, a non-EU artist who was visiting her home country when the pandemic started. Unlike Jessie, Anne's experience had to do with getting back to Svalbard. Her distress was triggered by a forced mobility – at a time when she wasn't sure if she would make it back into Norway before the borders closed. This placed her in a (forced) liminal space of transit. Her description of the process of trying to get back is one of on-going stress, 'by the time we got to *[town in Norway]* I had been up for 72 h because I couldn't sleep. I was so anxious the entire time' (Interview with Anne, 31 August 2020). When her adult son got Covid just after Anne went into quarantine on the mainland, she felt trapped. This forced immobility, while herself in a liminal state between two places (the home she was leaving and the home she was returning to) added to Anne's stress. Being an artist, she responded by painting and began a series inspired by her feelings of longing. Once Anne got back to Svalbard, she felt she could no longer leave. This placed Anne in a different version of forced immobility:

> I may not be able to see my family again. I may never see my sister again. She's older than I am. If she gets sick, I won't see her. This is … hard stuff. And I am not 30 so what happens when I get old? I cannot go back to my country, how do I manage this? I am a single woman and I can't go home. How do I get old in a foreign country? That is the future I have to consider. And I am lucky. Other people I know, who are not so well off, they are terrified. Absolutely terrified.

The raw emotions expressed in both of these stories, Jessie's despair at being forced to leave and Anne's fear of not getting back coupled with a fear of not seeing her family again, is typical of the kind of heightened emotions often experienced when undergoing a major change. What is interesting in these cases is that when the forced (im)mobility disrupted the otherwise ordered perceptions of 'home' and 'not home', it also opened up a liminal space where Jessie and Anne were forced to face their own vulnerabilities and sensitivities. In both cases, the participants found themselves in an undesired in-between state that left them feeling out of control. While the sense of losing control manifested in the magnitude of external changes, the emotional turmoil they had to confront signalled the changes happening from within. As Katz (1996) argues, the major and the minor are 'intertwined in an exquisite and mobile tension' (491). As the movement from both positions are mutual and relational, whatever is expressed through the tension and the in-between space will bring changes. For Jessie, closing her eyes and going back to her memories provided her space to find comfort, familiarity and a feeling of home. For Anne, creating artwork inspired by her sense of longing and disruption helped her to cope with her in-between situation and express her understandings of what was being lost, changed or perhaps created. Through finding their own 'minor expressions' (Katz 1996), Jessie and Anne were enacting micropolitics by taking a certain element of control over their own situation.

Dealing with the situation

After the initial shock of the lockdown brought on by the pandemic, many people began to settle into what some called the 'new normal'. For Tom, a non-EU guide, the upheaval put him in a state where he no longer had a job (due to the halt in tourism) but he had time. Having no work engagements allowed Tom and his friends to explore the island and its opportunities for outdoor experiences at a time when they usually worked non-stop: 'The time, I really enjoyed to have that time free, April is typically a very busy month' (Interview with Tom, 20 September 2020). After a few months, however, the lack of employment made him question living in a place where having a job is the reason to stay:

> Towards the end of the summer it started to affect me more and more, I felt like I didn't really have any purpose being in Longyearbyen. I got to do the trips I wanted to, but it was just a weird time being there.

The initial feeling of 'freedom' became bittersweet. This also points to a particular aspect of Svalbard's transiency: the absence of the need for a work visa makes it a place where it is easy to come to work – even if there are no social services or healthcare benefits once you get there (for many non-public sector jobs like Tom's). For Tom, the feeling of 'not having a purpose' had to do with his inability to maintain the mobile lifestyle he had chosen which always included a combination of outdoor experiences and an economic income. The pandemic highlighted the vulnerabilities inherently linked to this mobility choice in Longyearbyen. In particular, Tom pointed out the precarious situation of working in the tourism industry:

> Tourism seems to be a very fickle industry. And the guides are often the first ones to get cut if there's anything like a disruption. And that suck being a guide. When you're cut all the time. It's made me really question if I were to stay in this industry or whether to have children would be actually for me. To provide financially it's not an income that you can expect, it's very up–down.

Unwilling to continue in this uncertain state, Tom eventually left Svalbard and quit being a guide. Yet we will lose the depth and richness of Tom's story if we only see him as someone forced to leave Svalbard because of his lifestyle choice. The transition in Tom's feelings about being out in nature during the pandemic from 'feeling free' to 'feeling more affected', indicates there is an often-unmentioned space between a person's economic reality and their lifestyle choice. In this in-between space of life and work choices lies lifestyle workers' dilemma and vulnerability. As Cresswell (2010) points out, our experience of being mobile is affected by whether we have chosen to be mobile or have been forced into it. Tom's questioning of his experience of being mobile and his choices based on those experiences – due to the specificities of the tourism sector on Svalbard – bring to light a different facet of the mobility lens: people may be juggling multiple lifestyle choices at the same time and it is only when one aspect tips out of balance that they are forced to make a choice between them.

Such decision-making entails distress and emotional reactions. Sam, a service worker with children who was also supporting her family back in Asia, found herself forced into an uncomfortable in-between state where she could not make certain choices, even if her financial situation had become dire. She explained, 'If I lived alone, I wouldn't worry about it. I could stay on the mainland with friends. […] But now I have my kids, so it is not possible' (Interview with Sam, 1 September 2020).

This meant Sam was constantly on edge, constantly walking the line between being able to support her family and failing to provide for them. Even if she knew she could get temporary work elsewhere, she couldn't leave Svalbard because her children were in school in Longyearbyen. Sam found herself in a forced state of immobility that made her feel vulnerable:

> Before, I was so tired from work, I go home, I sleep, I am refreshed again. Now, I don't get enough sleep, I over-think. […] I make my brain function 300%. Because I am afraid to make a mistake, and miss the standard of my work, because I need it so badly, my work.

Given the very real possibility of losing her job due to a lack of tourism, Sam's stress was constant. If she no longer had any work, she would no longer have any income as she did not qualify for welfare without a Norwegian passport. Tom narrated a similar situation of vulnerabilities:

> It has affected me with stress […] It was stressful being on Svalbard in Norway, having a D-nummer, and not getting money from NAV *[the Norwegian Labour and Welfare Administration, providing unemployment benefits]*, or from the State. I was paying taxes in Svalbard in Norway, but I didn't get any benefits. I did get 8000 kroner from Lokalstyre. […] I have signs of depression and frustration and angst. There's just a big question mark.

Sam and Tom were forced to decide how to balance the need to provide for themselves and/or their families within the new paradigm of the pandemic. In both situations, which continued over several months, the participants had to work through the process of rationalizing why they were in Longyearbyen. Instead of coming from the forced physical movement experienced by Jessie and Anne,

Tom and Sam's in-between state was triggered by the pragmatic need to make a living. Faced with these major changes, Tom and Sam were left to find their own way of dealing with their stress and uncertainties. Instead of giving up and saying 'life is too hard', they made choices that would minimize the vulnerabilities of their situations. Tom chose to leave Svalbard to find a job, while Sam worked extra hard to ensure her job performance was above reproach. In both cases, Sam and Tom needed to create a certain sense of security for themselves.

The (In)security of living in Longyearbyen

At the same time as the Norwegian state was implementing measures to secure public health, individuals responded to the feeling of being in a crisis where the future was unknown. As Hans, a Norwegian health worker, pointed out, 'it is not easy to live on an island, you cannot go home. On the mainland, if you get sick or something, you can. Here you are stuck' (Interview with Hans, 2 September 2020). Ana Paula Souza, a psychotherapist living in Longyearbyen, confirmed that her clientele increased during the pandemic, with higher numbers among the youth, people employed in research, tourism and the service industry. With permission, we quote a client's reflection during a therapy session, 'The general shared feeling among friends is as if we were inside the Titanic and it is about to sink down in a cold dark place without a safety vest for everyone'.

These two elements, the feeling of not being in control of the situation and the inability to be an active agent in one's own mobility in case of need, combine to form a deeply embedded insecurity. Several participants expressed the need to create a feeling of security, be it emotional, financial, or health-wise. One participant, Carl, an elderly European, imposed upon himself a forced immobility in order to ensure his own safety: 'I am in the risk group so I tried to barricade myself inside but you cannot live such a life forever, it was crazy in the end' (Interview with Carl, 4 September 2020).

Others, as in the case of nationals of non-EU/EEA countries who didn't qualify for welfare and would lose access to healthcare if they lost their jobs, described a feeling of insecurity related to their physical health. One participant in this situation was Parita, an East-Asian youth. She explained her lived experience as follows:

> I felt quite trapped in Longyearbyen. […] I had no job so it would have been very dangerous for me to go to mainland Norway. Because if I would get ill or infected with corona, I don't know quite who would pay all the money I would need to recover. (Interview with Parita, 28 August 2020)

Her feeling of being trapped, of being unable to be an active agent in her own mobility, was linked to the fear of getting sick and not being able to cover the costs. In both cases, Carl and Parita chose a self-imposed immobility. In Carl's case, confined to his house; in Parita's, to Longyearbyen. Looking at their confinement through minor theory, however, we may understand it as the need to move from being out of control, and therefore vulnerable, to being in a space of safety. Even if they later realized that these efforts could not be sustained as long-term solutions, what they produced was a rupture away from the general anxiety and uncertainty of the moment that was being imposed upon them from external sources. This rupture enabled them to find a certain respite in the small comforts they had shaped for themselves by removing fear of infection (and therefore costs, financial or physical) by choosing immobility – even if it also caused them a certain level of distress that in the end was untenable.

Unlike Sam and Tom who were working in the service sector or hired as freelancers, people employed in the public sector did not experience the same exposure to insecurity or changes in their mobility patterns. However, threads of vulnerabilities were also apparent in their reflections on how minor, everyday life things were missed and valued when facilities in town were shut down. According to Svein, a Norwegian business owner,

> People *[were]* tired, bored, demotivated. It's the sum of everything, plus the dark season, you can't travel … Then one festival closes down, then the other … And then there are all the other factors. The gym is closed, such small things that mean so much when you live here. (Interview with Svein, 30 August 2020)

For all three participants, the inability to move freely and participate in the activities that they had done before was felt as a hardship – whether self-imposed or not. Yet this hardship indicates a need of 'revealing the limits of the major as it is transformed along with the minor' (Katz 2017, 598). The otherwise taken-for-granted everyday convenience and comfort only became visible and precious when they were temporarily lost. Adding to this, as in the case of Svein, was the feeling that others didn't understand the hardships he was experiencing:

> There are people in Longyearbyen who walk around saying 'it's so nice now without tourists!' You can afford to say that when you work in the public sector. But for those of us with our own companies, we risk bankruptcy and work without pay to stay open. So it hurts a lot to hear those comments.

For Hans, his understanding was based in a different position. He explained how the need to secure the future care of infected patients also impacted tourism, ' … the hotels cannot have 100% full because we have to organize quarantine if people get really sick'.

As can be seen in these testimonies, the range of emotional reactions and understandings fluctuated according to each participant's situated perspective. This multilayered and varied experience of Longyearbyen, as both the Norwegian state and individuals tried to establish a position of security in the new reality being created by the pandemic, exposed systemic differences in the town's structure.

Systemic issues/politics of mobility

One systemic issue that came out in the interviews was the increased focus on Norwegianness in Longyearbyen. Here as elsewhere, public-sector employees were not as impacted by the pandemic as compared to those working in the private sector. However, while the public sector in Longyearbyen employs almost exclusively Norwegians, in line with the political aim of maintaining a Norwegian settlement, a large part of the workforce in tourism, and research and education, is non-Norwegian. The unequal negative impact of the pandemic on private-sector employees was thus linked to citizenship, with non-Norwegians impacted more than Norwegians. As Matts, a local Norwegian journalist, explained,

> The biggest impact for the community has been the travel ban, for people in the tourism sector. They lose their jobs, they are laid-off, not permanently … and also it is very obvious the problem with the third country citizens that fell out of every social network that we have, Norwegians. Suddenly it was so obvious, or it became so real. We hadn't seen that before. This problem has not been this way before. Ever. (Interview with Matts, 1 September 2020)

The sense of shock Matts expresses about the inequality in terms of social security indicates a complex emotional landscape regarding how individuals deal with systemic issues. While at the official level the Covid-19 pandemic and the ensuing economic crisis highlighted a division between the Norwegians and the non-Norwegians in Longyearbyen, at a personal level there were efforts made to minimize the negative impacts towards non-Norwegian workers. Here Maria, a non-EU service worker, reflected with mixed emotions:

> Regarding my employers, really, I am very grateful, because we had priority as we were the last ones in being laid off and the first ones being re-contracted. That was really very humane of them. To prioritize people that are more in need or that are not protected by the State or … Just because of their passport. It feels unjust, but I understand the rules in the world, that one is working, like any other citizen, and you pay taxes, like any other citizen, and just because of your passport or the place you were born you don't have the same rights. (Interview with Maria, 8 July 2020)

For other non-Norwegians who weren't as protected as Maria by their employers, the Norwegian state's controversial *ad hoc* 'travel home' grant was seen as a way for the State to remove them from the island. The scheme's stated goal was to make sure that people without any coverage granted through Norwegian or European legislation would be able to get 'home' before unemployment

put them in a precarious position. Since those who could apply for the grant were non-Europeans – generally, tourism and service industry workers – the scheme challenged what individuals had heretofore perceived as 'home' or 'community', and created a deep sense of insecurity in many non-EU/EEA citizens of Longyearbyen. As Parita said,

> I always thought I was used to the society in Longyearbyen, I was thinking it will be all right, I will be safe. But I wasn't. I didn't feel safe when corona came. We could have been sent back, couldn't we? I understood how foreign I actually was … It is so unusual for me to think that I am a foreigner here. I have lived here almost all my life, I am part of the community but still I am not Norwegian enough to get the help I need.

This transition from feeling 'part of the community' to feeling 'not Norwegian enough to get help', or the feeling of 'animosity' towards non-Norwegians as another participant expressed it, was shared by many non-Norwegians in Longyearbyen. For some, even though they had felt at home in Longyearbyen before, the situation of the pandemic made them realize the structural imbalances inherent in the system. Maria explained:

> And after this crisis happened … it's like there I had a different perspective regarding being a foreigner … I am not accusing Svalbard or Norway, nor anybody in particular, I think that in every country in the world obviously certain persons, certain citizens will have benefits that others cannot access. But … then I felt that I wasn't that integrated, that I didn't have a European passport, that you are a third-class citizen, you're not Norwegian, not Scandinavian, not European, you're the last of the last in the line.

This dynamic – of a town openly divided along national identity lines, where one segment is undesired – is a tension that has increased during the pandemic. As Matts explained, the focus on Norwegianness in Longyearbyen will have an impact:

> It will be hard to be a foreigner here, I think. More and more difficult. It's expensive to live here and it will be maybe more expensive. I think we will meet quite hard times. I think corona started this, given more … speeded up, the problems in a way. It's hard to say how this society will look like. What else can they do here? Of course, you have KSat and UNIS and you have other things. But tourism is a very big industry. But it generates almost only foreigners and hardly any Norwegians working, and only in the top positions —and even then, it's not well paid. And the Sysselmannen, everybody working there, they have so many benefits. The society is very divided with all this.

In addition to trying to control who can live in Longyearbyen, the Norwegian state has also begun exercising increased control over people's mobility in the natural environment of Svalbard. This politics of mobility will impact all living on the archipelago, Norwegian and non-Norwegian alike, and will potentially bring about frictions just as other measures did during the pandemic. However, viewing such frictions with the help of minor theory, we start to see the entangled relations between the minor (the reactions from a personal/individual level) and the major (the ones from an official/systemic level). Instead of being opposed to one another, the major and the minor are in constant negotiation, where the minor is entangled with the major from within, in an interstitial position (Katz 1996).

Discussion

Covid-19 pandemic showed both the inherent vulnerabilities associated with the lifestyle choices people make when coming to Longyearbyen, as well as the underlying foundations that preclude the possibility of settling down and having a long-term attachment to place. This reality of transience anchors the town of Longyearbyen as a place of extreme mobilities. The interviews with our participants brought forward both structural issues and systemic vulnerabilities, often expressed in emotional tellings of lived-experiences.

These emotional tellings add to the worldwide reports on impacts of Covid-19 on people's mobility and highlight how individual responses are entangled with the socio-economic and political framework of a specific place. Even before the Covid-19 pandemic, Longyearbyen was in socio-economic transition. Initially, a company town controlled by the Norwegian state, the decision

to open Longyearbyen to a diversified, market economy from the end of the 1970s led to decreased state control. The economic restructuring from coal mining to a post-industrial economy based on tourism, research and education has led to an increase in the non-Norwegian population, which rekindled the need for the Norwegian state to regain control. Each of our participants experienced changes in their mobility patterns differently, depending on their varied positions and perspectives. In addition, the State is using politics of mobility in order to increase their control, further differentiating the participants' experiences. Keeping this politics of mobility in mind allows us to link the proposed regulations regarding tourism, outdoor recreation, housing, safety, social and educational services, and voting rights, to the established patterns of mobility in Longyearbyen.

These stories from Longyearbyen also contribute to the growing literature on emotional reactions to the Covid-19 pandemic with a deeper and more nuanced understanding from the High Arctic. By reading these stories closely with minor theory, we have presented the individual, emotional, responses that emerged when participants found themselves in the in-between spaces created by a forced or encouraged situation of (im)mobility. Using minor theory highlighted the important roles of such interstices showing the interstitial perspectives in relation to how people's emotional reactions to the change in Longyearbyen's mobilities in the context of the Covid-19 crisis. The emotions that leaked through the interstices form a terrain of affect. This terrain cannot be revealed in simple descriptions of rejection or exclusion, but can only be depicted when individual emotions are understood within the situatedness of Longyearbyen – of which the systemic issues are part. This affective terrain, in turn, shows the interconnections between emotions and mobilities in Longyearbyen, and how they can only be understood in conjunction and not in isolation.

The stories therefore reveal systemic inequalities and vulnerabilities in Longyearbyen that were heightened and exacerbated by the Covid-19 pandemic, as well as bring forward the emotional vulnerabilities that led participants to respond and make certain choices in an effort to establish a sense of security and/or to be active agents in their own mobility.

Conclusion

More than a decade ago, mobility scholars asked us to rethink how people's movements are part of the space and place in which these movements occur (Sheller and Urry 2006). Barenholdt and Granås' edited book 'Mobilities and Place' examines the many ways place and mobility overlap and entangle and 'become together' (2008, 1). In the northern European context, new patterns of mobilities have been examined against the background of economic restructuring (Carson et al. 2016). These analyses demonstrate the shift of mobilities studies towards more nuanced explorations of the various temporal, spatial and motivational relationships people have with mobility, transiency, and place.

In many ways, the corona virus has further troubled our views on mobilities. As Tzanelli (2021) proposes, the changing mobilities imposed by the Covid-19 pandemic have changed our views of societies and ourselves, displaying the Virocene where multiple crises entangle. This points to the need to better understand the vulnerabilities of individuals and societal systems and the impact they have on each other. In this context, our case study of Longyearbyen demonstrates the complex and affective aspects of politics on an individual level by exploring the emotions connected to everyday practices in individuals' enforced (im)mobility during the time of the Covid-19 lockdowns.

The disruptions of mobility patterns in Longyearbyen, an inherently transient space, provide a rather unique situation where people's emotional attachment to mobilities is revealed. Because of this, we can see how Longyearbyen's systemic issues are enacted through the affective terrain as a process rather than as fixed categories. In this paper, we have responded to Jensen's (2021) invitation to 'think with Covid 19' through looking deeper into everyday life mobilities and individual, emotional and embodied experiences.

As shown in this article, the shift from mobility to immobility is not straightforward. Many people juggle multiple lifestyle choices at the same time and it is only when one aspect tips out

of balance that they are forced to make a choice between them. We see from the emotions expressed by participants how feelings guided their reactions to, and choices about, their change of mobility. This allowed us to gain a different understanding of people's experiences during this time of rupture in the heretofore established rhythms of mobility and immobility in Longyearbyen. In this way, we contribute to what Jensen envisions as an 'atmospheric readings of Covid-19' (2021, 78) which allows us to see the pandemic's disruptions as both material and tangible but also socially coded and affectual.

The politics of mobility lens showed how the enforced (im)mobilities exposed certain pre-existing systemic issues that are part of Longyearbyen's situatedness. By adding a second reading applying Katz' minor theory (Katz 1996, 2017), we then showed another layer, a deeper, more fluid and non-representational understanding of the town's specific situatedness, which would not have been possible without including an analysis of the underlying minor expressions of people's everyday lived experience in Longyearbyen during lockdown. This analysis highlighted individuals' emotional responses to the loss of control of their own mobilities. These responses, where people tried to regain a measure of control over their own lives, point to a micropolitics that is developed from within affective mobilities (Glaveanu and Womersley 2021).

By bringing emotions into the equation, we opened up the individual and personal connections people experience in their relationships to place and mobility. We have illustrated how mobilities can be enacted through individual (re)actions to a dominant force – in many cases by subverting a part of the situation in order to regain a certain element of control. It emerges from this that the value individuals place on (im)mobility has less to do with movement in and of itself than the ability to control that mobility. When in a forced situation, people strive to take back an element of control in order to re-anchor their life situation – even in instability. These are the reactions that we have tried to bring forward here in order to shed light on how disrupted mobilities has exposed the deeply personal, minor stories embedded in individual choices, thus revealing the affective and political aspects of mobilities.

Adding the third element of emotion to the work already done on mobility and place enables us to see the underlying relationships people have with both their mobility and the place(s) where they are mobile. It reveals the political in the flux of movement that would otherwise have been unseen. This way of going beyond a dualistic reading of mobilities and immobilities opens up the possibility for an affective approach to the political.

Notes

1. It is proposed that non-Norwegian citizens must have lived three years in a Norwegian municipality on the mainland in order to be able to vote and stand for election for the Longyearbyen Community Council (Government.no 2021a).
2. The tax office number combines Longyearbyen with the research settlement of Ny-Ålesund, which has approximately 40 inhabitants.

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Abstract

This dissertation explores Arctic change: how climate change, entangled with social, political and economic processes on various scales, encompassing discursive and material dimensions, is experienced and responded to in a particular locale. Longyearbyen, Svalbard, which is the focus of the study, is a former coal-mining company town at the tail end of socio-economic restructuring, profoundly globalized and considered a climate-change hotspot. The thesis contributes to the anthropology of (Arctic) climate change by focusing on a hitherto understudied societal context: a non-indigenous, transient, hyper-connected international settler community, lying at the center of Norway's strategic interests in the north. The study is based on long-term ethnographic fieldwork, including collaborations in an interdisciplinary research project and cooperations with other social scientists.

The thesis consists of six peer-reviewed publications that each address distinct aspects of intertwined socio-natural change in Longyearbyen. I demonstrate how climate change is deeply entangled with other transformations, such as globalization and demographic shifts, the out-phasing of coal mining and the growth in tourism and research/education, and Norwegian high-north politics. These multiple and entwined processes on various scales result in specific challenges and frictions locally in which it becomes impossible to separate concerns with "natural" processes from "social" change, the "local" converges with the "global", and in which climate change impacts simultaneously as a physical process and as a discourse.

To come to terms with this complex hybridity, the thesis engages with current theoretical discussions in anthropology and related disciplines on ontology, climate change and the Anthropocene, which call into question the distinction between nature and culture, material and discursive dimensions of climate change, as well as notions of locally bounded fields. Drawing on these debates and reflecting on my findings, I propose a holistic framework to the study of "Arctic Change", encompassing three theoretical notions revolving around entanglement/hybridity, ontology and scale, while arguing for the importance of local case studies.

Keywords: climate change; Arctic change; multi-scalar entangled socio-natural changes; Longyearbyen; Svalbard; ethnography

German Abstract

Diese Dissertation erforscht arktischen Wandel: wie Klimawandel als materielles und diskursives Phänomen, verstrickt mit sozialen, politischen und wirtschaftlichen Prozessen auf verschiedenen Ebenen, erlebt wird und wie damit umgegangen wird. Die Studie fokussiert auf Longyearbyen, Svalbard. Dieser globalisierte „Hotspot“ des Klimawandels ist eine ehemalige Kohlenbergbaustadt inmitten sozioökonomischer Umstrukturierung. Die Dissertation trägt zur Anthropologie des (arktischen) (Klima)wandels bei, indem sie sich auf einen bisher untypischen und wenig erforschten gesellschaftlichen Kontext konzentriert: eine nicht-indigene, hyper-vernetzte internationale Community, mit hoher Bevölkerungsfluktuation, die im Mittelpunkt der strategischen Interessen Norwegens im Norden liegt. Die Studie basiert auf langfristiger ethnografischer Feldforschung, einschließlich Zusammenarbeit in einem interdisziplinären Forschungsprojekt und Kooperationen mit anderen SozialwissenschaftlerInnen.

Diese Dissertation besteht aus sechs begutachteten Veröffentlichungen, die jeweils unterschiedliche Aspekte des verwobenen Wandels in Longyearbyen behandeln. Ich zeige auf, wie der Klimawandel tief mit anderen Transformationen verflochten ist, wie demografischer Wandel, die Einstellung des Kohlenbergbaus, Wachstum im Tourismus- und Forschungs-/Bildungsbereich sowie die norwegische Arktis-Politik. Diese vielfältigen und miteinander verflochtenen Prozesse auf verschiedenen Ebenen führen zu spezifischen Herausforderungen und Reibungen vor Ort, in denen es unmöglich wird, "natürliche" Prozesse von "sozialem" Wandel zu trennen, das "lokale" mit dem "globalen" verschmilzt und in dem der Klimawandel gleichzeitig als physischer Prozess und als Diskurs wirkt.

Um dieser komplexen Hybridität gerecht zu werden, setzt die Dissertation sich mit aktuellen theoretischen Diskussionen über Ontologie, Klimawandel und dem Anthropozän auseinander, die die Unterscheidung zwischen Natur und Kultur, materiellen und diskursiven Dimensionen des Klimawandels sowie Vorstellungen von lokal begrenzten Feldern in Frage stellen. Unter Bezugnahme auf diese Debatten und unter Berücksichtigung meiner Ergebnisse schlage ich einen ganzheitlichen Rahmen für die Studie des "arktischen Wandels" vor, der drei theoretische Konzepte umfasst, die sich um Verflechtung/Hybridität, Ontologie und Ebene drehen, während ich für die Bedeutung lokaler Fallstudien argumentiere.

Stichwörter: Klimawandel; Arktischer Wandel; multiskalare verflochtene sozio-natürliche Veränderungen; Longyearbyen; Svalbard; Ethnographie