



“You talk of threat, but we think of comfort”: the role of place attachment in small remote communities in Iceland that experience avalanche threat

Matthias Kokorsch¹ · Jóhanna Gísladóttir^{1,2}

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Abstract

According to the Icelandic Meteorological Office, climate change may increase the likelihood, intensity, and frequency of some natural hazards in the country, such as avalanches. It is therefore essential to increase preparedness for climate change-related effects. Until recently, social and community aspects of climate change-related hazards have not received much attention in Iceland. The aim of this study was to explore the role of place attachment in small remote communities in Iceland and how residents experience the threat of avalanches. Through a narrative approach, we conducted interviews with residents and focus groups in two communities in the Westfjords. Our findings suggest that both communities show a high level of place attachment, in particular with regard to the natural and social dimension. A positive impact of place attachment translates into willingness for volunteering and local engagement, which can increase preparedness and enhance capacity building. While we found negative tendencies of place attachment in both places, for example in that residents do not consider their communities vulnerable despite the risk, they seem to be less prominent than the positive aspects. Residents exhibit traditional local knowledge, but there is a need to better integrate newcomers and foreigners in the communities into emergency planning.

Keywords Natural hazard · Avalanches · Place attachment · Climate change adaptation · Capacity building · Iceland

Introduction

Avalanches are mainly caused by stressors such as precipitation and thawing permafrost, which have grown to become increasingly likely due to climate change (Einarsson 1984). Iceland has a long history of avalanches and landslides, claiming almost 700 lives (193 from the twentieth century onwards), causing economic damage (Jóhannesson and Arnalds 2001), and leaving behind traumatised communities (Thordardottir et al. 2015). Several regions and communities around Iceland are affected by avalanches, in particular coastal communities

(Morino 2018:36). According to the Department of Civil Protection and Emergency Management, some 16 settlements in Iceland could be affected by avalanches (Almannavarnir 2022). None of the places has more than 3000 inhabitants, and the Westfjords is the only area in Iceland that is classified as having “enormous risk areas” that require immediate action (Jóhannesdóttir 2011). Place attachment and the identification with a place and community are vital factors for place-specific behaviour, which has implications for capacity building in small communities that face the threat of natural hazards such as avalanches.

Two communities in the Westfjords of Iceland were hit by avalanches in 1995, and 34 people lost their lives (Jóhannesson and Arnalds 2001). It was not until after the two disastrous events that avalanche research and preventive measures gained more public and political support (Jóhannesson 2008). Since then, hazard zoning has taken place, and defence walls and barriers have been built, as well as updated reporting on hazards in combination with constantly improved warning systems (Morino 2018).

Although risk awareness has increased and avalanche research has been institutionalised, surprisingly little

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✉ Matthias Kokorsch
matthias@uw.is

¹ University Centre of the Westfjords, Ísafjörður 400, Iceland

² Agricultural University of Iceland, Reykjavík, Iceland

research has been conducted thus far. In 2011, the Icelandic Civil Protection Department stated that there is a need to increase preparedness for climate change–related effects, particularly with regard to aquaculture, marine status, ecosystems, and national health monitoring. However, a comprehensive approach to adaptation is still lacking (Björns-son et al. 2018); according to a recent international review (Canosa et al. 2020), there is no reported adaptation or initiative. Some Icelandic researchers have also discussed the lack of local (and national) adaptation plans (Ingólfssdóttir 2016; Johannsdóttir 2017; Aguiar et al. 2018). Climate change–related hazards are a rather young phenomenon, especially with regard to social impacts and local adaptation.

Apart from economic development, demographic development might be affected by increased avalanche risk. With increased outmigration, fewer people take care of local (volunteering) activities. The aim of this study is to explore the role of place attachment in small remote communities in Iceland and how residents experience the threat of avalanches. We investigate two villages in the Westfjords of Iceland that have experienced avalanches in the past.

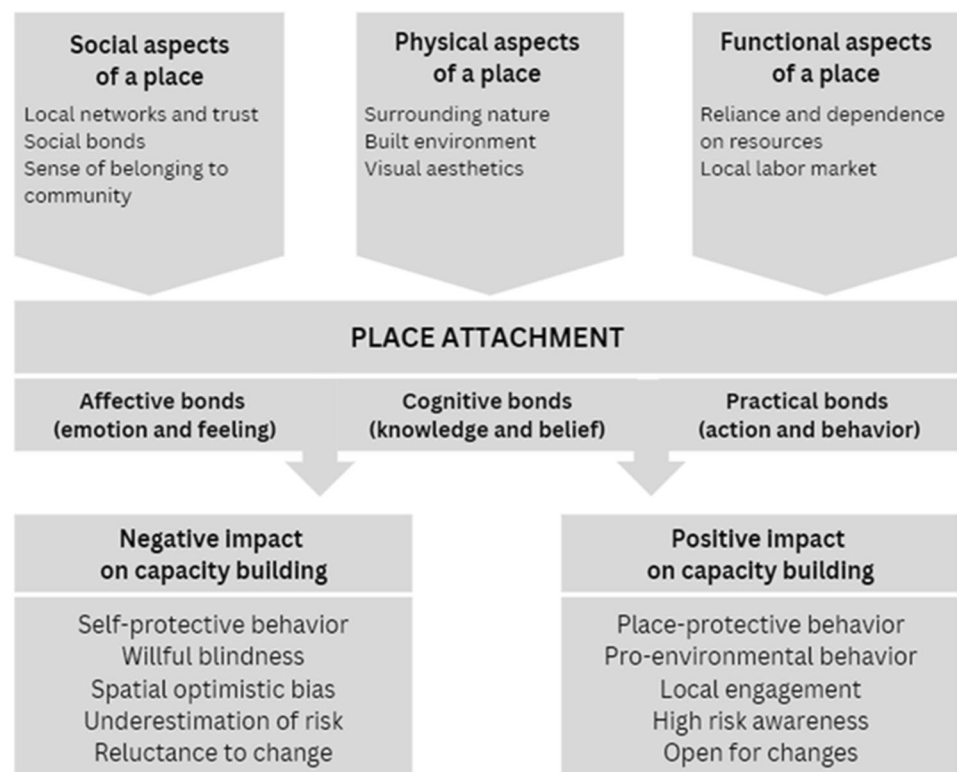
Place attachment

There are several ways to conceptualise how individuals and communities cope with or adjust to changes. Place attachment is one approach that has been applied in both quantitative and

qualitative research (Bonaiuto et al. 2016) in settings comparable to the case study locations (e.g. Scotland (Zwiers et al. 2018) and Norway (Hovelsrud et al. 2018)). Historically, place attachment was first conceptualised in the early 1960s with a focus on forced relocation and the accompanying psychological effects. The focus gradually shifted towards more general emotions connecting people and places (Scannell and Gifford 2010; de Dominicis et al. 2015). Manifold definitions are available, and they vary with the local circumstances. In general, place attachment defines a certain bond between individuals or groups with a particular place. Such bonds can be based on affection (emotion, feeling), cognition (thought, knowledge, belief), and practice (action, behaviour) (Gustafson 2006:19). Following Zwiers et al. (2018), three aspects of place attachment can be evaluated: social, personal, and environmental. In the same vein, Moore (2021) and Lewicka (2011) base place attachment on social bonds, the physical environment, and functional elements of a place (Fig. 1). The functional aspects relate to the reliance and dependence on surrounding resources, the local/near labour market, or “attributes of a place to support individual goals or activities. [...] Place attachment is therefore multifaceted and can include attachments not only to physical settings but to the people, communities and lifestyles that exist within those settings” (Moore 2021:22).

Place attachment is an important variable regarding risk perceptions; one reason is because risk is informed by emotion (Slovic and Peters 2006). Individuals and groups do not perceive something as being at risk unless something they value

Fig. 1 Conceptualisation of place attachment in combination with its potential effects on capacity building



has been as affected. According to a literature review conducted by Bonaiuto et al. (2016), place attachment can have different positive and negative impacts on communities facing natural hazard risk (Fig. 1). On the one hand, risk perception might be low in places with a highly attached community due to a “spatial optimistic bias”, i.e. an underestimation of risk and vulnerability. This can lead to “blindness” towards the risk, i.e. a self-protective behaviour through a neglect of the risk (de Dominicis et al. 2015). On the other hand, place attachment is an important variable for pro-environmental and place-protective behaviour and civic action (Bonaiuto et al. 2016; Moore 2021). Place attachment in combination with natural hazards and risk can also be linked to stigma and displacement (Manzo and Devine-Wright 2013). Hovelsrud et al. (2018) discuss place attachment as a “powerful moderator” for adaptive processes and preparedness. For the authors, place attachment is interrelated with social networks and trust, local knowledge, and engaged individuals. In addition, place attachment has proven to be a key factor in establishing community resilience and community-related activities in small and remote Icelandic communities (Kokorsch 2017; Kokorsch and Benediktsson 2018) and comparable locations outside of Iceland (Zwiers et al. 2018; Rapaport et al. 2018). Strong place attachment can also lead to reluctance towards decisions by external factors, such as the national government (Hovelsrud et al. 2018).

More generally, place-related behaviour, based on place attachment, can be divided into change-oriented and stability-oriented behaviour (Zwiers et al. 2018). Stability-oriented behaviour “[...] can result in protective behaviour, nostalgia, and fear of loss or change of existing place aspects. [...] Stability-oriented attachment leads to a desire to preserve the current features” (Zwiers et al. 2018:4f). Change-oriented place attachment, in contrast, is centred around adaptation to external changes and improvement (Zwiers et al. 2018). The difference between those two forms of behaviour is important when comparing newcomers to a community and long-term residents. The differences, here referred to as rootedness, and their importance as predictors of place attachment are highlighted and discussed by Moore (2021). Differences between newcomers and long-term residents are too place specific though, and no generalisation of the impact on place attachment is possible. It might be an important aspect in the Icelandic communities and their social fabric, since internal migration, in particular for educational aspects, is a common feature within Iceland and 18% of the Westfjords population have a foreign background (Wojtynska et al. 2023; Garðarsdóttir et al. 2021).

Methods

We follow a qualitative case study design for this research (Yin 2014). The methods used for our investigation were focus groups with residents of the communities, a

scenario-building exercise (Cederquist and Golüke 2016; Golüke 2016), and individual interviews with residents complemented by expert interviews (Arksey and Knight 1999).

The communities were chosen based on current risk and their history of deadly avalanches. In the selection process, we aimed for one case in which the last hazardous event dates back over one generation (more than 25 years) and one case that has experienced such an event more recently. This limited the suitable places to a minimum, and one could argue that Flateyri represents an extreme case. We consider it important to include this place since it is not unlikely to see comparable hazards in the generations to come.

Flateyri has had avalanche barriers for two decades, while those in Patreksfjörður are a recent development. Additionally, the communities vary in size, services, and administrative capacity. Both towns share similar history and development, as the communities in the Westfjords experienced population decline in the 1990s furthermore, with increased economic activity related to aquaculture and tourism in the last decade, the communities have experienced an influx of new residents, prominently with people of foreign origin (Statistics Iceland 2022).

Case study location and data collection

Case area descriptions

The town of Flateyri includes 202 individuals and is located in the northern part of the Westfjords, as shown in Fig. 2. It is a part of the Ísafjarðabær municipality, but the town of Ísafjörður is the most populated in the area, with 2700 inhabitants (Statistics Iceland 2022). The fishing industry has long been the backbone of the economy, while aquaculture and tourism are growing in importance. The town has an elementary school, a kindergarten, a folk school, a swimming pool, and a small store, along with restaurants and cafés. Only one road leads to the town of Flateyri, which crosses an avalanche-risk area. It is not uncommon for avalanches to fall on the road, resulting in closure while the snow is being removed. Avalanches are quite frequent in Flateyri; at least 37 avalanches have been documented between 1917 and 2002. The 1995 avalanche was the largest in terms of damage, where 20 individuals lost their lives and multiple houses were destroyed (Haraldsdóttir 2002). Following the event, a barrier was built in Flateyri at the cost of 5.5 million USD (Jóhannesson and Arnalds 2001). The town was hit by another avalanche in January 2020. This time, no inhabitants died, but the local fishing industry was hit hard since the barriers deflected the avalanche and channelled it into the local harbour, where most of the vessels were anchored overnight.

The Vesturbyggð municipality is in the southern part of the Westfjords, with Patreksfjörður being the largest in the area, counting 740 inhabitants (Statistics Iceland 2022).

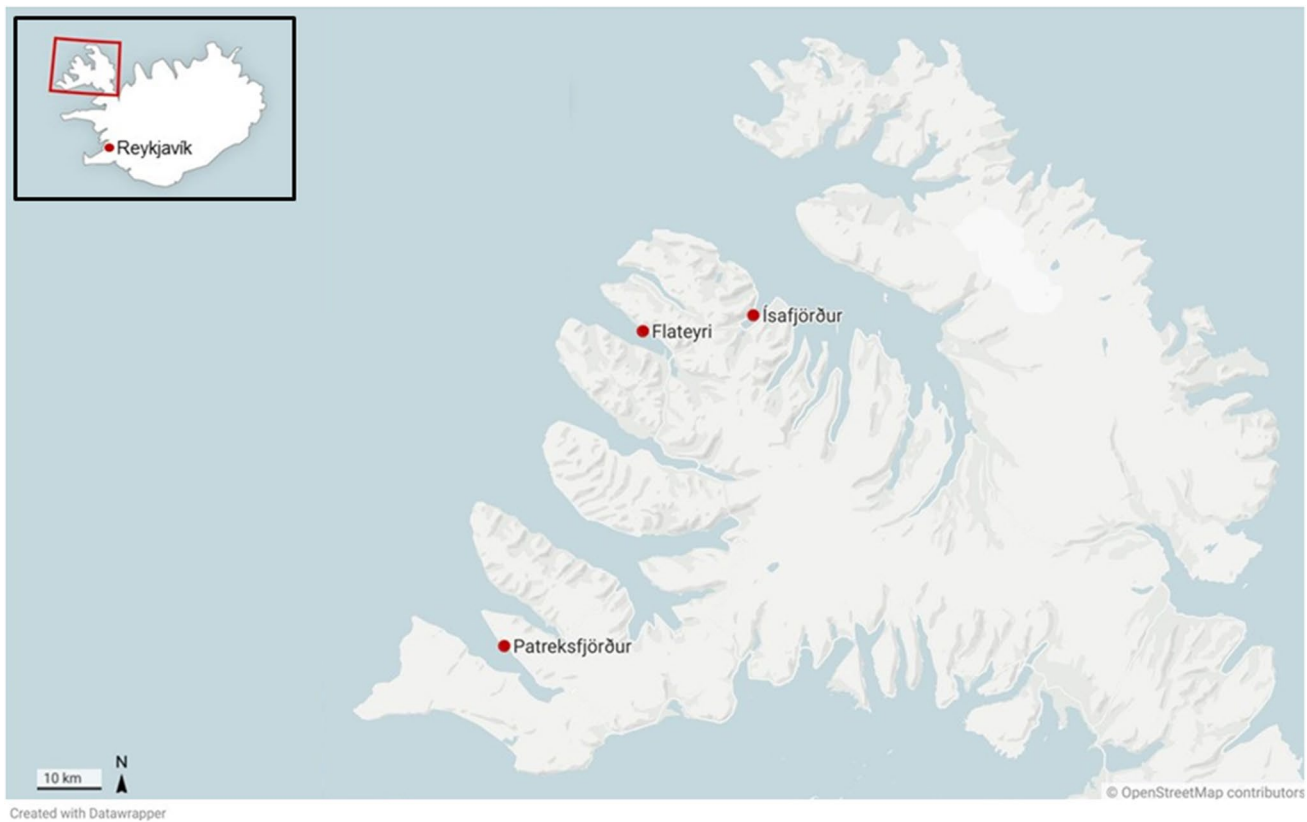


Fig. 2 The location of the two case study localities, the regional administrative centre (Ísafjörður) and the country's capital (Reykjavík) in the regional and national context. Map created by Benjamin Hennig

The main industries in the area are fisheries and aquaculture. The town has an elementary school, a kindergarten, a hospital, a swimming pool, a movie theatre, a small store, hotels, restaurants, and cafés. Patreksfjörður can be accessed by two roads coming from separate directions. However, the roads are regularly closed during winter due to weather conditions. Between 1906 and 2000, 17 avalanches were documented as coming from the gorges above the town. The avalanche in 1983 was the largest, with four casualties and 13 houses being destroyed (Veðurstofu Íslands 2003; Fjeldsted 2020). One avalanche barrier was constructed above the town in 2015, and an additional two barriers are currently being built. While a previous study (Simmons 2022) found the inhabitants to be conflicted about the barriers, the bad weather of the two subsequent winters has possibly changed the local perceptions of the structures, as locals have called for more avalanche protection in the media following a slush avalanche in January 2023 (Olafsson 2023).

Narrative approach

We apply a participatory approach drawing on principles of dialogue between actors (Gustavsen 2001; Phillips et al.

2012), involving the active use of narratives. Narratives provide one of the strongest ways to disseminate knowledge about hazardous events within communities and from one community to another (Lewis 2011; Fuertes 2012; Volkman 2017). According to the most recent IPCC report, “narratives play an important role in communicating climate risks and motivating solutions” (IPCC 2022: 124). The report further states that local knowledge has the potential to enrich the understanding of policy-makers on climate risk and responses to it.

In a narrative inquiry, the emergence of knowledge as part of social contexts and interactions is studied. Aiming for “narrative evidence” (Volkman 2017), the experiences and circumstances, situations, people's worries and hopes, perspectives on capacity building, and solutions to continue to live in the communities despite obstacles can be revealed. Applying a narrative approach can inspire community members to improve their own ability and their capacity to cope with future events. In line with the narratives and local knowledge, an understanding can be developed of how the role of identity, sense of belonging, and culture and belief system can have in shaping local communities' recovery process and how organisations from outside can support them

in appropriate ways. Transferring results can be useful for both communities with a similar development trajectory, as well as organisations and policy-makers outside those communities.

Data collection and analysis

Group interviews and individual interviews with semi-structured and open-ended questions have been carried out in avalanche-risk research in Northern Norway (Hovelsrud et al. 2018). We followed this example and carried out focus groups that included scenario-building exercises, as well as in-depth individual interviews. Recruitment for our research was based on criterion-based sampling, aided by a local person, in addition to snowball sampling. This included clear criteria that participants needed to cover in terms of place attachment, risk perception, and adaptive capacity. We wanted to include long-term inhabitants but also newcomers. It was also deemed important to reach a balanced demographic distribution, and to include people with experience from voluntary actions towards avalanche preparedness.

We conducted one focus group with eight participants in each community in spring 2022, which lasted 4–5 h. The group discussions were recorded after obtaining written consent. The questions posed during the focus groups were open and pertained to perceptions of the role of previous avalanches in the historical context of the community, feelings towards the avalanche barriers present in the town, and place attachment. During the focus group session, the participants also took part in a scenario-building exercise that allowed us to gain insights into local perceptions and ideas about the future of the town.

We conducted a total of 15 individual interviews with residents in the two communities in addition to the focus groups. Those interviews lasted approximately an hour each and took place between August and December 2022. Two individuals from each focus group were also subject to an individual interview. Pilot interviews were conducted to test the questionnaire. The questions posed to interviewees were about place attachment, risk perception, adaptation, and capacity building. The interviewees were also asked to place stickers on a map of the town, indicating services or places they valued. Five additional interviewees were also recruited from state institutions and organisations that are involved in avalanche protection, recovery, or prevention. All interviews were recorded after obtaining written consent. In total, 32 individuals took part in the research.

The interview and focus group data were analysed through thematic analysis (Roulston 2014) to provide an idea of place attachment to the community. Along with focus groups and individual interviews, document analysis was conducted before the focus groups and interviews took place to explore how dominant narratives emerged as well

as prepare for the fieldwork and questionnaires. We investigated how state agencies view the places by gathering public reports and documents. News reports were examined to gain insights into how the previous avalanches were portrayed in the media. Finally, we analysed legal documents and regulations pertaining to avalanche protection and response in Iceland. This approach enhanced our ability to understand the historical context of each case, as well as the legislative foundations of avalanche protection and recovery in Iceland.

Limitations

Despite taking measures to pursue a representative sample of the population for the research, it proved more difficult than anticipated to recruit residents of foreign origin for individual interviews. Therefore, none of the individual interviews had a foreign background. Since we received assistance from a local person in each community with recruitment for the focus groups, 3 out of the 16 participants were of foreign origin. Additionally, we chose to include Flateyri as a case study, which has suffered two major avalanche events within the last 30 years; however, the community has been a subject of other studies, especially regarding collective trauma and trauma relief (Finnsdóttir and Elklit 2002; Þórgrímsdóttir 2013; Thordardóttir et al. 2015, 2018). This occurrence of these additional studies did affect the recruitment of participants for this research, as research fatigue was given as a reason not to take part.

Results and discussion

Aspects of place attachment

In general, the inhabitants of both villages exhibited all aspects of place attachment: social, physical, and functional (Lewicka 2011; Moore 2021). *Social aspects* were the most prominent in Flateyri. The close-knit community, local networks, and social bonds were frequently referred to, and the two avalanches seemed to even strengthen the bonds between the locals. Many of the terms used in this regard included the Icelandic prefix “sam-”, which can be translated to together (e.g. samkennd, samheldni, samhugur). Reciprocal support was also highlighted by participants, as exemplified through a comment made during the focus group in Flateyri, i.e. “The second avalanche made us stronger”, indicating that the event had brought inhabitants even closer together than before. During an individual interview, an inhabitant described the community as follows: “When people from Flateyri meet, they don’t shake hands, they hug”.

Considering the small number of inhabitants, even in Icelandic standards, and the remote location, the importance of social aspects with regard to place attachment

might not be surprising. Having conducted case studies in Iceland before (Kokorsch and Benediktsson 2018), the frequency of social aspects being highlighted is outstanding, nevertheless. The most recent avalanche (2020) was often referred to and directly linked to aspects of place attachment. Only one family left as a direct result of the avalanche, and it seems that going through the—for some repeated—trauma together strengthened the residents' will and determination to stay. It was also repeatedly expressed, both during the focus group session and in individual interviews in Flateyri, that residents felt sorry for those who left, as they were perceived as less equipped to deal with the aftermath of the event, being away from the people in the community that went through the trauma with them.

Social aspects were also frequently addressed in Patreksfjörður. However, at the beginning of the focus group, the locals were somewhat hesitant to talk about the community, and they needed input from an in-migrant to break the ice. In most individual interviews in the community, participants associated Patreksfjörður with being their home, where their family and origin were. Family and social bonds were brought up as the main motivators for staying and, even more importantly, as possible drivers for migrating elsewhere.

In both communities, most participants also mentioned that the positive aspects of a close-knit community with high levels of social control can easily be turned into a negative aspect. People can thus neither be too introverted nor leave their ascribed or affirmative role. This seems not to impact the overall place attachment, and the lack of social bonds and social control in larger towns was simultaneously brought up as one driving factor for staying.

Regarding *physical aspects*, the surrounding nature, peace, and quietness were often highlighted during both focus groups and interviews, while the built environment seemed to be less important in both communities. A striking difference was the consideration of the avalanche barriers. The barrier has become an integral part of Flateyri and is used for recreational activities. In general, the participants of Flateyri often mentioned attachment to nature and nature-based activities that included their barrier, which seems to be well embedded in the local nature. Being man-made, nature has somewhat “reclaimed” the barrier, and it is covered with vegetation. The barriers in Patreksfjörður have been under construction during the research activities, and the noise and machinery in town might thus have influenced local perceptions negatively towards the barriers. The avalanche barriers are very visible, and the visual aesthetics have been previously discussed (Simmons 2022).

Not being vegetated, some people feel like they are living next to a massive wall that blocks their view of the mountain, which itself has been considered less a threat per se rather than an appealing landscape. Repeated evacuations in early 2022 have, however, highlighted the importance of the barriers, and during both the focus group session and individual interviews, people expressed that the barriers offer new walking paths for the community, which is considered positive. The discussion around the barriers in both villages can be related to change-oriented and stability-oriented perceptions and behaviour in relation to place attachment (Zwiers et al. 2018). Building a barrier such as that in Patreksfjörður is a massive intervention and permanently changes the land and townscape. According to the locals, it was mainly those who have moved away from the community, while having ties to Patreksfjörður, who were most vocal about the changes, and who exhibited a reluctance to change.

Of the three aspects, the *functional aspect* of place attachment was less frequently addressed initially, and was rather brought up during the focus groups. The importance of the local resources—mainly fisheries—was often mentioned though. One could rather refer to place-dependence in this regard. The sheer existence of both places is due to the proximity to the ocean and the ideal location for fish farming, the latter especially in Patreksfjörður. The location is certainly the biggest (economic) advantage for some industries; however, it is also a weak spot. This became clear during discussions around accessibility within the community but even more so with regard to the exports of goods, in particular during the focus groups. While road closures for a short period of time seem to be acceptable and unavoidable, more frequent and longer closures of the only road connecting both villages with the capital area, as well as the international airport, were considered a serious threat to the local economy.

The role of place attachment in risk perception

When asked about what came to mind when thinking of their community, participants in both focus groups mentioned the nature, the mountains, cohesion, a strong community, and its people. Living in a remote community with fewer than 1000 inhabitants means that people generally know each other well and know where to turn for help or assistance. A strong sense of belonging and pride was detected in discussions with inhabitants on place attachment, which can be considered a solid foundation for risk perception since risk is informed by emotion (cf. Slovic and Peters 2006). Risks were, however, not directly addressed by the participants in the focus groups; thus,

they needed concrete question from the researchers during the individual interviews.

In Fig. 3, we have inserted red dots over the avalanche hazard zone map of Flateyri that was published by the Icelandic Meteorological Office (IMO) and was updated after the 2020 avalanche.

The places valued by the participants that are located within the highest risk area are the cemetery or fisheries-related locations. The 2020 avalanche fell in the small boat harbour, causing considerable damage to the local fishing industry as all boats anchored there were destroyed. The places considered valuable that fall within the second highest risk area are the elementary school, the local swimming pool, and Gunnukaffi, which is both a restaurant and the only convenience store in the community. The only places that participants valued that fall outside of the hazard zones are the kindergarten, the folk school, and the Icelandic Search and Rescue (ICE-SAR) building, which also houses the health clinic. The places that the participants valued embody mainly social aspects, and functional aspects related to local industries and livelihoods. No participant indicated avalanche barriers as being a service or a place they valued.

The same task was given to interviewees in Patreksfjörður, and the results can be seen in Fig. 3. It is important to note that the avalanche hazard zone map was published in 2003 and has not been updated after the construction of avalanche barriers. The places valued by participants that are within the highest risk area are the local supermarket, a hotel with a restaurant, and a gas station that is also a restaurant. The

places that fall within the second highest risk area are the post office, the local swimming pool, and the hospital. Similar to Flateyri, participants mostly identified places of value, that can be related to social or functional aspects, and they did not mention the barriers being a place or service of value.

Due to the construction of the new avalanche barriers, most places on the Western half of Patreksfjörður will be protected from an avalanche, except from the harbour, as the barriers have been designed to deflect avalanches into the harbour area. While no barriers have been constructed to protect locations at the Eastern end of town from avalanche risk, landscaping has been done to minimise the risk of property damage in the event of slush avalanches (VSÓ Ráðgjöf 2018). It should be highlighted that in case of an avalanche coming down the river passage, it might block the only road out of the community.

Regarding change-oriented and stability-oriented feelings in light of place attachment, an interesting observation can be made for Patreksfjörður. While not all residents were equally supportive of the barrier construction, it became obvious that the change of the land and townscape will in fact bring about stability for places that people feel attached to. Such observations are opposite to the findings of Zwiers et al. (2018), who attest change-oriented behavior with respect to the natural environment among long-term residents.

Despite the avalanche risk the communities are facing, residents do not consider their communities as vulnerable for various reasons. They described it as part of their everyday life. There are threats and hazards everywhere, including traffic in the capital region and volcanic activity

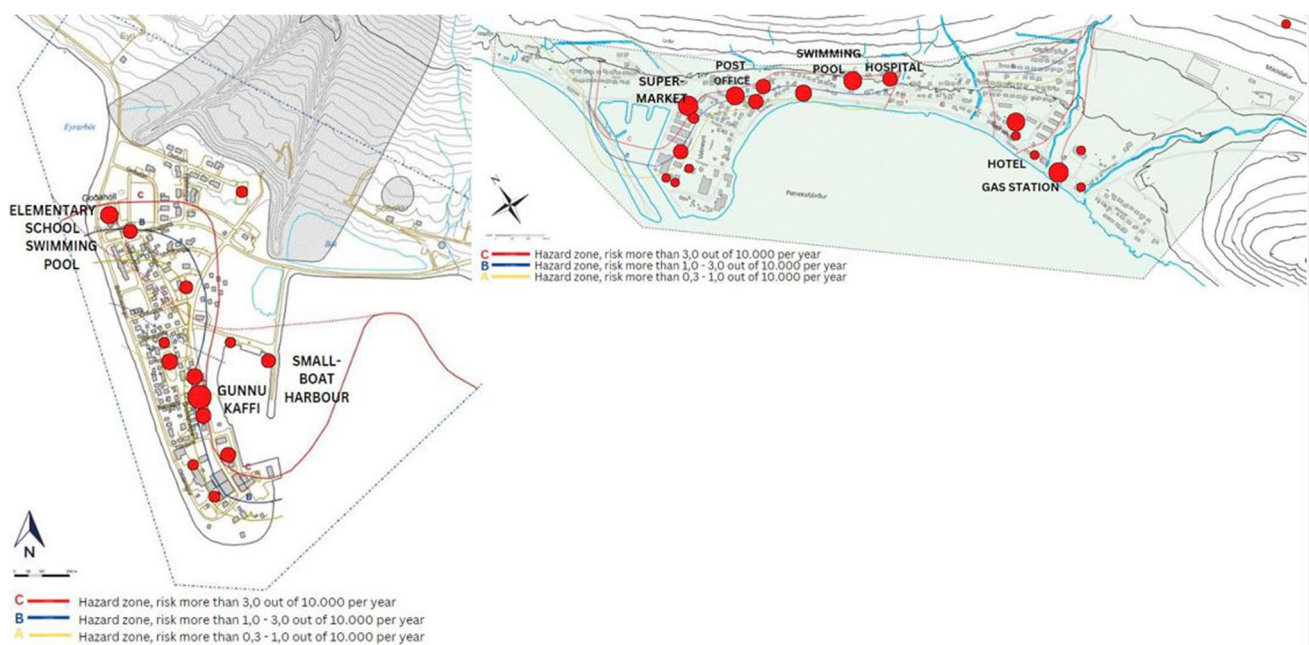


Fig. 3 The avalanche hazard zone maps of Flateyri (left) (IMO 2020) and Patreksfjörður (right) (IMO 2003). The size of the red dots signals the number of participants that placed a sticker on a location they valued

in the south. This was highlighted by most participants. One participant during the focus group referred to the history of Iceland, which itself is a history of risks, disasters, and constant changes; previous generations learned to cope with volcanic eruptions, loss of life at sea, remoteness, and isolation in times of natural hazards. Another participant in a focus group commented, “You talk of threat, but we think of comfort”, suggesting they have a feeling of security or comfort living in the community, while outsiders considered it dangerous. This comment relates to the aspects of ascription, i.e. the way in which locals perceive their surroundings and community compared to that of outsiders, which can result in stigmatisation, branding, and labelling (cf. Manzo & Devine-Wright 2013). Another participant experienced discomfort during holidays outside the Westfjords, but after returning and being surrounded by the mountains meant, they could breathe again. Focus group participants from older age groups also reminisced about growing up and playing in snowy and mountainous surroundings, where their play could accidentally set off a small avalanche. It was also mentioned that the best slopes for playing on a sled were formed after an avalanche. Such nostalgia and positive connotations of potential risk areas might be one explanation also for stability-oriented behaviour (cf. Zwiers et al. 2018).

After showing participants in the focus group maps with the hazard zones in their respective community and inquiring about their feelings towards it, we received replies such as “I have gotten so used to it that I never truly think about it” and “When I first saw it when I moved here, I thought, ‘Wait, where is my house?’ Then, somehow you never think about it again”. A participant in Patreksfjörður mentioned that maybe they were thinking themselves away from it. The residents of Flateyri generally considered that after the 2020 avalanche, inhabitants were very aware of the avalanche danger and discussed it frequently. Those with more local knowledge of the risk notify those in riskier areas about the increased risk in the case of worrisome precipitation patterns. There was a general perception before the 2020 avalanche that the barriers would protect the residents, but the extent of the damage caused by the avalanche undermined people’s sense of security.

In both focus groups, there was a consensus among the inhabitants that it had been valuable to look at the map to see the location of their houses to be able to respond to family members and friends living outside the community when they called to check up on them during bad weather events. When road closures, snowstorms, and avalanche risk had been reported in the news, the inhabitants described receiving phone calls from worried family members and friends. As one participant brought up, “People start calling from outside to check on us. It seems to bother them more than myself”. There were discussions in both focus groups on how the media reports on the weather, road closures, and avalanche risk in the area by

simply checking the status of roads or weather on official websites without having a journalist on site. They agreed that the situation was rarely as bad as the media coverage suggests.

Regarding place attachment, the results of the focus groups lead to both negative and positive impacts on risk perception and capacity building. In both places, people show a willingness for volunteering and local engagement. Talking down the risk and pointing to risks elsewhere can be interpreted as combination of self-protective behaviour and wilful blindness, coupled with some sort of underestimation of risk and spatial optimistic bias. Such phenomena are not unique to Iceland (de Dominicis et al. 2015; Bonaiuto et al. 2016). The spatial optimistic bias became apparent in discussions around the barriers in Patreksfjörður, where the last avalanche hit the village directly in 1983 and was thus more of an anecdotal event than a current threat. The exceptionally challenging beginning of 2022 in terms of severe weather changed this perspective.

Local knowledge

In both communities, people seem to incorporate important local knowledge with regard to microclimates, weather patterns, and the geological features, a finding similar to remote avalanche-risk areas in Norway (Hovelsrud et al. 2018). As one participant described, “We have learned to live alongside nature, not against it”. Being dependent on the ocean for occupation, people knew how to “read” the weather and mountains through wind directions, precipitation, and the build-up of snow layers. Through this observation and knowledge, people can navigate the possible risks and dangers. A resident who took part in the research described how it felt when moving into one of the communities: “I felt uncomfortable at first because I didn’t know the mountains [...] it took some time to gain local knowledge of where I shouldn’t be. Not that it bothered me or anything, but I just needed to gain this knowledge, and then I was ready”. Participants described how they navigated driving on the roads by looking up into the gorges in the mountain as they were passing along, checking the snow layers and whether there was an avalanche risk for the road they passed. It was mentioned in the focus group in Flateyri that children currently growing up in the community are more aware of the weather conditions that cause avalanche risk. It is discussed more openly in the school in a way that children understand than with previous generations.

In Patreksfjörður, participants, especially in the focus group, considered that the avalanche history of the town is not taught in the school and rarely discussed in the town. The 1983 event is hardly discussed openly, unless it is in a smaller group setting. As described by a

participant, “People here do not discuss this with people from outside, with strangers”. The reason being that they would not understand. It was brought up as an example that an annual gathering by the avalanche memorial from the 1983 event was usually only attended by a few people. The recent publishing of a book (Fjeldsted 2020) about the avalanche event appeared to act as a turning point for the community, both raising awareness among inhabitants about its avalanche history and spurring discussions on it.

Community actions and capacity building

Place attachment, a sense of belonging, and identification with a place and community are essential factors for place-specific behaviour (de Dominicis et al. 2015). Participants were asked in the individual interviews whether they took any measures to protect themselves or prepare if avalanche risk was high. To highlight the social aspects of capacity building and the strong sense of community we found, a few interviewees mentioned that inhabitants who lived outside of the hazard or evacuation zones made up extra beds in their houses for friends or family until the danger passed. Such behaviour was also found in comparable research settings outside of Iceland (Hovelsrud et al. 2018). In both locations, almost all participants highlighted the high level of local volunteering activities. Indeed, the number of formal and informal groups is considerable, particularly with regard to low population figures. Social gatherings and activities, e.g. in choirs or women’s associations, are an integral part of both communities. It is thus not surprising that the social aspects of place attachment were dominant in the focus groups and individual interviews. Considering capacity building, both villages are dependent on local resources given their remoteness and isolation during the winter months. Being inaccessible, especially in times of increased avalanche risk, requires the existence of a well-equipped team of first responders. While Patreksfjörður has a small hospital, Flateyri does not. The main institutions involved in recovery—the Red Cross and the ICE-SAR—are entirely made up of volunteers and thus dependent on motivated inhabitants. This is a heavy burden, and one should not underestimate the (psychological) pressure for locals and the fact that first responders and trained staff might be out of town or directly affected during an avalanche.

In addition, it is not clear to what extent migrants participate in voluntary activities. When interviewees were asked about the participation of newcomers in voluntary actions such as the ICE-SAR, most noted that voluntary action was mostly carried out by locals who had resided in the communities for a long time, even though newcomers did take part. However, a few interviewees mentioned

that inhabitants of foreign origin were usually less receptive to the idea of joining the ICE-SAR after learning that such activity—traditionally carried out by the army in their home countries—was unpaid. Yet, as described by some participants, during evacuations in Patreksfjörður due to avalanche risk, it can be helpful to involve local foreigners in avalanche preparedness and risk communication when talking to other individuals with non-Icelandic background.

Newcomers, especially foreigners, have been identified as a particularly vulnerable group in regard to avalanche risk. They do not necessarily have a social network within the village and might be “forgotten” unintentionally during a disaster. Access to strong social networks is of paramount importance in remote risk areas, as outlined by Hovelsrud et al. (2018). As highlighted by an interviewee: “I think that is often the case in such communities, I feel it myself, that when the weather turns bad, or there is a possibility for evacuations, you start turning to the older residents that have more knowledge on this, and things like that [...] To the people that have always lived here or have specific knowledge. Know their surroundings and such. There are a lot of newcomers here that have no sense for that. Perhaps we need [...] to have some active information platform. Because otherwise people are just talking amongst themselves and then this group, for example people of foreign origin, will probably be a little bit left out and are therefore less aware”.

Additionally, short-term residents who do not register their legal domicile in the communities might not be registered with first responders as living within the village. The long-established locals have an extensive social network. In times of avalanche risk, they take the initiative to call those living in hazardous areas, based on their observations, to alert them. In combination with local knowledge of weather patterns and potential risk, this group seems less vulnerable. Integrating newcomers better into emergency planning, risk adaptation, and awareness is not an impossible task but demands planning. This can be achieved to some extent by the locals themselves; however, participants identified it as one of their strengths in dealing with an avalanche, i.e. that the community was so small it was easy to know all the inhabitants.

Another group has thus far gone unnoticed in terms of capacity building and was not addressed by participants. The Westfjords have experienced a continuous increase in tourism, and even during the winter months, individuals decide to explore the Westfjords, sometimes while being poorly equipped. While locals possess enough local knowledge and avoid unnecessary risk, tourists might be confronted with the effects of avalanches. While this risk can be minimised to some extent within the villages, the roads remain a dangerous terrain, and not all warning signs reach travellers in time.

Conclusion

In this research, we investigated the role of place attachment and risk perception in two small and remote communities that face avalanche risk. The two communities exhibit all three aspects of place attachment, which can be considered a strong foundation for capacity building and community resilience. In contrast, we also found examples of place attachment that lead to a spatial optimistic bias and the underestimation of threats. Such self-protective behaviour is understandable and probably necessary for coping with disasters. While the outsiders' perspective of the villages—in particular that of Flateyri—is shaped by avalanches and risks, the inhabitants find ways to cope and persist. While the local narrative is surprisingly optimistic given the history, the village is still stigmatised. Strong place attachment might thus be a coping mechanism based on a mix of pride, stubbornness, and defiance. While we found negative tendencies of place attachment in both places, they seem to be less prominent than the positive aspects. This is the place-protective behaviour and local engagement. Despite being well equipped with volunteers, it would be grossly negligent if state institutions continued to rely mainly on locals and their readiness to volunteer. Both villages and almost all other avalanche-risk areas of Iceland are remote and temporarily inaccessible. Hence, the first response has to come from within the community. A continuous assessment of local manpower and equipment is thus necessary. Another limitation is that the assessment of place attachment within the two villages can only reflect one side of a coin. For future research, it might be advisable to find out exactly who those people were who migrated out of the villages and investigate the role that disaster risk and trauma played in this decision.

Another important issue in terms of place attachment and capacity building that has been neglected by several actors is that of migrants and tourism. Regardless of the degree of place attachment among this group, there are distinctive needs, challenges, and barriers that need to be addressed. First and foremost, information needs to be accessible in languages other than Icelandic and English. While social control and social bonds work very well in close-knit communities such as those under investigation here, it is unclear to what extent in-migrants are part of the (security) network. The role of temporary visitors, such as tourists, seasonal workers, or students, is another aspect that needs to be addressed.

The year 1995 was a turning point in the Icelandic disaster policy, and important measures have been put in place to avoid forced relocation due to disaster risks. Considering the recent development in terms of climate change, Iceland might need to reflect on whether the adaptation strategies in place are sufficient. If avalanches become the norm rather than the exception, while simultaneously being harder to predict given the rapidly altering weather patterns in combination with changing snow composition, new strategies will be necessary.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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