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Disaster risk perceptions and multinational cooperation in Barentsburg, Svalbard

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Abstract

Svalbard's geographical positioning, environmental characteristics and multinational population make it conducive for considering informality and multinational cooperation in disaster risk reduction and response. Most research examining disaster risks and disasters for Svalbard has focused on Norwegian efforts in and for the main settlement of Longyearbyen, with none covering Svalbard's second-largest settlement of Barentsburg. This paper addresses this gap by analysing how 21 Barentsburg residents deal with disasters. We conducted semi-structured interviews, visually aided by the revised PRISM (Pictorial Representation of Illness and Self Measure) tool, to examine interviewees' disaster perceptions, sources for disaster-related information and learning, and formal and informal sources for dealing with disaster risks and disasters. Our findings suggest that, despite being risk-aware, Barentsburg interviewees consider the settlement, and Svalbard as a whole, to be safe. The explanation is their faith in the existing disaster-related mechanisms, made up of both local Russian entities and the Norwegian rescue services, especially Svalbard's governor (Sysselmesteren). Interviewees rely significantly on Russian and Norwegian informal actors and relationships for disaster-related information. These findings suggest that alongside formal approaches, informality may play a significant role in dealing with disasters in Barentsburg, which itself might serve as a platform for international cooperation.

Introduction

Disaster risks and disasters around the Arctic, as with the rest of the world, are common, frequently requiring coordinated – often collaborative and international – preparedness and response (Lauta, Vendelø, Sørensen, & Dahlberg, 2018). A swift and efficient response is particularly important in this region due to its environmental and geographical conditions such as harsh weather, low levels of infrastructure, difficulties with access for rescue teams and equipment, and for parts of the year, months of darkness (Sydnes, Sydnes, & Antonsen, 2017).

Within this context, the Svalbard archipelago is an apt example of a place where populations often rely on collaborative and multinational disaster-related activities. Located midway between Norway's northern coast, or the port of Murmansk, and the North Pole, disaster risks and past disasters include polar bear attacks, aircraft and snowmobile crashes, earthquakes, avalanches, power outages, oil spills, nuclear leaks off its coast, and disease, as epitomised by the COVID-19 pandemic starting in 2020 which has disrupted life on Svalbard (and around the world). While the archipelago registered its first cases only in the fall of 2021 (Jonassen, 2021; Nilsen, 2021), a combination of epidemiological requirements and cross-border travel restrictions effectively halted most tourism and scientific research (Duggan, 2021; Uryupova, 2021).

All these risks and disasters are listed together in line with the approach from disaster research which does not differentiate between "natural disasters" and "human-made" disasters on the premise that disasters happen due to people not having the resources or opportunities to reduce their risk, or allocating resources elsewhere, hence disasters are not natural (Hewitt, 1983; O'Keefe, Westgate, & Wisner, 1976). Thus, the actions to stop disasters and to reduce disaster-related damage are termed "disaster risk reduction and response" (DRR/R). DRR/R refers to all disaster-related activities, covering pre-disaster actions (disaster risk reduction) such as prevention, preparedness, planning and mitigation alongside a principal post-disaster action of response.

Svalbard is a sovereign Norwegian territory, so Norwegian authorities have established elaborate and predominantly search-and-rescue (SAR)-focused disaster response mechanisms. Svalbard is governed in accordance with the Svalbard Treaty (1920) which gives citizens of all 46 signatory countries certain rights, including for living, livelihoods, resource extraction and scientific activities. Russia is the main other country to exercise its Treaty rights over the long term,

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but many other nationalities have established a presence. Given Svalbard's multinational nature, its DRR/R mechanisms are complex, ranging from Norwegian laws to local realities to joint training exercises between the involved parties.

The numerous studies about these efforts have mostly focused on Longyearbyen, which is Svalbard's largest and main settlement (Indreiten & Svarstad, 2016; Jonsson, Kronholm, Nielsen, & Birgisson, 2019; Macdonald et al., 2011; Mitchell, Bungum, Chan, & Mitchell, 1990). While recent studies (e.g. Schennerlein, 2021; Sevastyanov, Grigoryev, Paranina, Obyazov, & Kiseleva, 2021; Vlakhov, 2019) offer insight into Barentsburg's socio-economic status, infrastructure and future prospects, little has been investigated on how Svalbard's second-largest and main Russian settlement, Barentsburg, deals with risks and disasters. This lacuna appears within the context of Russia's motivations for the Arctic being the subject of considerable concerns and opportunities within geopolitical deliberations (Bruun & Medby, 2014; Nikitina, 2018; Pedersen, 2021; Wilson Rowe, 2018).

Svalbard's multinational make-up and governance structure, coupled with its geographical positioning and environmental conditions, thus offer an interesting test case. In fact, the aptitude of Norway's Arctic disaster-related policies cannot be fully understood and, therefore, credibly evaluated without taking into account the experiences of all involved parties. In this context, the absence of more studies on Svalbard's second-largest settlement is a particularly significant barrier to understanding DRR/R around and for the archipelago.

To contribute to filling this gap, the research here considers the question of whether disaster-related activities could and should be used more in the Arctic and the High North to foster links between Norway and Russia. To do so, it analyses how a group of residents in Barentsburg perceives and deals with disasters and how this group feels about Norway's role for DRR/R around Svalbard. By examining 21 Barentsburg residents' disaster-related perceptions of the relationship with Longyearbyen and, more generally, Norway, this study provides insights into Arctic DRR/R and its intersections with politics including trust, history, international cooperation and informal disaster governance (IDG).

First, we introduce Barentsburg and provide information on disasters in, or relevant to, the settlement. Then, the innovative methodology used to gather the qualitative data is described. The 21 semi-structured interviews were visually aided by improvements to the PRISM (Pictorial Representation of Illness and Self Measure) tool. Our findings focused on Barentsburg interviewees' perceptions of: (I) disasters and disaster risks; (II) sources of disaster learning and information; and (III) perceived formal and informal sources of help for DRR/R. The findings show the roles played by international cooperation and IDG for Barentsburg's DRR/R efforts and vice versa. Further research avenues are then discussed. This work adds an important empirical case study to Arctic studies and to disaster science while bringing the two fields together through a methodological innovation in a location which, to the best of our knowledge, has never before been studied for this topic.

Background: Barentsburg, Svalbard and disasters

Barentsburg

Barentsburg is the second-largest settlement on Svalbard, about 55 km from the main settlement of Longyearbyen. With approximately 500 inhabitants of mainly Russian and Ukrainian origin, it comprises a significant proportion of Svalbard's permanent population of around 3000 people. The presence of a Russian community and state company on sovereign Norwegian territory has led to complex Norwegian–Russian relations. The first appearance of Russian hunters on Svalbard – then known as Spitsbergen – is thought to date to either the early 16th century (Albrethsen & Arlov, 1988; Starkov, 2005; Storå, 1987) or the early 18th century (Avango et al., 2011; Hultgreen, 2005; Mathisen, 1954). Although the Russian government was not actively making claims to Spitsbergen, it began to use its presence for diplomatic claims in 1871 when blocking Sweden's attempt to establish this settlement as a colony for the Swedish-Norwegian Union (Mathisen, 1954). Since then, Russians have been deeply entangled with the archipelago's intricate and disputed geopolitics.

Svalbard's status was officially "clarified" with the 1920 Svalbard Treaty (a part of the Versailles negotiations) that came into effect in 1925. The Treaty established Norwegian sovereignty over the archipelago. While Norway's sovereignty is "full and absolute" (Svalbard Treaty, 1920, Article 1), it is also qualified and, thus, limited. Most military activities are forbidden (Article 9), and while it puts issues of environmental conservation (Article 2) and taxation (Article 8) into Norway's hands, the Treaty's non-discrimination provisions grant all other signatory states (currently 46) "equal liberty of access and entry" to and "enjoyment" of Svalbard and its territorial waters for specified activities (Articles 2, 3 and 7).

Russian mining on Svalbard started in 1912 and it took off when the Soviet company "State Trust Arktikugol" (literally: Arctic coal; hereafter Arktikugol) acquired the Dutch settlement of Rijpsburg in 1932, renaming it as Barentsburg. Effectively, this made Norway and Russia the only countries conducting mining activities on Svalbard (Avango et al., 2011; Statistics of Norway, 2020) with Russia contributing about 60% of the archipelago's total current coal output (Glomsrod, Duhaime, & Aslaksen, 2021). From the 1930s onwards, except for a WWII-forced interruption from 1941 to 1946, mining endeavours on Svalbard were for economic reasons; that is, for heating, railways, steam energy and coke production in Norway's case and, for Russia, to fuel its Arctic industrial centres Arkhangelsk and Murmansk with coal. Beginning in the post-war period, Russia's and Norway's mining efforts continued, motivated by political and strategic considerations – as a means to substantiate a presence. As well, industrial activities on Svalbard that initially started for economic reasons, such as whaling, trapping, ivory and, later, coal, soon became entangled in political motivations. In doing so, they became proxies of influence for their respective countries or their attempts to protect their own (business) interests from others (Avango et al., 2011, p. 36; Galvao, Mileski, & Tiller, 2020).

After the Soviet Union's collapse, Svalbard's two-thirds of Russian population began to dwindle. Today, Barentsburg is still controlled and governed by the Russian state's mining company Arktikugol which, according to Russian law, has functions in creating and running settlements. Next to its coal mining activities, it is responsible for other vital activities such as maintaining technical and social infrastructure, and sourcing labour, predominantly Ukrainians, but also Russians, Tajiks and Armenians. Arktikugol is the federal unitary enterprise within the structure of the Russian Ministry of Energy, and it is not to be corporatised or privatised. It is included in the list of strategic enterprises of Russia (Arktikugol, 2020a,b), and its unique status makes it a vehicle of the Russian government's policy for Svalbard. In addition to the functioning Barentsburg mine, it has decommissioned the mines in other Russian Svalbard settlements of Pyramiden and (in the

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1960s) Grumant. Arktikugol admits hazards associated with operating the Barenstburg mine, which is dangerous in terms of high gas content and so has a high potential for coal dust explosions. Based on the remaining volumes of coal reserves, the mine produces, according to Arktikugol's plan, about 120,000 tons per year which permits operating the mine until 2024. About 1/5 of the mined coal remains in Barentsburg to fuel its power station and the rest is exported to Western Europe at low market prices.

Following the successful Norwegian example in Longyearbyen, and taking into account the limited time of the mine's operations, Arktikugol has recently begun to rebrand Barentsburg from a mining settlement to a research centre and a tourist destination (Gerlach & Kinossian, 2016; Kelman, Sydnes, Duda, Nikitina, & Webersik, 2020; Pedersen, 2021; Roberts & Paglia, 2016; Schennerlein, 2021; Sevastyanov et al., 2021). Buildings were modernised in 2013–2014 and a new research station was opened in 2014 (where the research expedition of the Arctic and Antarctic Research Institute from St. Petersburg is based) making it the second-largest employer in Barentsburg after Arktikugol with Government of Russia (2014) placing research as the first priority for Barentsburg's post-mining livelihoods. Tourism as the second priority represents Russia's own version of the so-called "last-chance tourism." For the Arctic, this is represented by the bleak asymmetry by which climate change both augments some Arctic risks while simultaneously making the region, and particularly Svalbard, more accessible, allowing tourists to see polar bears, icebergs and glaciers before they are expected to disappear (Galaburda, 2016; Lemelin, Dawson, Stewart, Maher, & Lueck, 2010). Beyond the attempt to substitute its unprofitable coal mining activities, this strategic move allows Russia to uphold its continued presence around the archipelago (Pedersen, 2021, pp. 8–9; Roberts & Paglia, 2016, p. 906).

This redevelopment has sparked much debate in the context of Norwegian–Russian relations, which have been generally peaceful despite occasional disputes over the interpretation of aspects of the Treaty (Grydehøj, 2020; Todorov, 2020; Vylegzhanin, Zilanov, & Savva, 2019). Although some view Russia with suspicion and fear, suggesting an expansionist vision involving unilateral actions and re-militarisation in the Arctic (Laruelle, 2013), other analysts see Russia as being peaceful in the Arctic due to recognising the gains from cooperation (Nikitina, 2018; Wilson Rowe & Blakkisrud, 2014). Moreover, Russian authorities and big businesses seem to finally realise that Arctic operations require stringent safety measures. Their environmental and disaster prevention awareness might be dictated by their concern about their international image (Rambler News, 2017), as well as by corporate sustainability challenges in the midst of rapid Arctic change (Nikitina, 2021).

Norway's introduction of stringent environmental protection regulations to safeguard a large part of Svalbard's environment angers some Russians who believe that such moves are designed to thwart their businesses, and ultimately, to remove their presence from the region (Hønneland, 2016; Staalesen, 2020). Recently proposed policy changes to tourism and research (Norwegian Environment Agency, 2021) might spark further such tensions. Other Russians used incidents such as the May 2020 diesel oil spill in northern Russia to add pressure for more environmental regulations. In turn, Russian opposition to these measures quickly evokes others' concerns over Russia's motives (Grydehøj, 2014; Pedersen, 2008). A recent example is the February 2020 statement by Russian Minister of Foreign Affairs Sergey Lavrov. This statement concerns Norway's expanded environmental regulations for Svalbard and the restrictions imposed on the use of Russian helicopters which are important for mining, transportation, scientific research and, ultimately, tourism. Referring to Russia's "long-term plans for strengthening, diversification and modernisation" of Svalbard settlements, Lavrov notes that Norway's "artificial expansion of nature protection zones to limit economic activity in the archipelago" stands in violation of the Treaty and unjustly limits Russia's "equal free access" (Ministry of Foreign Affairs of the Russian Federation, 2020). With 2020 marking the Treaty's 100th anniversary, Lavrov's challenge to Norway's interpretation of the Treaty seemed to come at a strategic moment, especially at a time when Russia is heavily investing in its Arctic infrastructure (Novoselov, Potravny, Novoselov, & Gassiy, 2017).

On the other hand, fluctuating oil prices and sanctions against Russia have forced Russia to put many of its Arctic plans on hold. The major Arctic diesel oil spill on 29 May 2020 caused by the subsidiary of Norilsk Nickel may affect Russian approaches to developing the Arctic and its perception of polar risks and safety measures, including the introduction of stricter environmental and disaster prevention regulations and fines for companies (Vasilieva, 2020). Nonetheless, the different perceptions of Russian motivations still converge on a shared acknowledgement that despite historical disputes and sustained conflict potential, relations between Norway and Russia on Svalbard have been largely peaceful.

Disasters

Disasters and disaster risks in Barentsburg – and, more generally, Svalbard – are common. These include numerous transportation-related crashes (airplanes, helicopters, boats, snowmobiles and other land-based vehicles), health-related incidents and disease outbreaks, polar bear attacks, significant power outages, oil spills, fears over nuclear leaks from nuclear-powered submarines (or ice-breakers should they approach the archipelago), natural-hazard-related situations such as avalanches, landslides, weather, storm surge, coastal erosion, earthquakes, and tsunamis, and the concern over climate change's consequences (Mitchell, Bungum, Chan, & Mitchell, 1990). Moreover, increased maritime traffic and scientific, economic, and tourist activities add potential to disaster risks on and around Svalbard, while climate change adds concerns over weather patterns, sea-level rise, melting ice and permafrost, erosion, landslides, and the behaviour and migration patterns of species. Barentsburg's and Svalbard's histories display many examples of such risks becoming disasters (Table 1).

As an Arctic mining town, additional specific risks manifest. Dozens of miners have died in the mines, while Barentsburg's small and limited hospital facility constrains healthcare for workers involved in mining disasters. Barentsburg is a male-dominated settlement because mining has traditionally been a male occupation, especially in Russia and Ukraine, while only few workers bring their families. Similarly to Longyearbyen's coal mines, isolation, loneliness, long working hours in the dark and dangerous conditions, and, for about three months every year, living in 24-h darkness contribute to depression and alcohol use, for which the settlement's hospital established a dedicated section.

Arctic conditions dictate some specific requirements for disaster response. Whereas all disasters require a swift and efficient response, this is even more critical when people live in sub-zero temperatures are geographically isolated and experience conditions of 24/7-(near-)darkness, all of which can significantly impede outside help from arriving or evacuation of people from Svalbard to the mainland. Additionally, the fact that the official responsibility for DRR/R on Svalbard lies with Norwegian authorities may be

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Table 1. Selected list of disasters affecting Barentsburg.

Year(s)	Event	Location	Fatalities/injuries/damage	Sources
1941–1946	World War II	Svalbard	Population evacuated; infrastructure destroyed	Harland (1997)
1978	Soviet Tupolev airplane crash	Hopen Island	7 fatalities	ASIL (1984); Devlin (1979)
1991	Russian Helicopter crash	Svalbard	2 fatalities	AIBN (1991)
1996	Vnukovo Airlines Flight 2801 crash	Operfjellet	141 fatalities	Olaisen, Stenersen, & Mevåg (1997)
1997	Mining explosion: most serious mining accident on Norwegian territory	Barentsburg	23 fatalities	Miljøverndepartementet (1999)
2008	Mw 6.1 earthquake: allegedly the biggest in Norway's history	140 km southeast of Longyearbyen, felt in Barentsburg	No fatalities; no major damage; but psychologically engrained	USGS (2008)
2008	Russian Mi-8 helicopter crash	Barentsburg	Three fatalities; 6 injuries	AIBN (2013)
2008	Fire in the mine	Barentsburg	Two fatalities; extensive damage that kept the mine shut for 2.5 years	Norum (2016)
2017	Russian Mi-8 helicopter crash	2–3 km off the coast of Barentsburg	Eight fatalities	AIBN (2018)
2018	*Aurora Explorer* ship crash	Barentsburg harbour	No fatalities; 48 injuries	AIBN (2019)

Note: Other smaller earthquakes noticed by residents occurred in 2009, 2010, 2014, 2016 (only shortly after a deadly avalanche had hit Longyearbyen in late 2015), and 2017.

problematic when a disaster requires – or benefits from – the involvement of Barentsburg's residents even if it happens outside of the settlement, for example, for the many tourist and scientific expeditions outside and between Svalbard's settlements. Such an expedition would call for Barentsburg's involvement by virtue of factors such as proximity, technical or linguistic expertise and capabilities, availability of rescue forces, or informal relationships prompting people's help. Moreover, given the similar geographical, meteorological, infrastructural or logistical conditions among Svalbard's settlements and the personal relationships among people in Barentsburg and elsewhere around Svalbard, disasters are expected to play an important role for residents' risk perceptions irrespective of whether or not they occur in their settlement.

Svalbard's governor (at the time of this research called "Sysselmannen" but now changed to "Sysselmesteren," a Norwegian word reserved for the Governor of Svalbard) is appointed and, thus, Norway, is responsible for DRR/R across Svalbard with a well laid out chain of command that, in disaster governance terminology, connects it "downward" to other settlements on Svalbard and "outward" and "upward" to Tromsø and the Rescue Coordination Centre in Bodø on mainland Norway and eventually to Oslo, when necessary. The resulting reliance on national response structures, which must be able to react adequately and rapidly and have political support, further burdens an already precarious situation. In addition, infrastructure and communication failures and the restricted ability of Longyearbyen's and Barentsburg's small hospitals to treat major injuries and surgeries necessitates an over-reliance on aeromedical evacuation to the Norwegian mainland. Limited transportation and other logistics connections between the settlements compound the difficulties. No roads connect Svalbard's settlements, so they are reached by aircraft (only helicopters in Barentsburg's case), snowmobiles in winter when avalanche conditions permit and boats in summer, provided the fjords are sufficiently ice-free. Walking is theoretically possible, but the large distances effectively preclude it, apart from specific expeditions. The potential for disaster response from Barentsburg has generally been limited, as demonstrated in the 2017 helicopter crash (Staalesen 2017; Table 1). Finally, the fact that any DRR/R disaster action by Barentsburg may be considered political by Norway's interpretation further burdens the complexities of reducing risks and responding to disasters on Svalbard.

Methods

Research context

The research here considers the question of whether disaster-related activities could and should be used more in the Arctic and the High North to foster links between Norway and Russia. Given Svalbard's geographical, political, and disaster risk characteristics, and the lack of data on the settlement of Barentsburg, this research set out to analyse disaster-related perceptions of Barentsburg's residents. To do so, it followed a qualitative approach grounded in critical realism (cf. Maxwell, 2012; King & Brooks, 2017), implemented a case study design and used interviews as a method. A qualitative research approach, both with and without representativeness, is well suited to understanding phenomena in their context, in particular, vis-à-vis refining or generating theories, as it can reveal underlying relationships between concepts and behaviours (Creswell & Creswell, 2018; Glaser & Strauss, 1967; Denzin & Lincoln, 2017; Patton, 2002; Silverman, 2017). Qualitative research is also well established and widely used in disaster research (Phillips, 2014:1–2).

Data collection, sampling and interviews

Twenty-one semi-structured interviews were conducted in Barentsburg over a period of 10 days in August 2019 (Table 2), a sample size common in qualitative research (Bryman, 2012; Ritchie, Lewis, & Elam, 2003; Silverman, 2017). Interviewees were recruited using a purposive and snowball sampling and were conducted until relative saturation was reached (Bryman, 2012;

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Table 2. Interviewee list.

#	Age	Gender	Nationality	Length of stay	Occupation	Interview language
1	22	F	Russia	8.5 months	Gastronomy	English/Russian
2	34	M	Ukraine	3 years	Gastronomy	Russian
3	25	F	Russia	1.5 years	Hospitality	Russian
4	31	F	Ukraine	2.5 years	Gastronomy	Russian
5	26	F	Russia	7 months	Gastronomy	English/Russian
6	70	M	Russia	15 seasons since 1995	Researcher	Russian
7	63	M	Russia	22 seasons since 1982	Researcher	Russian
8	59	M	Russia	11 seasons	Researcher	Russian
9	22	F	Ukraine	1 year	Hospitality	English/Russian
10	32	F	Russia	3 years	Hospital	Russian
11	48	F	Ukraine	4 years	Hospital	Russian
12	23	M	Russia	7 months	Hospitality	Russian
13	29	M	Russia	7 months	Hospitality	Russian
14	27	M	Russia	4 years	Tourism (Management)	Russian
15	46	M	Ukraine	14 years	Miner	Russian
16	25	M	Russia	1.5 years	Diplomatic	English/Russian
17	32	M	Ukraine	6 years	Gastronomy	Russian
18	22	M	Ukraine	4.5 years	Hospitality	Russian
19	29	M	Russia	7 months	Hospitality	Russian
20	30	F	Russia	15 months	Tourism (Management)	English/Russian
21	47	M	Russia	3 years	Emergency Services	Russian

Creswell & Creswell, 2018; Morse, 2017; Silverman, 2017), defined in this case as when no new themes emerged from the data (Malterud, Siersma, & Guassora, 2016). Participants meeting the following criteria were selected: (I) be an adult (i.e. aged 18 years or older); (II) be a resident of Barentsburg; and (III) have lived in Barentsburg for at least a combined six months. Sampling of participants was carried out at various sites across Barentsburg.

Overall, a gender balance of 13 men and 8 women was achieved. Fourteen participants had Russian nationality, while seven were Ukrainians. Ages ranged from 22 to 70 years, with the average age being 35.3 years and the median age of 30 years. Lengths of stay on the archipelago ranged from 7 months to 14 years, excluding three seasonal researchers. Among the year-round residents, the average length of stay was just under 3 years (34.9 months), and the median was 30 months. Finally, regarding job sectors, six were working in hospitality, five in gastronomy, three in research, two in tourism, two in the local hospital, one in the mines, one had a leading role at the consulate and one was a senior member of the emergency services. The absence of significant representation from the mining sector may have affected results, yet it also reflects Barentsburg's shift to a tourism and research hub (Kelman et al., 2020; Schennerlein, 2021), so the results here support an understanding of ongoing changes in the settlement in the context of developing a viable future.

Research ethics approval was obtained from the institutes and countries involved in this research, entailing confidentiality for and anonymity of participants. Participants were informed about the project's aim (disaster-related perceptions) and about the overall methodology before signing consent forms. Interviews were held in either English or Russian, based on the interviewee's preference, and were recorded. Each interview was 30–130 minutes long. The following questions were used as a guide and asked in the reported order:

1. Which disasters and/or disaster risks do you feel are relevant to your life in Barentsburg?
2. What are your sources of information regarding disasters in/around Barentsburg?
3. Who/What are sources of help in case of a disaster in/around Barentsburg?

Additional questions and probes were used to add relevant information in the context of the project under which this research was conducted. In particular, mentioning three hypothetical disaster scenarios was considered: an oil spill emergency, a crisis involving nuclear radiation release from a ship and a disease outbreak in Barentsburg. When interviewees did not themselves mention any of these scenarios, the interviewer probed for them to assess participants' perceptions.

PRISM

The interviews were visually aided by a tool deriving from clinical psychology called PRISM. Originally developed to assess suffering with respect to patients' illnesses in routine clinical practice,

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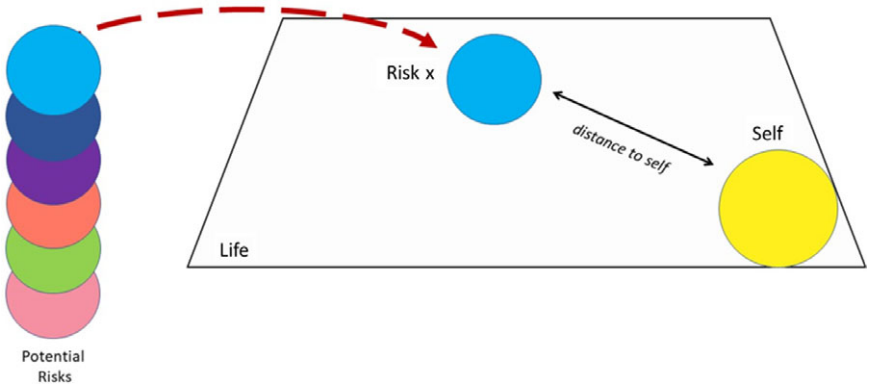


Fig. 1. Illustration of Q1-PRISM.

PRISM is an easily understood and time-visual method to elicit both qualitative and quantifiable information regarding participants' salient perceptions (Büchi & Sensky, 1999; Peter et al., 2016; Sensky & Büchi, 2016). PRISM has been successfully used to structure interviews on different research topics including "patient health outcomes, health and environmental risk appraisal, attitudes to the workplace, and group appraisals of meetings or training sessions" (Sensky & Büchi, 2016, p. 2).

In this study, which considered abstract topics such as perceptions of disaster risks, the PRISM tool was used to make the interview topics more tangible, an approach applied recently in survey form to consider threat perceptions (Bodas, 2021). It served as a "visual metaphor of the relationship of objects [i.e. disaster risk, sources of information and assistance] to a subject [i.e. the interviewee] in a defined context [i.e. their life in Barentsburg]" (Sensky & Büchi, 2016, p. 1). As a "tool for representational guidance" (Sensky & Büchi, 2016, p. 2), it offered interviewees the possibility of using additional senses (i.e. their vision and touch) to map their answers to the interview questions and to consider them in relation to each other, as well as to the "self" which was also expressed visually (see Fig. 1 below). PRISM thus provided a means of supplementing and triangulating the answers provided verbally during the interview, reducing the reliance on verbal interpretation by the interviewer of the interview content (Creswell & Creswell, 2018, p. 159).

Variations to the PRISM procedure were introduced in this study. Participants were shown a virtual A3-sized board via a PowerPoint template with a fixed yellow disc (approximately 7 cm) in the bottom right corner (see Fig. 1). The board itself constituted the context, that is, the participant's life in Barentsburg at the moment. The yellow disc represented the participant's "self." The participant was then asked to place other slightly smaller discs (approximately 5 cm) of various colours that represented the object(s) of inquiry (here: disasters in Q1, sources of information in Q2 and sources of help in Q3) in relation to the self. The more important the object was, the closer it would be placed to the self. Thus, distance became the main measure derived from this exercise.

To verify the accuracy of the resulting image in terms of completeness of the objects, and their distance to self, each PRISM exercise was supplemented by the second part in which qualitative follow-up questions were asked in relation to the board – that is, the reason why a disc was placed in a certain place or in relation to others, or why a hazard was missing. As a result of this discussion, participants in an interactive manner could adjust the PRISM board to reflect their perceptions more accurately.

Data handling and analysis

All of the data were anonymised, transcribed and, where necessary, translated from Russian to English. The resulting anonymous translated transcriptions, and associated PRISM PowerPoints, were then shared with the rest of the research team. The data were coded and analysed using thematic analysis, specifically using template analysis (King & Brooks, 2017) with input from reflexive thematic analysis (Braun & Clarke, 2019), independently by two researchers and then compared to generate the final template and themes.

Generalisability of findings and validity

This study offers an original examination of the disaster risk perceptions, sources for disaster-related information and learning, and formal and informal sources for dealing with disaster risks and disasters of 21 people from Svalbard's second largest settlement of Barentsburg. It is a qualitative research project based on a purposive and snowballing sampling strategy, rather than seeking out full representativeness. As such, this research draws on empirical evidence to develop theories that explain observed phenomena which can then be tested in other populations (or using other methods), a process Yin (2017) describes as "analytical generalisation." This "transferability" of the developed theory from one case to another depends on the researchers' abilities to transparently share as many details about the data and the process as possible (Guba & Lincoln, 1989, p. 241). Thus, a comprehensive data analysis was conducted, and the findings offer not only the dominant views among interviewees but also transparently share "anomalies or deviant cases" (Silverman, 2017, p.716). By doing so, reader(s) can evaluate the quality of the researchers' interpretations, and thus the validity of the presented findings (Maxwell, 2017, p. 120; Silverman, 2017, p. 672; White, Woodfield & Ritchie, 2003, p. 320).

Findings: Barentsburg residents dealing with disasters on Svalbard

To facilitate the understanding of the questions asked in section 3, this section is divided thematically into sovereignty (4.1) and awareness (4.2), followed by disaster information (4.3), disaster

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Table 3. Q1-PRISM: Disaster risks ranked by number of mentions.

#	Risks	Mentions
1	Arctic weather conditions (incl. wind, bad weather, whiteouts, freezing and extreme cold)	16
2	Polar bears	13
3	Helicopter crashes	9
=4	Mining incidents (collapses, explosions)	8
=4	Boating-related incidents	8
=6	Avalanches	7
=6	Climate change-related	7
=6	Falling into ice or snow	7
9	Earthquakes	5
10	Landslides	3

action (4.4) and the empirical reasons for them (4.5). Unless specified otherwise, segregation by age, gender, length in stay, nationality or job sector was checked and did not significantly affect results.

Sovereignty

Although questions regarding Barentsburg and Norwegian sovereignty were not asked directly, 15/21 interviewees shared their views, revealing a wide range. Seven of these 15 interviewees consider all of Svalbard, including Barentsburg, to be Norwegian. This is characterised by statements such as "[i]t's their [Norwegians'] territory" (interviewee 3) or "we are in Norway" (interviewee 5). Conversely, for 4 of these 15 interviewees, Barentsburg is Russian, embodied by interviewee 12's statement that "This [Barentsburg] is like any other region of Russia." The remaining four interviewees were somewhere in between these two positions. Interviewees 17 and 21 were in line with the legal stance of the Svalbard Treaty that the whole archipelago is governed by Norway and under Norwegian law; interviewee 6 considered Svalbard as fully neutral; and interviewee 1 referred to Svalbard as "divided into two parts, Norwegian and kind of Russian."

Awareness

The results suggest that Barentsburg's interviewed residents are aware of disasters and disaster risks on Svalbard. On average, interviewees mentioned five risks, with 11 as the highest value and 1 as the lowest. Gender, age groups (under 30 years, 30–45 years and above 45 years), length of stay, nationality and job sector did not significantly affect the results. Seasonal workers, who are generally researchers who have been coming to the settlement for at least 10 years, mentioned seven risks on average. Weather, polar bears, helicopter crashes, mining incidents and boating incidents were the five most commonly mentioned risks (Table 3). Out of these, polar bears, helicopter crashes and strong wind were most often mentioned as the most concerning to people's lives in Barentsburg (as per Q1-PRISM).

Awareness of the risks involved in boat and helicopter travel might have been influenced by the occurrence of similar incidents recently, including the boat crash of *Aurora* in 2018 and the helicopter crash in October 2017 (Table 1). Conversely, while six interviewees mentioned the 1996 plane crash during their interviews, and despite it being one of the deadliest disasters in Barentsburg's history, with 141 fatalities, the threat of plane crashes was identified as a disaster risk in Q1-PRISM by only interviewee 8, and as his fourth and most "distant" risk. Mine-related incidents were the fourth-most mentioned category of risks, considering that interviewees with access to information about its relative safety comprised only one participant working in the mining industry and one from the emergency services.

Finally, three risks were mentioned equally as sixth in the list: avalanches, climate change and falling into ice or snow. Barentsburg interviewees did not consider the settlement at high risk for avalanches, although they are a threat in the surrounding area, in Longyearbyen, and around much of the archipelago. This suggests, as mentioned in section 2, that Barentsburg residents' risk perceptions derive partly from disasters occurring elsewhere around Svalbard, as for example, in this case, from the deadly 2015 avalanche in Longyearbyen killing two people (Indreiten & Svarstad, 2016), which was directly mentioned by several interviewees.

Information

Norway is a major source of disaster-related information for the interviewed residents of Barentsburg, with 18/21 interviewees mentioning at least one "Norwegian" resource and ranking them as important in their Q2-PRISM. The high value could be affected by mentions of "weather services" by interviewees who may or may not be aware of the "Norwegian" origin of the island's forecast data. Even when these references were omitted, most interviewees (13/21) still mentioned "Norwegian" resources, with "Sysselmesteren" and weather forecast websites explicitly referred to as being Norwegian (such as yr.no).

The interviewees also rely on informal communication and proactive efforts by residents to inform themselves and others. This finding was universally supported by interviewees, with all 21 featuring at least one informal source in their Q2-PRISM. Overall, informal sources were mentioned an average of 2.3 times by interviewees, with the maximum being five informal sources (out of a total of nine) mentioned by interviewee 14. In descending order, the most commonly mentioned informal sources of information were social media (specifically local chat groups), direct and indirect interactions with locals (e.g. rumours, face to face), co-workers, friends, and family. 15/21 ranked informal sources as their most (or jointly most) important source of disaster-related information.

Action

Disaster-related activities in Barentsburg rely on an official multinational chain of command that extends across all DRR/R activities. For most emergency services affecting Barentsburg, the Mine Rescue Squad (GSV for the Russian name "горноспасательный взвод" or "gornospasately&ibreve; vzvod") is the first point of contact, along with the direct supervisors from their respective subdivisions of Arktikugol. Overall, GSV was mentioned directly by 18/21 interviewees and was the most cited local formal institution. Nine interviewees considered it to be the most important (or joint-most) source of help overall. When other responsible entities are added, namely, the local Barentsburg hospital and the operations manager for the Arctic Tourism Center ("Grumant"), local emergency services were mentioned by 20/21 interviewees, with 12 of them placing them closest to the "self" in their Q3-PRISM.

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Depending on the nature/severity of the incident and the status/nationality of those involved (i.e. if they are tourists and/or not Russian), Sysselmesteren's office in Longyearbyen is contacted. Outside the settlement, Sysselmesteren is also the only focal point for all emergency services and law enforcement. When a crisis escalates, then the Norwegian mainland must be alerted. The intervention of the Russian government is subject to Norwegian approval. This "chain of command" is accepted formally and features in many of the Barentsburg workers' contracts.

The presence of Norwegian authorities in the chain of command is supported by all interviewees in their Q3-PRISM and/or mentioned explicitly during the interviews. Local institutions, in the form of the GSV and the Barentsburg hospital, were mentioned by nearly all interviewees (20/21), with the exception of interviewee 21 who has a management position in the aforementioned emergency services. Similarly, 19/21 interviewees referred to Norwegian sources of help, while the remaining two, interviewees 1 and 9, omitted them only because they would not contact them directly, but, nonetheless, explicitly mentioned them as sources of support. Most references to Norwegian authorities were of the "governor," either with the Norwegian name "Sysselmannen" at the time, or more broadly as "Longyearbyen" and "Svalbard." For five interviewees, "Sysselmannen" was the most important "or closest" source of support in their Q3-PRISM.

Nine interviewees considered the Russian government on the mainland as a potential source of support, usually denoted as "Moscow," but for five of them, such reference only came after being prompted by the interviewer. In all cases, there were no instances where Moscow featured without mentioning Norwegian actors, with the latter being always viewed as more important. The average position (by first appearance) for "Moscow" was fifth (4.6), while Norwegian authorities (local and mainland) were third (2.8). Despite Russia maintaining a consulate in Barentsburg, it was only mentioned by one interviewee as a potential source of help.

Interviewees explicitly mentioned their trust that Norway would come when needed: "100%" in the words of interviewee 12 and "I have no doubts about that" (interviewee 13). In comparison, the same reliability was not extended to mainland Russia. Several reasons were given for this opinion. The first was distance, or in the words of interviewee 4: "[w]e are very far away from Moscow – but 20 minutes, and the Norwegians are already here." Unclear communication paths were also highlighted, with interviewee 14 mentioning that "[t]here will be help [from mainland Russia], I just honestly don't know who'll contact them." For nine interviewees, they rely on Norway because they consider Svalbard, including Barentsburg, to be under Norwegian law and sovereignty. Third, four interviewees perceived Norwegian authorities as more capable and reliable, with one of them (to be kept entirely anonymised) explicitly criticising Russia's "bureaucracy" or "slow" action, and another (to be kept entirely anonymised) lauding the caring and corruption-free attitude of the Norwegian governor when compared to Russian government officials. One interviewee (to be kept entirely anonymised) alluded to mistrust and a differential treatment of Ukrainians by the Russian authorities but chose not to elaborate when asked. No other interviewees shared this position. Finally, two interviewees declared that all issues must remain local and managed by the Norwegian governor, without appealing to either of the mainland governments ("Oslo" or "Moscow"). Overall, five of the nine who mentioned mainland Russia as a source of help were unsure about actual Russian intervention. No notable differences emerged in perceptions between Barentsburg's Russian and Ukrainian interviewees.

Although reliance on Norwegian DRR/R mechanisms was extremely high, 19/21 interviewees included at least one informal source of help in their Q3-PRISM. Seven interviewees considered such informal sources as most important (or jointly most important) in their Q3-PRISM. The most frequently mentioned informal sources of help were (in decreasing order) local bystanders, work colleagues, and family and friends. This suggests that proximity to and reliability of sources of help are important factors.

Furthermore, the findings suggested that there is some intersection between "informality" and "international DRR/R." Eight interviewees mentioned informal sources of help as well as specific examples of informal disaster response between Norwegian and Russian nationals and organisations, in both directions. This includes action by informal actors, such as the Barentsburg hotel providing tea and refreshments to international survivors of the *Aurora* boat crash in 2018, and informal means of communication between formal actors such as an appeal to a "friend" who has a formal role in the emergency services in Longyearbyen.

Reasoning: Memory and trust

When probed to elaborate on the reasons for their answers, interviewees overwhelmingly referred to factors that relate to either memory or trust.

Memory

Sixteen interviewees referred to specific incidents where the Norwegian rescue services were activated. These included both the first-hand experiences of interviewees, as well as their second-hand expression of "common knowledge," highlighting "communal history." For residents of Barentsburg, Norwegian assistance is therefore not a hypothetical situation, but an experienced reality at the forefront of their thoughts, contributing to their trust in the existing services.

As shown by the Q1-PRISM results, many of the incidents that affected Barentsburg and Svalbard have remained firmly in the minds of the interviewed residents. 11/21 interviewees mentioned the 2018 *Aurora* boat crash, 10 referred to the 2017 Barentsburg helicopter crash and six recalled the 1996 plane crash – despite it being 23 years before the interview. Additionally, seven interviewees referred specifically to the avalanches that occurred in Longyearbyen in recent years, mainly 2015, and compared it to Barentsburg's relatively lower level of avalanche risk. Disaster stories extended beyond the memories of the people who experienced them, as many interviewees referred to incidents that occurred months, years or even decades before they arrived. These incidents have shaped communal knowledge and forged their fears concerning the future.

Trust

Most interviewees expressed a strong sense of community cohesion, with all 21 explicitly mentioning friends, neighbours, colleagues, locals and bystanders as sources of information and help. Five interviewees considered informal sources of help to be just as important, or more important, than the formal authorities, placing them closest (or jointly closest) to them in their Q3-PRISM. Explicit statements of 11 interviewees supported this claim. For instance, according to interviewee 3, "the settlement is very small, everybody knows each other, everyone has good relationship, and if a person is lying in the street, people will help." This

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sentiment was echoed by interviewee 21 when describing the response to the 2018 *Aurora* boat crash:

> We were performing search and rescue operations. The medics were preparing their equipment, setting up the field hospital. The garage was providing equipment and transport. The cafeteria was providing hot food for the whole rescue group. [. . .] There were volunteers, scientists, who had snowmobiles. They searched the shoreline. It was hard to find a road. We sent motorboats. [. . .] Everyone tried to contribute to saving people, or, at least, to clarify the situation. Everybody was doing their job. There were no cases of people running around and screaming "Help!" in panic.

This sense of trust, belonging and reliance on each other also translates into confidence in the local emergency services, as shown by the reliance on the GSV, the local hospital and operational management.

Beyond a high level of community cohesion and trust in local emergency services, there is a strong sense of connection between the interviewed residents of Barentsburg and the Norwegian town of Longyearbyen and its authorities. Interviewees feel positive about Norwegian authorities and the residents of Longyearbyen, not criticising them. Ten interviewees made explicitly positive comments about the Norwegian services and their trust in their reliability. As above, "Norwegian actors" predominantly take the form of Svalbard's governor. In contrast, only three interviewees offered some critique of Norway. These were

- Interviewee 7 mentioning Norway's limitations on Russia's use of Svalbard's airspace affecting a rescue operation.
- One interviewee (to be kept entirely anonymised) describing Norwegian rescue services as "not very fast" nor always adhering to their own strict procedures.
- Interviewee 15 objecting to the Norwegian prohibition on the use of nuclear power for electricity on Svalbard.

In all the above cases, the interviewees did not express this criticism at length or with strong language or emotions, plus these interviewees also made explicitly positive comments about Norwegian services. This implies that the criticism is actually a reflection of in-depth familiarity with Norwegian services, policies and laws – reinforcing the camaraderie perceived by the interviewed residents of Barentsburg. The sense of connection with Longyearbyen and its Norwegian residents and authorities extended beyond crisis situations, revealing a sense of "shared existence." In this regard, 20/21 interviewees referred to personal relationships with Longyearbyen's inhabitants and institutions, as well as familiarity and interactions with their services, and an awareness of the particular disaster risks and disasters they face (4.5.1).

Interviewees' trust is also reflected in them considering Barentsburg to be a safe place irrespective of its sometimes-harsh Arctic conditions and location with respect to other population centres. Sixteen interviewees either referred to Svalbard "as safe as an ordinary town" where "nothing happened," or explicitly praised the emergency services, stating that they are "well organised," and that "following the protocol [. . .] will help prevent all disasters and accidents." Interviewees 17 and 21 stated that there are no real disasters on Svalbard. In contrast, interviewees 4 and 18 considered the area overtly dangerous, or not safe. Overall, none of the interviewees expressed doubts, or lack of confidence in the emergency services.

Seventeen interviewees also expressed positive comments about initiatives by Arktikugol to reduce disaster risks and increase preparedness. Eleven interviewees acknowledged the efforts by local management to reduce risks and improve safety in the settlement, and 14 interviewees showed widespread, and often enthusiastic, support for preparedness training courses and exercises initiated by their company together with entities such as the Red Cross, private companies from Moscow, Sysselmesteren and the Norwegian emergency services. Nine interviewees also referred to regular visits by Svalbard's governor and Norwegian emergency services to Barentsburg.

To summarise, in the words of interviewee 10:

> If we talk about Longyearbyen and our Barentsburg, these are normal settlements with full infrastructure in place, there is everything you need. It would not be correct to say that you feel some form of isolation in terms of help availability in case of emergency. On the contrary, they would react faster here.

When probed to compare the situation to Moscow, the same interviewee said that on Svalbard "help will be offered on a better level and on a larger scale."

Discussion: Sovereignty meets informality

The interviewees in this study expressed a strong sense of safety in Barentsburg, within a clear understanding of the risks associated with its environment and location. This perception can be explained, at least in part, by the interviewed residents' high level of trust in their local authorities, the Norwegian governance structures, and in the informal connections that link them to their fellow community members and to the Norwegian settlement of Longyearbyen – as amply illustrated by the data on awareness, information and action.

Given that most interviewees expressed satisfaction with existing governance structures, but relied on both formal and informal DRR/R sources for information and help, it seems that both formal and informal disaster governance (FDG/IDG) are used to build public trust in disaster governance structures. For interviewees, the lines between formal and informal interactions are blurred, amplifying the influence of one over the other. Trust in both formal and informal DRR/R governance structures is, therefore, interdependent, including for information and action. This finding suggests an important gap in the articulation of disaster governance, that to foster trust in FDG, authorities should include informal actors and promote informal relationships between FDG and the public. These points appear in the disaster governance literature in various forms such as volunteerism, spontaneous assistance, self-organisation and self-help (from Killian, 1952 to Carrero et al., 2019). This work does not always identify them as being linked, essential, constructive or complementary aspects to the formal structures.

Barentsburg's specific characteristic of relying on a DRR/R chain of command that is both formally built and institutionally accepted as multinational offers some insights into the relationship between international DRR/R, national political narratives and individual diplomatic perceptions in multinational settings. In Barentsburg, this built-in international mechanism leads to formal as well as informal interactions between Russians and Norwegians. The consequence is that the interviewed Barentsburg residents place a high level of trust and confidence not only in local DRR/R structures but also in Norwegian authorities and individuals. This trust seems to be built on informal disaster-related memory, not necessarily of individuals (who have a high turnover in both Barentsburg and Longyearbyen), but of the community, in that stories, ideas and trust in the Norwegian authorities and the people

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in Longyearbyen are passed down to those who arrive in Barentsburg. This may create a "constructed memory" of trust which parallels memory processes – in tandem with active forgetting and deliberate absencing – identified in disaster science, for instance, for Montserrat (Monteil, Barclay & Hicks, 2020).

This point is particularly important in the context of interviewees' differing views on the sovereignty of Barentsburg and of Svalbard. Despite the clear legal framework of the Svalbard Treaty (1920) that defines Svalbard as unequivocally under Norwegian jurisdiction, interviewees considered Barentsburg either Russian, neutral or Norwegian, while the same was true of the entire archipelago. A resulting hypothesis could be that nationalistic tendencies may emerge, particularly during disasters, leading to disputes and tension. Yet such attitudes and disagreements do not seem to be obviously present among the interviewed Barentsburg residents, suggesting that irrespective of political differences, the presence of FDG and IDG may foster international DRR/R-related cooperation.

Further, interviewees' trust in Norwegian authorities and informal sources on matters of DRR/R stands out as different from the official tensions and some narratives in the Norway–Russia relationship (Åtland & Pedersen, 2008). Yet, any contradictions seem to sit comfortably with the interviewed people of Barentsburg, because they are satisfied with what they perceive to have gained from Longyearbyen in DRR/R information, awareness and action. For them, in the context of a demanding environment with significant disaster risks, the concept of "Norway" as a nationalistic, geopolitical entity is secondary to their trust in the (Norwegian) people and institutions that they feel keep them safe.

This observed situation mirrors the insights and contradictions of international relations, borderlands literature and border studies. As much as borders and their expressions of sovereignty – namely formal sovereignty – are quintessential manifestations of state power, borderlands are often perceived as sitting at the periphery of state power (Boulding, 1962). As a result, borderlands tend to have their own dynamic, with a mixture of influence from states and societies on both sides of the border (Baud & van Schendel, 1997). Concepts such as Boulding's (1962) "loss of strength gradient" as well as some scholars' assertion that proximity (propinquity) rather than borders determines human interaction (for a detailed discussion, see Starr & Thomas, 2002) provide powerful theories that attest to borderlands' (potential) "otherness." The "border" (and absence thereof) between Norwegian Longyearbyen and Russian Barentsburg is a case in point, but Svalbard being at the periphery of the continent and at the intersection of governance regimes might still be considered as "borderland." In fact, while no official border exists around Barentsburg, it is seen as the Russian settlement within Norwegian territory and a customs and immigration border exists between Svalbard and mainland Norway due to the Svalbard Treaty.

We thus speculate that, for interviewees, the formal and informal relationships existing on Svalbard may supersede the existing national political narratives between Russia and Norway, demonstrating (disaster) "governance beyond government" (Wachhaus, 2014) in perceptions, emotions, and actions. Thus, DRR/R mechanisms relying on international cooperation may create informal opportunities to go beyond existing political realities. The local action for DRR/R cooperation observed for Barentsburg, whether it extends beyond national borders or not, can have far-reaching unintended consequences, including legal repercussions (Kuznetsov, 2014). Given that these actors lack access to traditional diplomatic channels, IDG efforts by sub- and non-state actors tend to be opportunistic, innovative, and, thus, experimental (Keating, 1999, p. 11). Hence, these informal DRR/R activities may often be in the grey zones of legality or be interpreted as illegal if a state wishes to do so. Thus far, the relevance of this aspect has only been mentioned in passing in disaster governance literature, with the importance here being how informality may supersede sovereignty.

Conversely, it cannot be assumed that Barentsburg's informal DRR/R actions and ready acceptance of Norwegian authorities for DRR/R will be tolerated by Moscow if it differs from the official policy. Perceptions and actions regarding borders can and have been challenged by scenarios. An example is migration, when, often on the basis of geopolitical considerations or securitisation, these barriers become "physically real," interrupting the fluidity previously experienced (Sassen, 1996; Heisler, 2001), that is, when states encounter difficulties in cooperating across these borders or prevent locals from doing so (Newman, 2006). However, cooperative actions by non-state actors in Barentsburg and Longyearbyen, and the possibility of the resulting norm generation and local institutional learning, may lead to on-the-ground realities that are difficult to reverse or contradict by the state (Toope, 2008; Tsai, 2006; Wolf & Pfohl, 2014). This raises a question regarding the impact of such cross-border efforts on central governments with predominantly top-down perspectives that continue to dictate policymaking. Barentsburg's formal and informal local/localised DRR/R reality might thus potentially offer a modicum of hope for locally driven international cooperation.

Conclusion

This study investigated the impact of international relations on disaster-related efforts in the multinational setting of Barentsburg, Svalbard. Aided by a methodologically new adaptation of the PRISM tool, interviews were conducted to examine 21 Barentsburg residents' perceptions of: (I) disasters and disaster risks; (II) sources of disaster learning and information; and (III) perceived formal and informal sources of help for DRR/R. The findings suggest that, despite awareness of disaster risks, including those associated with a High Arctic environment, interviewees consider Barentsburg, and Svalbard as a whole, to be safe. This finding can be explained by Barentsburg residents' trust in their multinational disaster-related mechanisms to keep them safe, notwithstanding the political relations between Russia and Norway. These perceptions are fuelled by positive experiences with their Norwegian disaster-related actors, as well as formal and informal interactions with their neighbours in the Norwegian settlement of Longyearbyen.

Thus, this research represents an original contribution to the body of knowledge on DRR/R and disaster diplomacy in the Arctic. On the empirical level, this study adds the perspectives of 21 residents of Barentsburg to existing DRR/R and disaster diplomacy research covering Svalbard. Adding voices from Barentsburg for the first time helps complement previous studies which focus on the archipelago's main settlement of Longyearbyen. On the methodological level, the use of the improved PRISM tool provided a platform to add a visual, non-verbal dimension to the semi-structured interviews and to facilitate discussion and interpretation. It helped to focus the interviews, offering an additional "numerically descriptive aspect [. . .] of accounts" (Maxwell, 2017, p. 125), essentially clarifying and corroborating the perspectives expressed verbally by the interviewees. The resulting data are precise and classifiable, facilitating analysis. In this case, due to the

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PRISM diagram generated for each interview question, clear disaster risks and sources of disaster-related information as well as help were generated, and their relative significance ranked by and for each interviewee.

The implications from this study are twofold. First, the study highlights the importance of both formality and informality within disaster governance, and the significant and seemingly interdependent role that each plays in fostering trust for disaster-related mechanisms. By doing so, it uncovers an important gap in the existing literature on disaster governance, supporting the findings of Duda, Kelman and Glick (2020) and "paving the way for a better understanding of the 'complete' picture of disaster governance" (p. 375). Second, by revealing that Barentsburg's Russian and Ukrainian residents trust their multinational and Norwegian-led disaster governance mechanisms, ostensibly irrespective of the political dynamics of their respective governments, the study suggests that disaster-related activities may serve as a platform for international cooperation. This ties into previous work on disaster diplomacy (Kelman, 2012, 2016; Kontar et al., 2018), including on Svalbard (Kelman et al., 2020), possibly offering new perspectives to the prevailing thought that disaster-related action does not significantly affect international relations. The disaster diplomacy literature, though, lacks detailed engagement with memory/forgetting (as per Monteil et al., 2020), and with foundational literature on trust and governance (e.g. Nooteboom, 2000), thereby opening up areas for further exploration.

Other avenues for further research emerge. First, a study of the perceptions of Russia by Longyearbyen's Norwegian residents would add an important contrasting perspective and set up a comparative analysis. Similarly, a study of the same population (i.e. Barentsburg residents), based on a different sample and perhaps a quantitative approach, would shed light on the statistical generalisability of this study's findings and could include more perspectives from miners who did not feature significantly in this project. Further, to check the "analytic generalisability" of these concepts (Yin, 2017), similar studies in other locations, with an emphasis on border or border-type areas, are encouraged. Another perspective would be to investigate, both conceptually and empirically, the aspects of memory and trust raised here, in order to compare and contrast those with existing research on similar topics, particularly to encapsulate concepts that consider and frame human interactions. These and other research avenues can help to indicate the uniqueness of Svalbard regarding insights into disaster diplomacy and disaster governance, or whether the lessons are transferable and apply to many other examples.

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