

Local Business Perceptions of Weather Impacts on Tourism in Svalbard, Norway

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Abstract: Tourism in Svalbard, Norway has expanded rapidly in recent decades due to increased accessibility and the region's appeal as a perceived wilderness destination. Using two-stage interviews with employees, mainly operators/owners, from thirteen small- and medium-sized enterprises (SMEs) in Longyearbyen, this article explores the tourism and hospitality industry's perceptions of weather's impacts on their business. Perceptions of how future weather trends, expected due to climate change, will impact their work are also examined. Three main categories from the surveys comprise the results and discussion. First, weather is one factor amongst many affecting business operations and is not seen as being important. Second, the interviewees' comments on changing weather requiring business flexibility and adaptation are discussed in the context of day-to-day and inter-annual variability, as well as longer-term climate change. Third, SME interviewees' thoughts are described and analyzed regarding their perceptions of the weather preferences of and impacts on the tourists whom the businesses serve. Overall, weather is seen as being comparatively unimportant for SMEs' operational decisions at any time scale. Instead, they accept weather as something that must be dealt with as it comes—part of life in the Arctic. This pragmatic attitude matches SMEs' approaches in general in terms of not planning strategically for either the short-term or long-term. That works well at the moment since many tourists travel to the Arctic assuming that the weather is part of the experience, plus they cannot go elsewhere from Svalbard in case of inclement weather. Nevertheless, SMEs could consider longer-term planning to address climate change.

Introduction

Northern regions are experiencing significant changes, socially as well as environmentally (ACIA, 2005; AHDR, 2004; AMAP, 2011; IPCC, 2007). Consequently, northern peoples are continually adjusting their means of livelihood. From reindeer herding and marine living resources (e.g., fishing and whaling) to mineral extraction (e.g., oil, gas, and diamonds),

opportunities for making a living in the Arctic are opening and closing—and are particularly being subject to increasing scrutiny and interest from outside parties. Another significant means of livelihood in northern regions that is undergoing change is tourism.

Over five million tourist trips are taken annually in the Arctic and Subarctic region and those numbers are expected to increase in the future (Hall et al., 2009; Hall and Saarinen, 2010; Mason, 1997). While many Arctic tourists have specific expectations of the weather that they will experience (Hübner, 2009), limited research to date explores the motivations, attitudes, expectations, and experiences of polar tourists with regards to weather (Stewart et al., 2005). One example of such a study is Denstadli et al. (2011) who surveyed tourists in Northern Norway's archipelago of Vesterålen regarding their perceptions of and interests in certain types of weather for their holiday. Analyses of other locations such as Michigan (Shih et al., 2009) and Nepal (Nyaupane and Chhetri, 2009) have provided a baseline of literature for pursuing more such studies in the Arctic.

In Norway's Arctic, the Svalbard archipelago has been of particular interest for tourism and Arctic studies, due to its combination of accessibility for tourism, unique governance system in which several countries can access its natural resources, and its cultural and natural heritage (e.g., Kaltenborn and Emmelin, 1993; Guðmundsdóttir and Sæþórsdóttir, 2009; Mason, 1996; Viken and Jørgensen, 1998). While studies exist of businesses in Svalbard's capital and main settlement Longyearbyen (e.g., Bjørsen and Johansen, 2008; Viken, 2006), they generally do not engage directly with the business community on Svalbard to explore their specific understanding of the tourism and hospitality industry.

Meanwhile, climate change is affecting the weather, wildlife, cultural heritage, and landscapes that tourists come to see in the Arctic, including Svalbard (e.g., Hovelsrud and Smit, 2010; IPCC, 2007; Johannessen et al., 2004). Studies have been done on climate change impacting tourism in places such as Greenland (Pagnan, 2003) and the Faroes (Kelman and Lewis, 2005). Overall, however, polar tourism research has not been fully appreciated in studies of climate change nor has tourism research thoroughly delved into how climate change will affect the Arctic tourism and hospitality industry (Dawson et al., 2007; Hall and Saarinen, 2010; Maher et al., 2011).

Similar gaps appear for weather and tourism research. The importance of different perspectives for understanding weather perceptions—covering daily and inter-annual weather variability as well as longer-term weather trends especially due to climate change—and the influence of those perceptions on tourist choices has been justified and explored in other

studies (e.g., Denstadli et al., 2011; Gongmei et al., 2009; Moreno, 2007; Perch-Nielsen et al., 2010; Rauken et al., 2010; Riedel et al., 1999). Findings from these publications show that weather factors such as wind, temperature, intensity, and precipitation influence tourist decisions, but in complex ways depending on tourist and destination characteristics. Few general patterns emerge. Limb and Spellman (2001), in particular, detail the complexities of how tourists from the U.K., travelling domestically or internationally, evaluate the weather that they experience. Bigano et al. (2005) identify similar complexities for tourists in Europe, noting that expectations of future weather influence the tourists' evaluation of the current weather.

Limited literature exists on weather and tourism for Arctic regions. As a few examples, recent studies explore how tourism businesses perceive and address weather for destinations in Northern Norway (Rauken et al., 2010) and Northern Finland (Saarinen and Tervo, 2006; Tervo, 2008). Overall, as exemplified by Martín (2004), de Freitas (2003), and Smith (1993), researchers have long been calling for more detailed work on how the tourism and hospitality industry is influenced by weather (which is the daily state of the air, expressed through parameters such as temperature, precipitation, humidity, and wind), climate (which is long-term weather patterns, usually considering statistics over thirty years), and their variability and trends.

To contribute to this research area, in the context of tourism and travel in the Circumpolar North, this article explores perceptions of weather's impacts on the tourism and hospitality industry from the perspective of employees of small- and medium-sized enterprises (SMEs) in Svalbard. Perceptions of how weather trends, expected due to climate change, will impact business in the future are also examined. This study's objective is to understand how SMEs in Svalbard's tourism and hospitality industry see weather influencing their business—daily, seasonally, yearly, and over the long-term.

The next two sections provide background to tourism SMEs and Svalbard, focused on weather and the tourism and hospitality industry. Afterwards, the method is detailed, explaining a two-stage survey of SME employees. Results of this survey are then presented and discussed, followed by conclusions highlighting key points learned from the study.

Tourism SMEs

In non-urban locations such as Svalbard, the tourism and hospitality private sector often principally comprises SMEs (Morrison, 1998). Studies have explored characteristics of how SMEs across sectors tend to run their businesses, highlighting the limited planning at any time scale, short-term or long-term (e.g., Ingirige et al., 2008), along with their minimal financial

contingency (e.g., Beck and Demircuc-Kunt, 2006). Instead, the focus is on a steady and continual (or seasonal) cash flow with the business effectively functioning in a “just-in-time” manner (Smeral, 1998). Within these topics, tourism SMEs are usually not well-represented, so further research into these topics for tourism-specific SMEs is suggested (Thomas et al., 2011).

Within the tourism sector, business strategies for SMEs are not always fully formulated or presented formally, nor are business strategies necessarily needed or desired by SMEs (Getz et al., 2004). Additionally, SMEs are not always run to focus on profit maximization because a family-oriented lifestyle is more important (Getz and Carlsen, 2005). The staff might not work longer hours to serve more clients or to sell more products because they prefer to use the time for leisure and family. Getz et al. (2004) and Getz and Carlsen (2005) mention Arctic tourism SMEs as displaying such traits.

Studies of Arctic SMEs are varied, with many comparing Indigenous and non-Indigenous approaches, especially in the context of different understandings of entrepreneurship (e.g., Dana and Riseth, 2011; Dana, 1995, 2010; Mason et al., 2007; Prattis, 1974). In much of this work, weather impacts on businesses and entrepreneurship are not detailed extensively, usually because that was not the purpose of the investigation. The work does note that most Arctic SMEs are owner operated, with the owner frequently having more means of livelihood than just their business or just within the tourism and hospitality industry.

Despite the lack of explicit interest in weather impacts on Arctic businesses, Arctic weather is known for its daily, sometimes hourly, volatility along with its wide inter-annual variability. Coupled with long-term weather trends potentially changing due to climate change, Arctic SMEs affected by weather, such as those offering outdoors activities to the tourism and hospitality industry, might find that more strategic planning could be useful to deal with weather changing at all time scales. That conclusion is not a certainty. Instead, it provides a useful research area to explore, rarely examined previously in the literature. That would help to better understand SME perceptions of weather impacts on their livelihood and how the SMEs might adjust their activities to address any weather-related concerns, at all time scales.

Svalbard

Weather and Tourism

Svalbard, lying between 74°N and 81°N and between 10°E and 35°E, is an archipelago of islands within the Arctic Circle, approximately 800 kilometres north of Norway’s mainland in the Barents Sea (named after the sixteenth

century Dutch explorer who is the first recorded non-northerner to sight Svalbard), and adjacent to the ice fields of the Arctic Ocean (Wråkberg, 2006). The archipelago is dominated by four islands that contain rugged mountains and deep fjords, and that are over 50% glaciated (Guðmundsdóttir and Sæþórsdóttir, 2009). Svalbard has not had an Indigenous population and all human settlements, including the Norwegian administrative centre of Longyearbyen, are located on the largest island of Spitsbergen (Kaltenborn, 2000).

Due to the international treaty governing Svalbard (Svalbard Treaty, 1920), several countries are permitted access to the archipelago's natural resources. Other than Norway, Russia is the main country exercising those treaty rights with respect to natural resource exploitation. Consequently, many Svalbard residents are Russians working in two Russian mines on Spitsbergen. An example of other countries' presence on Svalbard is Poland's research station at Polar Bear Bay, in the south of the archipelago. Across the settlements, some residents stay for a decade or more, but the majority stay for a shorter time before moving back to the mainland.

Svalbard's weather and climate are Arctic, although tempered by the warm waters of the North Atlantic Current. Unpublished weather data from 1976 to 2010 were obtained from the Norwegian Meteorological Institute for Longyearbyen Airport, about 3 km along a fjord's coastline from Longyearbyen. Mean daily air temperature in May averages around -4°C, rising to just over 5°C during July and dropping back down to just above freezing in September and then to approximately -14°C in January. Average maximum and minimum daily air temperatures for each month can vary by up to 10°C above and below the means. Because cold Arctic air meets milder sea air in and around the archipelago, the weather is variable, with rapid changes in wind, visibility, temperature, and precipitation, especially in the winter. Fog is a common summer condition away from the shore, with visibility under 1 km for a fifth of the time in July.

Today, Svalbard's economy is based upon coal mining, Arctic research, and Arctic tourism (Guðmundsdóttir and Sæþórsdóttir, 2009; Mason, 1996). Mason (1997) highlights how tourism is sometimes seen as replacing declining industries such as mining. Yet at the end of 2011, Norway's government was debating the opening of a new coal mine on Svalbard.

Tourism has been present in Svalbard for over a century, starting with luxury cruises in and around the archipelago in the 1890s. A lack of retail food, fuel, and equipment stunted industry growth well into the latter half of the twentieth century (Kaltenborn and Emmelin, 1993; Viken and Jørgensen, 1998). In 1975, Svalbard became accessible to tourists by air (Catford, 2002)

and a retail and service sector emerged that became a foundation for the tourism and hospitality industry (Viken and Jørgensen, 1998). Today, the tourism and hospitality industry is primarily SMEs with most offering one or more of accommodation, food, souvenirs, and outdoor activities. Viken (2011: 338) writes “In the period from 1990 to 2010, Longyearbyen was more or less transformed into a tourist resort.”

While many local residents in the 1980s viewed tourism as a form of environmental intrusion, non-local entrepreneurs saw Svalbard as a unique and potentially lucrative location (Kaltenborn, 1998, 2000). The nascent tourism industry benefited from the infrastructure supporting the mineral extraction industry, while expanding the base for economic development (Hall and Saarinen, 2010). The tourism infrastructure then surged to meet the increasingly lucrative market and the needs that the tourists expressed (Viken and Jørgensen, 1998).

In contemporary times, Svalbard has been marketed as “the last European wilderness” (Kaltenborn and Emmelin, 1993: 41). Those promoting the archipelago present it as a disappearing wilderness that is unsullied, untamed, fragile, and fleeting (Gyimóthy and Mykletun, 2004)—and a vast arena for recreation, adventure, and self-reflection (Mason, 1997; Johnston, 1995). Many tourists come to Svalbard to be a part of Arctic history and, to varying degrees, to test their physical and psychological limits in a wilderness “playground” (Gyimóthy and Mykletun, 2004: 856). Svalbard tourism websites promote it as a location where tourists are explorers and where polar bears outnumber human beings.

Most tourists to Svalbard are European, with about a third being Norwegians. A majority take part in package tours, where they are provided with what Kaltenborn and Emmelin (1993: 45) call “the safe adventure,” which emphasizes quality of experience as opposed to material consumption.” Tourism offerings are diverse, from conference locations to wilderness expeditions. Package tours and trips away from the Longyearbyen main settlement are increasing, as are independent expeditions including some with snowmobiles (Kaltenborn, 1998, 2000).

Tourism in Svalbard is divided between tourists who come and stay in and/or embark on expeditions from Longyearbyen, and visitors who experience the archipelago aboard cruise ships. The Governor of Svalbard (2006) indicates that approximately 26,900 tourists, including conference participants, came to Svalbard by air in 2006, up from 12,400 in 1998. Of those staying overnight, nearly 60% are recreational tourists and the average stay is 2.5 days (Governor of Svalbard, 2006). In 2007, the total number of cruise ship tourists was over 55,000 (Evenset and Christensen, 2011).

Much of the interest in Svalbard tourism comes due to it being one of the most accessible locations in the High Arctic. The main airport in Longyearbyen is a four hour jet flight from Oslo and approximately two hours from Tromsø in Northern Norway. Good harbour facilities accommodate a variety of cruise ship sizes. Most cruise ships, especially those offering landings at wildlife and heritage sites, carry 70–100 passengers, whereas much larger ships, with up to 2,500 passengers, are rarer and tend to focus on Longyearbyen, Ny-Ålesund, and Magdalenefjorden (Evenset and Christensen, 2011).

Almost all tourists to Svalbard come during the spring and summer seasons, from March to August. The months of heaviest travel are July and August, corresponding to the warmest temperatures and the typical holiday schedules of most European travellers. Historically, tourism has been limited during the winter (Governor of Svalbard, 2006).

Tourist activities on Svalbard include tours of historic monuments, such as current and abandoned coal mine operations, trapper's cabins, Russian settlements, and explorers' camps. Many tourists engage in outdoor activities such as nature walks (for scenery, plants, and animals), dogsled and snowmobile tours, horseback riding, skiing, boating in the summer months, and reindeer hunting towards the end of the summer (Colman et al., 2001). Guest surveys indicate that nearly 90% of tourists engage in more than one organized activity (Governor of Svalbard, 2006).

Changing Tourism and Weather

With climate change increasingly a dominant concern articulated in Arctic contexts (ACIA, 2005; AHDR, 2004; AMAP, 2011; UNESCO, 2009), Svalbard has become represented as a place to see polar bears and glaciers before they disappear (Hall and Saarinen, 2010; Viken, 2006). NGO and government information explains to readers that the loss of snowpack and sea ice is likely to have severe impacts on the region's polar bear population. Some tour operators note a reduction in polar bear sightings along the west coast, but 2011 saw increased observations in that area. Yet less ice in the Arctic Ocean might make the region more accessible to cruise ships, permitting larger volumes of tourists to reach Svalbard and perhaps to spend time in Longyearbyen. Several obstacles nevertheless remain, including seasonal drift ice and icebergs, annual variations in ice cover of the central Arctic Ocean, and persistent local sea ice formation along shipping routes (AMAP, 2011).

Concerns also extend to the challenge of maintaining Svalbard's cultural heritage (Haugen and Mattsson, 2011; UNESCO, 2009). Warming temperatures will bring increased mould, fungus, insects, and loss of

permafrost that will augment the weathering and decay of the area's cultural relics.

Meanwhile, tourism in Svalbard is changing in terms of the way tourists arrive and the way in which they interact with the natural and cultural heritage. From 1996 to 2008, the total number of landings by passengers (a single passenger might have several landings during a single cruise) has approximately tripled to around 60,000 (Evenset and Christensen, 2011). From 1996 to 2010, the number of landing sites for cruise ship tourists increased from 52 to 144 (Evenset and Christensen, 2011).

In addition to the popularity of experiencing the midnight sun during the summer, tourism is also expanding into the colder and darker months. While the overwhelming majority of tourists still visit from May through September, data tracking independent travellers show many in the field in March and in large numbers by April (Governor of Svalbard, 2006). Furthermore, tour operators are now advertising winter trips, such as activities to view the northern lights (especially during 24 hours of darkness in the winter) or to celebrate the return of the sun. That complements Polarjazz, the "world's most northerly jazz festival ... Cool Place, Hot Music" (<http://www.polarjazz.no>) in Longyearbyen every February, which was launched in 1998. An industry campaign to promote winter tourism was launched in the summer of 2010.

Changes have also taken place in the way that Svalbard's cultural and natural heritage is managed. In 1995, the Norwegian government laid out goals, later codified in a management plan, for developing sustainable recreation and tourism operations (Kaltenborn, 2000). The plan divided the archipelago into ten management zones with specific goals, actions, and acceptable activities in each. Along with the plan, a growing adherence to environmental stewardship principles and promotion of Svalbard as an ecotourism destination is witnessed (Kaltenborn, 2000; Kaltenborn and Emmelin 1993). In 2007, Svalbard was placed on Norway's tentative list for nomination as a UNESCO World Heritage Site.

Climate change in Svalbard provides another potentially significant and long-term change affecting the tourism and hospitality industry. Using Longyearbyen airport data for 1911–2004, Nordli (2005) reports "a significant trend of 0.16°C per decade for the annual values. During winter ... no significant trend in the data is seen, whereas in spring the trend is highly significant, 0.42°C per decade" (p. 2). Arctic sea ice in the summer continues to be at or near the lowest levels recorded and has recently been averaging approximately two-thirds of the value of the medium-term average (AMAP, 2011). The warmest winter ever recorded in most parts of

northern Scandinavia up until that time occurred in 2008 (Hall and Saarinen, 2010), with recent years continuing that trend, based on the unpublished data from the Norwegian Meteorological Institute at Longyearbyen airport. The possibility of an Arctic Ocean that is nearly ice free in the summer is a major concern (AMAP, 2011; IPCC, 2007), while water temperatures in the region are at the highest levels observed (Bogstad et al., 2008).

Method

To understand how SMEs in Svalbard's tourism and hospitality industry see weather influencing their business, a two-stage survey was completed with SME employees. Tourism and hospitality SMEs in Longyearbyen were located by asking the local tourism office, searching the web, examining public business registries, talking to people who know Longyearbyen (especially those who have lived there recently), learning from other interviewees (word of mouth), and walking around the city.

In 2004, over 150 businesses were registered in Longyearbyen with approximately 105 being especially small in terms of employing 0–9 person-years per annum (Longyearbyen lokalstyre, 2004). Bjørnsen and Johansen (2008) list almost 300 companies for Svalbard while the *Yellow Pages* for Norway listed over 300 entries as this research was being completed. These businesses include firms that likely serve tourism businesses, such as plumbers and electricians, but who do not serve tourists directly. From these lists, approximately fifty businesses were clearly serving tourists as a significant portion of their focus, identified because they provided guest accommodations, souvenirs, outdoor activities, rentals, or restaurants—all of which the literature (e.g., Viken and Jørgensen, 1998) identifies as expanding due to tourism.

From this background work to understand Longyearbyen's tourism businesses, thirteen detailed interviews with tourism and hospitality SME representatives were completed for each stage of the survey (Table 1). That represents approximately one-quarter of those identified as tourism-related SME operators in Longyearbyen at the time. The selection method yielded a representative sample for the interviewees for two reasons. First, the representativeness of the sample is corroborated through the sources examined for businesses in Svalbard (e.g., Bjørnsen and Johansen, 2008 and the *Yellow Pages*). Second, Longyearbyen is a small community—only between 2,000 and 3,000 people, depending on the season and who is counted as a “resident”—so it is straightforward to glean an overview of the tourism and hospitality industry. As well, the sample size is adequate for analysis according to other published studies such as Cohen and Higham (2011)

using fifteen interviews while Cioccia and Michael (2007) had a sample size of eleven—in both cases, with the potential sample size being much larger than Svalbard’s potential sample size.

Table I. SME interviewees on Svalbard

#	Main services	Period of operation (appx)	Interviewee’s position	Main source of income
1	Outdoor activities & accommodation	Two decades	Owner	Tourism
2	Souvenirs, especially jewellery & clothing	One decade	Owner	Tourists buy clothing & souvenirs; Locals buy jewellery
3	Outdoor activities & accommodation	One decade	Non-owner manager	Tourism
4	Auto rentals, sales & repairs; petrol and parts	One decade	Owner	Difficult to say share from tourism compared to locals
5	Food	Six decades	Non-owner manager	Tourists 50% Locals 50%
6	Accommodation & food	One decade	Owner	Tourism
7	Shoes, leather goods, clothes & souvenirs	Two decades	Non-owner manager	Tourism
8	Accommodation, food & activities	Two decades	Non-owner manager	Tourism
9	Sporting goods	One decade	Owner	Tourists 40% Locals 60%
10	Transportation & sightseeing	One decade	Owner	Tourism
11	Outdoor activities	One decade	Owner	Tourism
12	Outdoor activities related to horses	One decade	Owner	Can’t live off business. Freelances in Antarctica to supplement
13	Outdoor activities & accommodation	Two decades	Hired employee	Tourism

The most significant constraint on the selection of interviewees was availability for and interest in being interviewed. Interviews could not be conducted during the main tourism season of May to August because the SME employees do not have time. Off-season, some operators pursue alternative means of livelihood on or away from Svalbard and so are not available for interviews about their tourism business. Some potential interviewees were not interested in the topic or would not spend the time being interviewed, so they declined to be interviewed. As such, the choice of SMEs for interviewing aimed for a variety of businesses within the context of which SME employees would and could be interviewed.

Two consequent biases in the data result. First, interviewees tended to work in their SMEs with limited alternative means of livelihood for the off-season. Second, those who agreed to be interviewed did not immediately reject the premise of talking about weather impacting their business. That does not mean that they were actively interested in the topic. Some interviewees were merely curious or just had the time to chat. Given the representativeness of the sample, as discussed above, this constraint does not seem likely to introduce major biases into the sample.

Two interview guides were used. The first guide had open-ended questions while the second was more structured.

In the first round, interviewees were asked questions concerning the business environment, drivers for tourism, risks to their business, and success factors. Specific questions were asked about the importance of weather for their business success; whether or not the interviewees had noticed any changes in the weather; and whether or not they perceived a necessity to change their business as a response to weather.

The second round was more structured in naming specific weather conditions and requesting the interviewees to rank how those weather conditions would affect tourism and their business. It asked questions regarding perceptions of tourist preferences for weather; activities that depend on weather; and accessibility potentially affected by weather. The interviewees were asked to either rank or choose among predefined answers. As such, the interviewees were deliberately focused on weather and responded accordingly without necessarily considering wider contexts.

Overall, the interview guides were designed to focus on perceived effects of weather on each SME along with suggestions for improving the business to take advantage of weather conducive to tourism, and to adjust to adverse weather without revenue loss. The interview design and interpretation methods were based on and adapted for the Svalbard context from Perry

(1993), Lohmann (2001), Lohmann and Kaim (1999), Tervo (2008), Rauken et al. (2010), and Uyarra et al. (2005).

Most interviewees were the operator or senior manager of the business (Table 1), but few businesses had many other employees (as confirmed by Longyearbyen lokalstyre, 2004). The interviewees tended to prefer not to provide quantitative information regarding turnover and staffing, and they were not pushed to do so; so these data are not described here and the analysis cannot consider such aspects of business operations. Few of the interviewees had formal business strategies and so further consideration of this topic was not possible.

All interviews were completed in March 2009 in Norwegian by the same Norwegian native speaker—who is this article's second author—enhancing the comparability of the responses. A digital recorder was used with the interviewees' permission. For both rounds, all interviews were completed in person, except for interviewee #8 who was interviewed by phone because repeated attempts to do the interview in person were unsuccessful.

Data are reported here to preserve as much anonymity as possible for the interviewees, keeping in mind that the case study area is small and that some identifying statements must be made because the observations make sense only in the context of the specific interviewee. The interviewees accepted that anonymity might not be feasible and their statement regarding this point was recorded. The detail with which each question was answered and the inclusion of other elements depended on the direction of the dialogue as taken by each interviewee. The data collected were translated into English by the interviewer (this article's second author), who is experienced in translating between Norwegian and English.

Results and Discussion

Combining the two sets of interviews, three main categories from the surveys are used to report and discuss the results. First, regarding the importance of weather for SMEs, weather is discussed as one factor amongst many affecting business operations, but weather is not the most important factor. Second, the interviewees' comments on changing weather requiring business flexibility and adaptation are discussed in the context of day-to-day and inter-annual variability as well as longer-term climate change. Third, SME interviewees' thoughts are described and analyzed regarding their perceptions of the weather preferences of and impacts on the tourists whom the businesses serve.

These results need to be interpreted in the context of the tourists to whom the SMEs cater. When discussing their tourist clientele, the SME interviewees noted that they generally did not serve the cruise ship tourists. The cruise ship passengers will tend to either fly into Longyearbyen and immediately embark on the ship or else disembark in Longyearbyen after their cruise in order to fly out. While some tour operators are trying to make day trips in Longyearbyen more attractive by offering activities and advertising directly to the cruise companies and tourists, at the moment most cruise ship tourists might have a few hours around the town, but eat and sleep on board the cruise ship. Instead, the SMEs are mostly serving tourists who come to see Longyearbyen or to partake in organized or independent treks around the archipelago.

Importance of Weather for Business

The interviewees were asked about the importance of weather for their business operations, how they plan for different weather conditions, and the degree to which they are flexible in the face of unpredictable weather, both day-to-day and year-to-year. Interviewees noted that summer weather in particular could vary considerably, both daily and annually, in terms of temperature, precipitation, and sunshine.

When first asked, eight of the thirteen SME interviewees stated that weather does not have a direct effect on their business operations (interviewees #1, #4, #6, and #9) or does not have much of an effect (interviewees #2, #5, #10, and #11). These interviewees cover a wide range of services. A significant part of some tourism businesses is providing services to Svalbard residents as well as to tourists, so the impact of weather on tourism is somewhat masked by the continual services for residents. Others felt that their business operations were prepared for a range of expected weather conditions, so weather causes few disruptions.

The interview guide listed specific weather conditions that the interviewees were asked regarding positive or negative effects on their business operations, as shown in figure 1. Interviewee #2 suggested that bad weather helps town businesses, such as their own business, by keeping tourists indoors and in town where they would shop more. Interviewee #2 particularly noted that cold weather would lead to increased sales to tourists of mittens and hats, although it was unclear if the clothing was needed, if it was an excuse to bring back souvenirs, or if they were shopping due to lack of anything else to do.

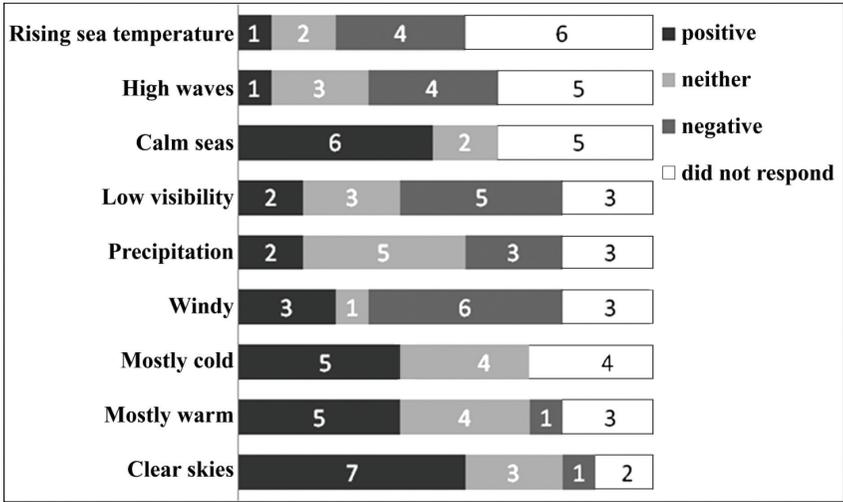


Figure 1. Effects of weather on Svalbard small businesses in the summer (the main tourist season).

Yet weather was far from the only factor of interest. Interviewees stated that they often had to be flexible and to adapt to seasonal and annual variation of, and long-term changes in, tourism and their tourism-related business goals due to multiple factors. In terms of principal risks to and worries regarding their business, only interviewee #3 mentioned the weather, focusing on the ice conditions around Svalbard. This interviewee runs outdoor activities that could be affected by ice conditions.

Interviewees noted the importance of the local mining and research industries for their business, which are weather-independent. The research industry refers to researchers passing through or temporarily based in Longyearbyen, conferences in the town, and the University Centre in Svalbard (UNIS), which runs Arctic-related courses at all university levels, bringing in students and lecturers. For mining, one mine is currently operated by Norwegians, near Longyearbyen. If that closed, interviewee #9 said that it would be impossible to run a business while interviewee #10 would lose a quarter of his/her income. Interviewees #6 and #8 noted how much scientific research on Svalbard boosts their income, while interviewee #9 commented that “research will never provide the same revenue and infrastructure in Longyearbyen” as tourism and the same expectation exists for mining. Researchers use the accommodation, food, and facilities offered by interviewees #6 and #8, but do not generally purchase the sports

equipment sold by interviewee #9—although that equipment is useful for those in the mining industry.

With such discussion, the interviewees were clear that weather is not a primary concern regarding their business operations and successes, matching results from other studies (e.g., Rauken et al., 2010 who examined two locations in northern Norway). The interviews, though, took place in March 2009, at the point when the companies would have been realizing the medium-term impact of the global financial crisis. In fact, interviewees #1, #3, #5, #6, #7, #11, and #13 specifically mentioned the global economy or the financial crisis as being a major concern, rather than weather. The economic worries could potentially translate into the concerns reported by interviewees #1, #9, and #12 regarding the expense of Svalbard—referring to travel costs as well as on-site costs—discouraging tourism, which matches tourist expectations for costs of Arctic travel in general (Hübner, 2009). That is, concerns other than weather were highlighted and were the most interesting for the interviewees to discuss.

Overall, the interviewees downgraded the importance of weather in light of these more pressing concerns with tangible influence on their income. The economic worries manifested in reality, in that the first half of 2010 saw an increase in travellers to Svalbard but no increase in spending—but this time period was marred by a five-day closure of airspace across Europe due to volcanic ash from Iceland.

Against the background of these immediate and fair concerns that are weather-independent, climate change is affecting the weather. The long-term changes to weather in the Arctic have been shown to affect the wildlife (Freitas et al., 2008; Lydersen and Smith, 1989; Rosing-Asvid, 2006) along with the cultural heritage (Hall and Saarinen, 2010; Haugen and Mattsson, 2011; UNESCO, 2009) that tourists come to see. Drifting icebergs combined with the lack of accurate charts and insufficient experience in navigating in ice-covered areas will challenge many cruise ships, especially those not constructed for Arctic Ocean conditions (Stewart et al., 2007). These factors influencing weather could require the SMEs to adjust the activities that they offer tourists.

Such adjustment is already being attempted, with mixed success. As one example, the Spitsbergen Airship Museum in Longyearbyen opened on 15 November 2008 in order to give tourists another indoor venue. Costs then stymied its operations. In July 2010, the museum announced that it was going to move venue because of the high costs of rent and of heating an old stone building with many draughts. The museum closed in October 2010 and is hoping to re-open for the 2012 summer season in a newer building near the

centre of Longyearbyen that, at the time of writing, was being renovated and extended to accommodate the museum.

Overall, though, the interviewees showed little concern regarding climate change (see the evidence in the next section). This lack of interest in how climate change might affect the weather is understandable, because if short-term challenges such as the economy are not resolved, then long-term challenges are irrelevant. That is sensible business operations, and is shown in the literature to be a standard characteristic of SMEs not to think long-term and not to develop long-term business strategies (Getz et al., 2004; Beck and Demirguc-Kunt 2006; Getz and Carlsen, 2005; Ingirige et al., 2008; Smeral, 1998). Since Svalbard's population has a high turnover with low numbers staying for the long-term, it is generally accepted that people can pack up and leave, such as if their business is not succeeding.

The interviewees also emphasized that—day-to-day, annually, and over the long-term—they can do little about the weather and that they have always had to deal with weather-related vagaries—irrespective of climate change. They are used to adjusting to weather. That contrasts with relatively unusual global economic hardships over recent years along with possibilities for immediate action by the businesses through enticing tourists who have money, irrespective of the global economy. Pragmatic business perspectives were evident in the interviewees recognizing what they could and could not change, in order to work on the former (including bringing people to Svalbard despite the economic downturn) and not the latter (including the weather).

The implication is that the tourism and hospitality industry on Svalbard has an appropriate attitude in not worrying too much about the weather. Instead, aiming to provide an exciting but “safe adventure” (Kaltenborn and Emmelin, 1993: 45), including under weather that changes at all time scales, makes sense.

The final factor to consider is that, irrespective of the weather, tourists come to Svalbard because it has destination identity (e.g., Baldacchino, 2006; Dredge, 2003). The dream of visiting Svalbard was mentioned by interviewee #3 as being important for Norwegians while uniqueness was mentioned by interviewees #4, #5, and #8. There is no substitute—Svalbard is a final destination, not a place enroute to somewhere else, where tourists could move on if weather or prices are not to their liking. On Svalbard, no option exists to go elsewhere. The SMEs accept that irrespective of the weather, the tourists will be there.

Business Flexibility in the Face of Changing Weather

The interviews also explored how businesses adapted to or remained flexible in the face of varying weather conditions, including extremes. Speaking about day-to-day, seasonal, and inter-annual flexibility, four SME interviewees (#8, #9, #11, and #13) explicitly discussed the importance of proper outdoor equipment. They noted that with advanced gear, activities could, and do, occur within a wide range of weather conditions. Interviewee #8 discussed how it was necessary to remind tourists of the importance of having proper clothing and other gear in order to be prepared for weather changes. Weather, overall, was not seen as needing to impact the activities that SME operators offered. Given that these interviewees offer outdoor activities (#8, #11, and #13) or sell outdoor equipment (#9), they have an incentive to encourage proper clothing and equipment in order to continue activities in all weather.

Interviewees #8 and #13 were the only two who heavily emphasized that they needed business operation flexibility in order to serve tourists, in cases of rapidly changing or bad weather. Others were more cavalier or flippant, such as interviewee #10 indicating “that you have to wash the buses more often in the summer if it rains.”

In helping tourists adjust to cancellations due to inclement weather, the SMEs put forward a range of strategies. Interviewee #6 would give tourists a car to drive around or assist with a barbeque. Interviewee #4 would suggest that the tourists hire a car—unsurprising since that is their business. Interviewees #2, #3, and #13 would suggest indoor activities in Longyearbyen, an advantage for #2 selling products but with no clear incentive for the other two other than keeping their clientele happy. When high waves or wind cancel excursions in small boats or kayaks, the operators suggest excursions in larger boats, indoor activities, hiking, or a visit to Barents’ Hut which is a replica of the Dutch explorer’s hut used for overwintering. The day trip tour operators would refund cancelled trips, with an opportunity to return the following day if tourists had time and if the same excursion were offered and had space.

While often dismissing the impact that daily and seasonal weather had on operations, every interviewee except for #12 and #13 stated that they have cancelled activities due to weather, but the general attitude is that this situation is part of life in the Arctic. Interviewee #12 noted that particular weather conditions could make certain outdoor activities more dangerous or less enjoyable for the tourists. Interviewee #11 emphasized the latter point. Interviewee #13 noted that rising temperatures inhibited ski activities in June but expanded kayaking opportunities. Meanwhile, interviewees #3, #5, #11,

and #13 noted that they have had customers cancel due to the weather, with interviewees #5 and #11 highlighting that it occurred because fog inhibited the plane from landing, although that was infrequent.

Moving beyond day-to-day weather and considering long-term weather trends that might require business flexibility, two interviewees (#2 and #7) said that they had not noticed long-term weather changes, while two interviewees (#4 and #13) had been on Svalbard too short a time to comment. The rest stated that they had noticed long-term changes in the weather.

Interviewees #10 and #11 referred to a tendency towards more precipitation, especially in the summer according to interviewee #10. Interviewees #6, #8, #9, and #12 said that the winter weather has changed, but not the summer. Interviewee #3 explained that recent weather had much more variation and was not as stable as remembered. Interviewee #1 made several specific observations about weather changing:

- July used to be a very foggy month, now this is pretty much non-existent.
- The summer season is stretching into the fall.
- The last couple of years, the winter has ended earlier.
- We might risk seeing the spring in early May.

When asked directly if they saw it as necessary for their business to adapt to the observed changes, none of the interviewees thought that to be urgent. The interviewees are again signalling that weather is not the most important factor for the tourism and hospitality industry's viability.

As well, the interviewees do not always report the same changes observed. Differences in views do not necessarily mean that some interviewees are right and that some are wrong, just that they are observing weather from different perspectives and highlighting what is relevant for their tourism operations. As well, the high turnover of the Svalbard population and the different lengths of time of operation of the SMEs (varying extensively over one to two decades, with one interviewee in operation for six decades) means that they are observing over different time frames. Comparing their observations with data from the Norwegian Meteorological Institute's data set from Longyearbyen Airport would not necessarily indicate "reality" (see also Førland and Hanssen-Bauer, 2003).

In particular, weather changes can be highly localized. That is shown by research elsewhere in the Arctic. Gearheard et al. (2009) compared people's weather observations in a small community with instrumental records, discussing how the instrumental records can sometimes have as many

discrepancies as the people's observations. As such, the interviewees on Svalbard should not be judged according to apparent differences in their perceptions of weather. Instead, they have experienced weather differently and report different aspects that are important for them.

A long-term warming of Svalbard, if the 1911–2004 mean air temperature trend from Nordli (2005) continues, will nonetheless require adjustments from both tourists and SMEs. While tourists visiting one time would not necessarily perceive long-term weather changes, most interviewees from SMEs do, and commented further. For instance, changing weather patterns can bring dangers. Interviewees #8 and #12 who rely on outdoor summer activities noted an increase in avalanches brought on by warmer summers. Interviewee #12 explained that is a “result of more layers in the snow because of warm low pressures coming in from the south.”

When asked about how future, long-range changes in weather due to climate change might affect business operations, interviewees #2, #6, and #7 downplayed the question, indicating that changes to weather would not be a big concern. The general attitude amongst the others is that weather happens, so people need to deal with it. As noted in the previous section, tourists will come to Svalbard irrespective of the weather and, to some extent, specifically to experience Arctic weather. Meanwhile, interviewees #2, #4, and #10 saw advantages in climate change due to a longer summer season that would yield more tourism income. Interviewee #3 speculated on the possibility of increased summer drift ice hampering sea activities while interviewee #12 considered that climate change might bring more wind and avalanches.

Many tourist activities in Svalbard depend on ice and ice conditions around the archipelago. Interviewee #1 depends on that and highlighted noticeable changes in ice volume and strength, explaining that over several decades, ice along the west coast had dwindled and was now almost completely gone in the summer months. Inlets and fjords around Svalbard had more drift ice than in the past, negatively impacting cruise tourism. During the beginning of the 2009 summer tourist season in June and July, a belt of drift ice floated through, posing dangers to small ships.

Interviewee #1 also commented extensively on wildlife. Due to the ice almost disappearing from the west coast, polar bears are not encountered as frequently as in the past. The interviewee was concerned that, if it is known that polar bears have almost disappeared from a certain area of Svalbard, that would affect the tourists coming. Interviewee #3 suggested that changes to the sea and weather were leading to more whale sightings over the last decade. Yet that could also have arisen from increased numbers of tour operators seeking whales or simply the operators' gaining experience and

being more successful at bringing tourists to whales. It might not result from changing weather. That could indicate possibilities for business flexibility—go to where the wildlife is, assuming that the locations do not change so drastically that they become out of range.

Perceived Effect of Weather on Tourists

The third main theme from the interviews addressed the interviewees' perceptions of how weather affected tourists visiting Svalbard. This theme is important from a business perspective because they are catering to the tourists, so their perceptions and understanding of how their clients think—whether based on evidence or not—impacts the products and services offered. Activity cancellations or dangers from weather are impacts on tourists that might be of concern to the tourism and hospitality industry.

Overall, the interviewees downgraded the importance of weather by noting that tourists recognize that the weather and its foibles, including extremes, are part of the Arctic experience. The interviewees felt that those choosing to visit Svalbard have already taken the Arctic weather conditions into consideration, deciding that weather was part of the holiday and hoping that nature's extremes and variability would give them what they seek. That view is corroborated by Denstadli et al. (2011) for another location in Northern Norway, in that the weather was one reason to visit—as long as the weather was not too bad for too long, according to the tourists' views.

When asked whether tourists liked or disliked weather conditions listed in the survey, the interviewees overwhelmingly felt that tourists liked clear skies as shown in figure 2. Interviewee #8 described how “everything is easier when the weather is nice.” In contrast, interviewee #6 simply stated that tourists do not care about the weather, because it holds little importance regarding the enjoyment or disappointment for their Svalbard experience. The other main comments were that many tourists are surprised that it is windy, that it “should not be warm” (both from interviewee #7), and that, rarely, low visibility can prevent planes from landing, which makes the situation “chaotic” (interviewee #2). But the interviewees were pragmatic about such situations, explaining the range of weather-related conditions that they regularly, and successfully, negotiate to assist tourist activities. That is simply part of being an SME in Longyearbyen; it is reality—the grounded, pragmatic attitude without strategic planning that is typical of SMEs (Getz et al., 2004; Beck and Demirguc-Kunt 2006; Getz and Carlsen, 2005; Ingirige et al., 2008; Smeral, 1998).

Low visibility and fog represent a useful example. On rare occasions, such weather prevents airplanes from landing, disturbing tourists' travel

plans to and from Svalbard. The Longyearbyen Airport, according to the airport manager, has only a few flights each year affected by weather. From unpublished weather data from the Norwegian Meteorological Institute for Longyearbyen Airport, no trend exists indicating that this number is changing. Interviewee #3 explained how some tourists found fog to be “a little mystical” adding allurement to the Arctic, although over longer durations it became “a bit boring.” Weather—that is, expectations of Arctic weather—is part of the tourist experience according to the interviewees, changing the landscape and contributing to the enjoyment.

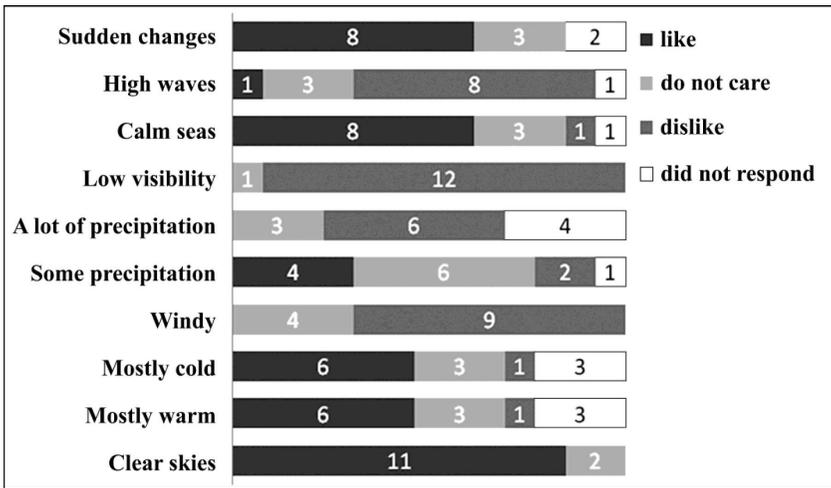


Figure 2. SME interviewees’ perceptions of how tourists feel about weather

Yet matching Denstadli et al.’s (2011) findings, weather can interfere with a holiday if it is too extreme or if weather perceived to be bad continues for too long. Windy weather, more than any other weather condition, was judged by the interviewees to be particularly interfering, especially for kayaking, horseback riding, fishing, and hiking. Although the interviewees emphasized that cancellations are rare, it certainly changed the experience of the activities for both tourists and tour operators. Windy weather could make business operations “a little exhausting” (interviewee #3) and “not comfortable” (interviewee #2) for tourists and operators.

These observations regarding the perceived effect of weather on tourists and their activities are similar to findings from elsewhere in Northern Norway (Rauken et al., 2010), as well as what tourists suggest is their own perception of the Arctic (Hübner, 2009). Weather is certainly something to talk about and interviewees report conversations with tourists that often

focus on the weather just experienced or expected to come. Some tourists called ahead to hear about the weather as a central point of their interest in Svalbard (interviewee #6). As such, tourists come and the SMEs gain the income, irrespective of the weather—because Arctic weather, by definition, draws tourists. Hence, being unconcerned about the weather's importance is understandable from a SME's perspective.

SME interviewees were also asked what type of weather would most likely bring tourists back to Svalbard. Most saw sun and cold weather as draws for repeat visits. Interviewee #10 suggested that many tourists thought that it is nice to experience cold weather while interviewee #11 believed that tourists expect it to be cold. Interviewees #2, #5, #7, and #8 strongly felt that the weather would not matter for repeat visits. Reasons given were that "Svalbard is so special" (interviewee #7) and that "the weather changes so much" (interviewee #8). Even high waves, while leading to cancellations of kayaking, was seen by some tourists as exciting (interviewees #1 and #13).

In effect, this tourist response perceived by the interviewees indicates "the safe adventure" (Kaltenborn and Emmelin, 1993: 45). The tourists did not get their kayaking jaunt, because the Arctic was too wild for humans to bear! Fog, wind, and high waves personify the untamed and adventurous dimensions of the Arctic (Gyimóthy and Mykletun, 2004; Mason, 1997; Johnston, 1995) making any tours that did run all the more worthwhile for being fleeting.

Conclusions

Tourism in Svalbard has grown to be a strong component of the local economy, mainly in the summer tourist season but increasingly during other parts of the year. The tourists are placing increasing pressure on the fragile natural and cultural heritage that they come to see (see also UNESCO, 2009; Guðmundsdóttir and Sæþórsdóttir, 2009) on top of ongoing climate change that is changing Arctic weather and also affecting natural and cultural heritage (Hovelsrud and Smit, 2010; IPCC, 2007; Johannessen et al., 2004). Yet little research to date has examined tourism businesses in the Arctic to determine their own perceptions and understanding of the challenges and opportunities brought by weather, now and in the future (e.g., Saarinen and Tervo, 2006; Stewart et al., 2005; Tervo, 2008).

This article contributes to filling in this gap through the case study of Svalbard, Norway by exploring SME employees', mainly owners'/operators', perceptions of weather's impacts on the tourism and hospitality industry. As per the article's objective, understanding has been gleaned regarding the views of SMEs in Svalbard's tourism and hospitality industry on how

weather influences tourism business choices. That covers contemporary variability, daily and inter-annually, in addition to trends expected due to climate change. This work does not cover non-SMEs of which cruise ship tourism is particularly important for Svalbard, keeping in mind that there are about twice as many cruise ship tourists on Svalbard as other visitors.

For SMEs, weather turns out to be relatively unimportant because they accept that weather brings opportunities as well as challenges that must be dealt with. This attitude is pragmatic, but is also in line with general SME approaches in terms of not planning strategically at any time scale (Getz et al., 2004; Beck and Demirguc-Kunt, 2006; Getz and Carlsen, 2005; Ingirige et al., 2008; Smeral, 1998). Within the context of day-to-day operations, weather cannot be controlled, so the SMEs deal with it as it comes.

Similarly, even though many operators had cancelled activities due to inclement weather, weather overall was not seen as affecting the activities that SME operators offered or should offer. Alternative activities were usually available and, if not, then that is just part of life in the Arctic. Again, the day-to-day approach to weather is that it is not a major consideration. Nevertheless, over the long-term, as weather patterns become different due to climate change, adjustments to tourism businesses might be needed (Hovelsrud and Smit, 2010; Hall and Saarinen, 2010; IPCC, 2007); but the interviewees saw little reason to think about that now, even amongst the interviewees who identified long-term changes to the weather.

Part of the ostensible apathy manifests from the businesses' experiences with tourists. The SME operators perceive that tourists often want to experience the Arctic through weather, a viewpoint corroborated by some empirical evidence (Denstadli et al., 2011; Kaltenborn and Emmelin, 1993) although studies on this topic are limited for the Arctic. But because tourists cannot go anywhere else if the weather on Svalbard is perceived to be bad, the operators do not expect loss of income due to differing weather patterns. This work adds a new dimension to findings from other locations (e.g., Gongmei et al., 2009; Nyaupane and Chhetri, 2009; Perch-Nielsen et al., 2010; Riedel et al., 1999; Shih et al., 2009) in how tourists' choices are expected to be influenced (or not) by weather.

In focusing on tourism and hospitality SMEs, this article has given one part of the picture. Further research is needed regarding the non-SMEs on Svalbard, especially the cruise ship industry's perspectives. Further work should also cover the tourists' viewpoints regarding their perception of weather in Svalbard and how that affects their experiences, their desire to return, and their word-of-mouth reports influencing others' choices (see also de Freitas, 2003; Denstadli et al., 2011; Rauken et al., 2010; Smith,

1993; Viken, 1995). That could be connected to deeper investigations into tourists' perceptions of how weather and climate, and advertised weather and climate, influence destination identity. Such data could then be coupled with downscaled projections for changes to land and sea weather-related conditions in the future, helping tourism and hospitality SMEs to enact future planning for their activities.

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References

- ACIA. 2005. *Arctic Climate Impacts Assessment*. Cambridge University Press, Cambridge, UK.
- AHDR. 2004. *Arctic Human Development Report*. Stefansson Arctic Institute, Akureyri, Iceland.
- AMAP. 2011. *Snow, Water, Ice and Permafrost in the Arctic*. AMAP (Arctic Monitoring and Assessment Programme) Secretariat, Oslo, Norway.
- Baldacchino, G. 2006. Warm Versus Cold Water Island Tourism: A Review of Policy Implications. *Island Studies Journal*, 1(2): 183–200.
- Beck, T. and Demirguc-Kunt, A. 2006. Small and Medium-size Enterprises: Access to Finance as a Growth Constraint. *Journal of Banking and Finance*, 30(11): 2931–2943.
- Bigano, A., Gorla, A., Hamilton, J., and Tol, R.S.J. 2005. *The Effect of Climate Change and Extreme Weather Events on Tourism*. Working Paper 30. Milan: Fondazione Eni Enrico Mattei.

- Bjørnsen, H.-M. and Johansen, S. 2008. *Samfunns-og Næringsanalyse for Svalbard 2008*. NIBR-rapport 2008:21. NIBR (Norsk Institutt for By- og Regionforskning), Oslo, Norway.
- Bogstad, B., Gjørseter, H., Ingvaldsen, R., and Stiansen, J. 2008. *Barents Sea Ecosystem Marine Resources and Environment*. Institute of Marine Research, Bergen, Norway.
- Catford, K. 2002. The Industrial Archaeology of Spitsbergen. *Industrial Archaeology Review*, 24(1): 23–36.
- Cioccioa, L. and Michael, E.J. 2007. Hazard or Disaster: Tourism Management for the Inevitable in Northeast Victoria. *Tourism Management*, 28(1): 1–11.
- Cohen, S.A. and Higham, J.E.S. 2011. Eyes Wide Shut? UK Consumer Perceptions on Aviation Climate Impacts and Travel Decisions to New Zealand. *Current Issues in Tourism*, 14(4): 323–335.
- Colman, J., Jacobson, B., and Reimers, E. 2001. Summer Response Distances of Svalbard Reindeer *Rangifer tarandus platyrhynchus* to Provocation by Humans on Foot. *Wildlife Biology*, 7(4): 275–283.
- Dana, L.P. 1995. Entrepreneurship in a Remote Sub-Arctic Community. *Entrepreneurship: Theory and Practice*, 20(1): 57–72.
- Dana, L.P. 2010. Nunavik, Arctic Quebec: Where Co-operatives Supplement Entrepreneurship. *Global Business Economics Review*, 12(1/2): 42–71.
- Dana, L.P. and Riseth, J.A. 2011. Reindeer Herders in Finland: Pulled to Community-based Entrepreneurship and Pushed to Individualistic Firms. *The Polar Journal*, 1(1): 99–114.
- Dawson, J., Maher, P.T., and Slocombe, S.D. 2007. Climate Change, Marine Tourism, and Sustainability in the Canadian Arctic: Contributions from Systems and Complexity Approaches. *Tourism in Marine Environments*, 4(2-3): 69–83.
- de Freitas, C.R. 2003. Tourism Climatology: Evaluating Environmental Information for Decision Making and Business Planning in the Recreation and Tourism Sector. *International Journal of Biometeorology*, 48: 45–54.
- Denstadli, J.M., Jacobsen, J.K.S., and Lohmann, M. 2011. Tourist Perceptions of Summer Weather in Scandinavia. *Annals of Tourism Research*, 38(3): 920–940.
- Dredge, D. 2003. Destination Place Identity and Regional Tourism Policy. *Tourism Geographies*, 5(4): 383–407.
- Evenset, A. and Christensen, G.N. 2011. *Environmental Impacts of Expedition Cruise Traffic Around Svalbard*. Akvaplan-niva AS Report: 4823-1 for the Association of Arctic Expedition Cruise Operators, Longyearbyen, Svalbard, Norway.
- Førland, E.J. and Hanssen-Bauer, I. 2003. Past and Future Climate Variations in the Norwegian Arctic: Overview and Novel Analyses. *Polar Research*, 22(2): 113–124.
- Freitas, C., Kovacs, K.M., Ims, R.A., and Lydersen, C. 2008. Predicting Habitat Use by Ringed Seals (*Phoca hispida*) in a Warming Arctic. *Ecological Modelling*, 217(1-2): 19–32.

- Gearheard, S., Pocernich, M., Stewart, R., Sanguya, J., and Huntington, H.P. 2009. Linking Inuit Knowledge and Meteorological Station Observations to Understand Changing Wind Patterns at Clyde River, Nunavut. *Climatic Change*, 100(2): 267–294.
- Getz, D. and Carlsen, J. 2005. Family Business in Tourism: State of the Art. *Annals of Tourism Research*, 32(1): 237–258.
- Getz, D., Carlsen, J., and Morrison, A. 2004. *The Family Business in Tourism and Hospitality*. CABI, Wallingford, UK.
- Gongmei, Y., Schwartz, Z., and Walsh, J. 2009. A Weather-resolving Index for Assessing the Impact of Climate Change on Tourism Related Climate Resources. *Climatic Change*, 95(3/4): 551–573.
- Governor of Svalbard. 2006. *Tourist Statistics for Svalbard*. Longyearbyen: Governor of Svalbard.
- Guðmundsdóttir, A.M. and Sæþórsdóttir, A.D. 2009. Tourism Management in Wilderness Areas – Svalbard. In Hannibalsson, I. (ed.) *Research in Social Science X. Reykjavík*. University of Iceland Press, Reykjavík, Iceland: 41–53.
- Gyimóthy, S. and Mykletun, R. 2004. Play in Adventure Tourist: The Case of Arctic Trekking. *Annals of Tourism Research*, 31(4): 855–878.
- Hall, C.M., Müller, D.K., and Saarinen, J. 2009. *Nordic Tourism: Issues and Cases*. Bristol: Channel View.
- Hall, C.M. and Saarinen, J. 2010. Last Chance to See? Future Issues for Polar Tourism and Change. In Hall, C. M. and Saarinen, J. (eds.) *Tourism and Change in Polar Regions: Climate, Environments and Regions*. Routledge, London: 301–310.
- Haugen, A. and Mattsson, J. 2011. Preparing for Climate Change's Influence on Cultural Heritage. *International Journal of Climate Change Strategies and Management*, 3(4): 386–401.
- Hovelsrud, G.K. and Smit, B. (eds.) 2010. *Community Adaptation and Vulnerability in Arctic Regions*. Netherlands: Springer.
- Hübner, A. 2009. Tourist Images of Greenland and the Arctic: A Perception Analysis. *Polar Record*, 45(233): 153–166.
- Ingirige, B., Jones, K., and Proverbs, D. 2008. *Investigating SME Resilience and Their Adaptive Capacities to Extreme Weather Events: A Literature Review and Synthesis*. CIB W89, Building Education and Research (BEAR), Sri Lanka, February 2008.
- IPCC. 2007. *IPCC Fourth Assessment Report*. IPCC (Intergovernmental Panel on Climate Change), Geneva.
- Johannessen, O.M., Bengtsson, L., Miles, M.W., Kuzmina, S.I., Semenov, V.A., Alekseev, G.V., Nagurnyi, A.P., Zakharov, A.F., Bobylev, L.P., Pettersson, L.H., Hasselmann, K., and Cattle, H.P. 2004. Arctic Climate Change: Observed and Modelled Temperature and Sea-Ice Variability. *Tellus A*, 56(4): 328–341.
- Johnston, M.E. 1995. Patterns and Issues in Arctic and Sub-Arctic Tourism. In Hall, C.M. and Johnston, M.E. (eds.) *Polar Tourism: Tourism in the Arctic and Antarctic regions*. John Wiley and Sons, Chichester, England: 27–42.

- Kaltenborn, B. 1998. Effects of Sense of Place on Responses to Environmental Impacts: A Study Among Residents in Svalbard in Norwegian High Arctic. *Applied Geography*, 18(2): 169–189.
- Kaltenborn, B. 2000. Arctic-Alpine Environments and Tourism: Can Sustainability be Planned? Lessons Learned on Svalbard. *Mountain Research and Development*, 20(1): 28–31.
- Kaltenborn, B. and Emmelin, L. 1993. Tourism in the High North: Management Challenges and Recreation Opportunity Spectrum Planning in Svalbard, Norway. *Environmental Management*, 17(1): 41–50.
- Kelman, I. and Lewis, J. 2005. Ecology and Vulnerability: Islands and Sustainable Risk Management. *International Journal of Island Affairs*, 14(2): 4–12.
- Limb, M. and Spellman, G. 2001. Evaluating Domestic Tourists' Attitudes to British Weather: A Qualitative Approach. In Matzarakis, A. and de Freitas, C.R. (eds.) Proceedings of the 1st International Workshop on Climate, Tourism and Recreation. *International Society of Biometeorology, Commission on Climate Tourism and Recreation*: 21–28.
- Lohmann, M. 2001. Coastal Resorts and Climate Change. In Lockwood, A., and Medlik, S. (eds.) *Tourism and Hospitality in the 21st Century*. Butterworth-Heinemann, Oxford, UK: 284–295.
- Lohmann, M. and Kaim, E. 1999. Weather and Holiday Destination Preferences - Image, Attitude and Experience. *Tourism Review*, 54(2): 54–64.
- Longyearbyen lokalstyre. 2004. *Retningslinjer for Bruk av Longyearbyen Lokalstyres Disposisjonsfond Merket Næringsfond*. Longyearbyen Lokalstyres. Longyearbyen, Svalbard, Norway.
- Lydersen, C. and Smith, T.G. 1989. Avian Predation on Ringed Seal *Phoca hispida* Pups. *Polar Biology*, 9(8): 489–490.
- Maher, P.T., Stewart, E.J. and Lück, M. (eds.) 2011. *Polar Tourism: Human, Environmental and Governance Dimensions*. Cognizant Communication Corporation, Elmsford, New York, U.S.A.
- Martín, M.B.G. 2004. Weather, Climate and Tourism: A Geographical Perspective. *Annals of Tourism Research*, 32(3): 571–591.
- Mason, P. 1996. Developing Guidelines for Arctic Tourism. *Tourism Management*, 17(6): 464–465.
- Mason, P. 1997. Tourism Codes of Conduct in the Arctic and Sub-Arctic Region. *Journal of Sustainable Tourism*, 5(2): 151–165.
- Mason, A.M., Dana, L.P. and Anderson, R. 2007. The Inuit Commercial Caribou Harvest and Related Agri-Food Industries in Nunavut. *International Journal of Entrepreneurship and Small Business*, 4(6): 785–806.
- Moreno, A. 2007. The Role of Weather in Beach Recreation – A Case Study Using Webcam Images. In Matzarakis, A., de Freitas, C.R., and Scott, D. (eds.) *Developments in Tourism Climatology*. Commission on Climate, Tourism and Recreation – International Society of Biometeorology, Freiburg, Germany: 80–86.

- Morrison, A. 1998. Small Firm Co-operative Marketing in a Peripheral Tourism Region. *International Journal of Contemporary Hospitality Management*, 10(5): 191–197.
- Nordli, Ø. 2005. Long-term Temperature Trends and Variability at Svalbard (1911–2004). *Geophysical Research Abstracts*, Vol. 7, Abstract #06939.
- Nyaupane, G. and Chhetri, N. 2009. Vulnerability to Climate Change of Nature-Based Tourism in the Nepalese Himalayas. *Tourism Geographies*, 11(1): 95–119.
- Pagnan, J.L. 2003. *The Impact of Climate Change on Arctic Tourism – A Preliminary Review*. For the World Tourism Organisation, presented in Djerba, Tunisia.
- Perch-Nielsen, S., Amelung, B. and Knutti, R. 2010. Future Climate Resources for Tourism in Europe Based on the Daily Tourism Climatic Index. *Climatic Change*, 103(3/4): 363–381.
- Perry, A. 1993. Weather and Climate Information for the Package Holiday Maker. *Weather*, 48(12): 410–414.
- Prattis, J.I. 1974. Developmental Constraints in a Case of Eskimo Entrepreneurship in Arctic Quebec. *Arctic Anthropology*, 11(1): 61–67.
- Rauken, T., Kelman, I., Jacobsen, J.K.S., and Hovelsrud, G.K. 2010. Who Can Stop the Rain? Perceptions of Summer Weather Effects Among Small Tourism Businesses. *Anatolia*, 21(2): 289–304.
- Riedel, A., Maksimovic, O., Merkovic, A., Lohmann, M., Braun, O., Messerschmidt, E., Meyer, M., and Turner, M. 1999. Potential Impact of Climate Change Effects on Preferences for Tourism Destinations: A Psychological Pilot Study. *Climate Research*, 11(3): 247–254.
- Rosing-Asvid, A. 2006. The Influence of Climate Variability on Polar Bear (*Ursus maritimus*) and Ringed Seal (*Pusa hispida*) Population Dynamics. *Canadian Journal of Zoology*, 84(3): 357–364.
- Saarinen, J. and Tervo, K. 2006. Perceptions and Adaptation Strategies of the Tourism Industry to Climate Change: The Case of Finnish Nature-Based Tourism Entrepreneurs. *International Journal of Innovation and Sustainable Development*, 1(3): 214–228.
- Shih, C., Nicholls, S. and Holecek, D. 2009. Impact of Weather on Downhill Ski Lift Ticket Sales. *Journal of Travel Research*, 47(3): 359–372.
- Smeral, E. 1998. The Impact of Globalization on Small and Medium Enterprises: New Challenges for Tourism Policies in European Countries. *Tourism Management*, 19(4): 371–380.
- Smith, K. 1993. The Influence of Weather and Climate on Recreation and Tourism. *Weather*, 48: 398–404.
- Stewart, E.J., Draper, D., and Johnston, M.E. 2005. A Review of Tourism Research in the Polar Regions. *Arctic*, 58(4): 383–394.
- Stewart, E.J., Howell, S.E.L., Draper, D., Yackel, J., and Tivy, A. 2007. Sea Ice in Canada's Arctic: Implications for Cruise Tourism. *Arctic*, 60(4): 370–380.

- Svalbard Treaty. 1920. *Treaty between Norway, The United States of America, Denmark, France, Italy, Japan, the Netherlands, Great Britain and Ireland and the British overseas Dominions and Sweden Concerning Spitsbergen Signed in Paris 9th February 1920.*
- Tervo, K. 2008. The Operational and Regional Vulnerability of Winter Tourism to Climate Variability and Change: The Case of Finnish Nature-Based Tourism Entrepreneurs. *Scandinavian Journal of Hospitality and Tourism*, 8(4): 317–332.
- Thomas, R., Shaw, G., and Page, S.J. 2011. Understanding Small Firms in Tourism: A Perspective on Research Trends and Challenges. *Tourism Management*, 32(5): 963–976.
- UNESCO (ed.). 2009. *Climate Change and Arctic Sustainable Development*. UNESCO (United Nations Educational, Scientific and Cultural Organization), Paris, France.
- Uyarra, M.C., Côté, I.M., Gill, J.A., Tinch, R.R.T., Viner, D., and Watkinson, A.R. 2005. Island-Specific Preferences of Tourists for Environmental Features: Implications of Climate Change for Tourism-Dependent States. *Environmental Conservation*, 32(1): 11–19.
- Viken, A. 1995. Tourism Experiences in the Arctic: The Svalbard Case. In Hall, C.M. and Johnston, M.E. (eds.) *Polar Tourism: Tourism in the Arctic and Antarctic Regions*. John Wiley and Sons, Chichester, UK: 73–84.
- Viken, A. 2006. Svalbard, Norway. In G. Baldacchino (ed.), *Extreme Tourism: Lessons from the World's Cold Water Islands*. Elsevier, Oxford, UK: 129–144.
- Viken, A. 2011. Tourism, Research, and Governance on Svalbard: A Symbiotic Relationship. *Polar Record*, 47(4): 335–347.
- Viken, A. and Jørgensen, F. 1998. Tourism on Svalbard. *Polar Record*, 34: 123–128.
- Wråkberg, U. 2006. Nature Conservationism and the Arctic Commons of Spitsbergen, 1900–1920. *Acta Borealia*, 23(1): 1–23.