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CHAPTER 5

Glacial Narratives: How Can They Be Captured?

Katrín Anna Lund

Institute of Life and Environmental Sciences, University of Iceland, Iceland

Ludovic Moncla

Univ Lyon, INSA Lyon, CNRS, UCBL, LIRIS, UMR5205, F-69622, France

Gabriel Viehhauser

Department of Digital Humanities, University of Stuttgart, Germany

On 18th of August 2019, a funeral ceremony was held in the Highlands of Iceland at which the glacier Ok was commemorated, as the first in Iceland to disappear. The ceremony was initiated by two anthropologists from Rice University, Texas, Cymene Howe and Dominic Boyer, both of whom have researched climate change in the Anthropocene. Joining them were about 100 people who followed in a procession to the glacier's former location, including the prime minister of Iceland, Katrín Jakobsdóttir, the former UN human rights commissioner and the president of Ireland, Mary Robinson, glaciologist, Oddur Sigurðsson and writer and environmental activist, Andri Snær Magnason, who authored the text 'A letter to the future' written on the memorial plaque:

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Ok is the first Icelandic glacier to lose its status as a glacier. In the next 200 years all our glaciers are expected to follow the same path. This moment is to acknowledge that we know what is happening and needs to be done. Only you know we did.

Ok has officially been declared extinct but the narratives continue so that we will remember and learn from it and be reminded about the consequences of global warming.

Going back to my time in geography classes at primary school, learning about Icelandic nature, I remember Ok being mentioned as the smallest glacier in Iceland that would probably disappear soon; no emotions attached. This was a fact of life, Ok was a small glacier that would not survive warmer conditions; no risk attached. The funeral reflects how the discourse regarding global warming and glacier melting has changed, with a variety of emotions attached to a future at risk, confirmed by melting glaciers.

At school in Iceland, 40 years ago we learned about the main features of nature: glaciers, mountains, rivers, waterfalls and fjords. We learned their names, how to locate them and their utilitarian and aesthetic values. But we did not learn to listen to the stories that nature tells. Rather, we learned to perceive landscape from a visual perspective, locating features as points on a two-dimensional map. Today, people want to engage more closely with nature, it still has its forms, features, names and locations, but, in addition, it has been given a voice. Still, it is a rather passive voice, because it is humans who select the narratives they want to hear by reading into signs stemming from nature. In those narratives glaciers are interesting, they have become, as pointed out by environmental historian, Mark Carey (2007), an 'endangered species'. They are a symbol for climate change. Glaciers are retreating, a warning sign hinting at what may happen if we, the humans, at least in the Western world, continue to treat nature as we have done until now. As storytellers for scientific knowledge, glaciers accumulate a history of changing climate and natural conditions, hence, their important role as natural laboratories. Simultaneously though, they contain narratives of encounters with their human neighbors and how their movements and narratives have been interpreted in different contexts, hence they too have a social and cultural history.

The aim of this chapter is to examine the variety of narratives glaciers have told at different times and are still telling. It can be argued that simultaneously they contain narratives that can be a subject of scientific investigations, and for others who want to listen, and interpret their sayings, they also create their own narratives, not the least in terms of how they can be unpredictable as mobile beings. As such they are creatures of their own nature. So how are their narratives to be captured?

5.1 Living Creatures

In the Western world we often tend to think about our surroundings in terms of dichotomies, cultural on the one hand and natural on the other (Descola and Pálsson, 1996). Nature has become an object out there, to be conquered, researched and adored, but also controlled and activated for human needs. As Pálsson (1996) has argued, Westerners channel their relations with nature predominantly through two pathways of thinking, on the one hand, as exotic and distant, and on the other, through dominating it and situating human beings above. These relational patterns continue in today's environmental discourse. Nature is seen as passive but needing protection and, in that context, it has been provided with life and given a voice, nevertheless as a sensitive being. Thus, today's environmentalists' narratives have provided nature with a voice that calls for help. Nature has reached a point of being at risk. This is why news about the funeral of an extinct glacier in Iceland, that 40 years ago was only regarded as rather insignificant in comparison to other bigger glaciers, is international news. In short, glaciers have become an important symbol of climate change and as a result they attract attention.

Tourists flock to get in touch with glaciers before it is too late. In contemporary society, glaciers have become a valuable product for consumption (Lemelin et al., 2010; Furunes and Mykletun, 2012). As Furunes and Mykletun pointed out, glacial landscapes are viewed as distant and dramatic. They carry the aura of the sublime, that has been

used to denote vast wilderness with a paradoxical capacity to frighten, but also attract human interest, with thrills and excitement (2013: 327–8).

It appears 19th-century Romanticism is repeating itself but in a different social and political context; the context of a consumer society. Glacier science took off in the 19th century, turning glaciers into natural laboratories. Simultaneously the Romantic era labelled glaciers as 'sublime landscapes and symbols of wilderness' (Brugger et al., 2013, p. 5) and created landscapes of attraction, distant and dramatic enticing 'mountaineers, tourists, and artists seeking awe-inspiring or physically challenging experience' (Ibid.). Science and romanticism created glacier narratives combining feelings for emotions and risk. However, as Douglas and Wildavsky (1983) point out, risk is always selectively defined, depending on geopolitical and social contexts. In the 19th century, scientists dealt with different types of risks from those foreseen by contemporary science. They were working at the end of the era called the Little Ice Age that had been ongoing since the 14th century and glaciers had been advancing. Glaciers were

threatening, causing floods, destroying livelihoods and the wilderness they represented was 'remote, desolate, and scary' (Carey, 2007, p. 502).

This was not in the least the situation in the European Alps where, despite their sense of remoteness, people lived in the vicinity of glaciers, although the 'glaciers were mostly in areas where few people ventured' (Wiegandt and Lugon, 2008, p. 34). Glaciers provided water for fertilising land in otherwise harsh mountain surroundings and those who inhabited these surroundings accepted the risk. However, the image provided of glacier environments as remote and perilous also added to their aura as sublime beings, unpredictable and not to be disciplined, thus, the combination of immense beauty evoked through their capacity to frighten.

Whilst people living in European Alpine areas had to deal with increased, unexpected and sometimes disastrous flooding during the era of Little Ice Age co-habitation with glaciers, in Iceland it also became more difficult as they expanded towards the inhabited coastal lowlands. During the first ages of settlement, from around 900, glaciers did not influence the daily life of the inhabitants as they were located in the uninhabited highlands and the glacial rivers streaming over to the coastal areas did not influence movements of people mostly travelling by sea (Björnsson, 2016). However, although at a distance, they evoked mysterious stories about hidden and fertile valleys inhabited by outlaws (Ibid.). In fact, all kinds of myths were associated with glaciers. The most famous one in Iceland is probably the one about Bárður, who was the first settler in Snæfellsnes peninsula on the west coast. The 13th-century story recites how Bárður, half human and half giant, walked and disappeared into the Snæfells glacier at a time he experienced irredeemable grief, never to return. He was for centuries, and still is by some, regarded to be the protector of life in the area. Thus, before glaciers started advancing in Iceland, during Little Ice Age, the risk associated with glaciers was more connected to the mysteries they entailed providing them with the sense for sublimity. However, as glaciers advanced co-habitation became more problematic, and the fact that glacially covered terrain was also volcanic was an additional threat. The interplay of fire and ice evoked narratives of the proximity of hell to earth (Jóhannesdóttir, 2015) that enticed the 'imagination to imagine the enormous powers of the earth that creates this landscape' (Ibid., 61), not the least in the mind of those who traveled from a distance. Glacial activities in the Alpine regions also formed a 'rich body of legends and stories' (Wiegandt and Lugon, 2008) in which disasters were blamed on collective sins.

From the account above it becomes evident how important the context of the encounters between humans and glaciers is in terms of what narratives are and how we, as inhabitants of earth, locate ourselves in relation to glaciers physically and mentally. The question is how we live with them and what do they feature? Before the Little Ice Age in Iceland, glaciers shaped a body of legends related to other worldly creatures, outlaws, humans and giants. On the

other hand, when they started advancing and became a threat, the legends hinted at more evil forces at work, invisible, stemming from below the earth or even a moral revenge from forces above. At this time, modern science had not entered the stage and the cosmos was differently ordered. Living with, what today is regarded to be otherworldly, was a part of the everyday (Lund, 2015; Lund and Jóhannesson, 2016), nature and culture had not been separated into two domains as they are now typically perceived in contemporary Western Society. Glaciers were alive and moving and their activities were felt directly. Risk was constantly near. Science, on the other hand made an attempt to control the movements, by finding ways to predict them. Still, glaciers are not to be disciplined, the risk is still inherent.

It is interesting in this context to consider the materiality of glaciers especially given the conventional Western notion of thinking about culture as something separated from nature. This type of dualistic thinking permeates much of our contemporary world view – the Enlightenment taught us how to look at the world as a mosaic, combined by separate units that add up to a whole and that is how we tend to think about landscape, as a surface on which we live, furnished with features and forms (Ingold, 2011). And as Ingold has argued, that is how we conventionally think about landscape, as a surface, of which other less solid things are not a part, such as the sky, weather and the air we breathe. In this context, it can be argued that glaciers are difficult to single out; they are an in-between phenomenon, not solid earth, but at the same time tangible in their materiality as frozen water, but extremely mobile and thus hard to predict. Hence, despite attempts to gain control by predicting glacier behaviour, the sense of risk persists. However, it manifests in a new contextual framework, now one of science and simultaneously awe.

In his writings, Carey (2007) reflects on how the Little Ice Age created a fear that advancing glaciers, especially polar glaciers, could result in ice covering the majority of the earth. Thus, the short period of glaciers advancing

...fueled apocalyptic visions of colossal ice sheets descending from the earth's poles to join with mountain glaciers and erase civilisation (Carey, 2007, p. 502).

While scientists worried about the future of humanity in an icy world there were others that attempted to conquer these awesome creatures through different activities. Artists and poets admired them from afar, affected by their sublime characteristics which were expressed through work of arts. At the same time, there were those who went further as they were urged 'to prove their masculinity or femininity, to explore new heights, or challenge their mettle against capricious glaciers' (Carey, 2007, p. 504). Glaciers became fields for recreation. They continue to enthuse scientific, artistic and recreational activities, and do so in the contemporary Western world more than ever before. However, glaciers

have ceased to advance and are instead rapidly declining, which has changed how humans live with them. Today they not only put humans and their livelihood at risk, they are at risk themselves as a result of irresponsible behaviour by their human neighbours. Glaciers still represent wilderness and are experienced as distant but simultaneously advanced technology, transport and information, has moved them closer to the everyday life of humans. Increased awareness of climate change and environments at risk, not least through environmental discourses, has made people sense strongly that they live with nature and have responsibilities, although they may not be personally affected (Isenhour, 2010; Brugger et al., 2013).

As a result, people have become more aware of the possibility of vanishing environments, many of whom want to go and experience these evanescent landscapes in person as wildernesses becomes more accessible. Last chance tourism is a new trend in travel encouraging people to travel long distances to witness landscapes in transformation, amongst them glacial landscapes (Lemelin et al., 2010; Furunes and Mykletun, 2012). To approach endangered glacial landscapes is especially popular in the far north and south whilst there is a slightly different story to be told in the European Alpine region. As in Iceland and other northern regions, glaciers have gained importance as recreational places to which tourists are guided, often by local people. So as a source for livelihood they have been gaining a new role in regions where tourism, as an economic activity, has been expanding over recent decades. However, as glaciers melt in Alpine regions ski areas may lose value due to a lack of snow and ice and vanishing glaciers will leave naked mountain landscapes lacking aesthetic appeal (Brugger et al., 2013).

In closing, glaciers not only store valuable information about changing climate and natural conditions. As living creatures that have co-habitated the environment with people for centuries, they also—as pointed out by Brugger, et al. (2013) – store memories. They are cultural and social, as much as natural beings, telling stories about how nature and culture are a patchwork of human and non-human co-habitation, and about how the dynamic of constantly changing relations between different earthly beings shape our cultural/natural environment.

5.2 Experiments

5.2.1 *Corpus*

In the following, we want to explore how digital methods can help detect narratives told about glaciers in different times and places. We will apply those methods to a macroanalysis (aka distant reading) (Moretti, 2000), tracing stories related to glaciers in text corpora too large for a single researcher to read. Using this approach we aim to observe patterns, shifts or differences in the discourse about glaciers on a large scale. However, since digital distant reading approaches always focus on the ‘big picture’, these methods can only trace

out a broad-brush picture and have to be supplemented with a qualitative close reading.

One of the biggest problems of distant reading analysis is the availability of corpora. Our exploration of glacier narratives is constrained by the breadth of sources available in different languages and spanning different time periods, and as such provides a much shallower account than that outlined in the previous section. Nonetheless, we apply an exploratory approach based on three different, and contrasting, corpora:

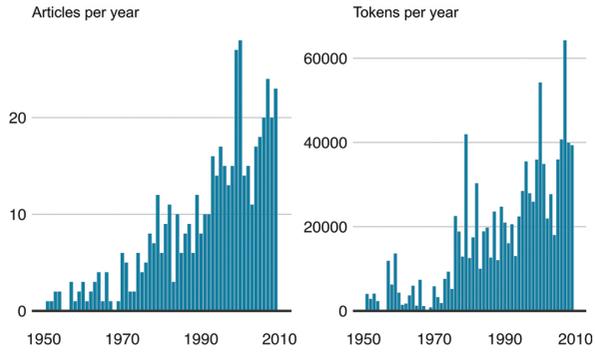
1. a corpus of articles from the influential German news magazine *Der Spiegel*;
2. a corpus of debates from the UK parliament, accessed through the website <http://www.theyworkforyou.com>; and
3. the ‘Text+Berg’ corpus that features the yearbooks of the ‘Schweizer Alpenclub’, in German and French (Volk et al., 2010).

These three corpora, we surmised, could potentially contain differing narratives. Glaciers form some of the core landforms likely to be described in ‘Text+Berg’, and are central to the narrative of mountaineering irrespective of time. In *Der Spiegel* and the parliamentary corpora, however, we expected to see more changes over time, as modern concern and evidence of climate change increases.

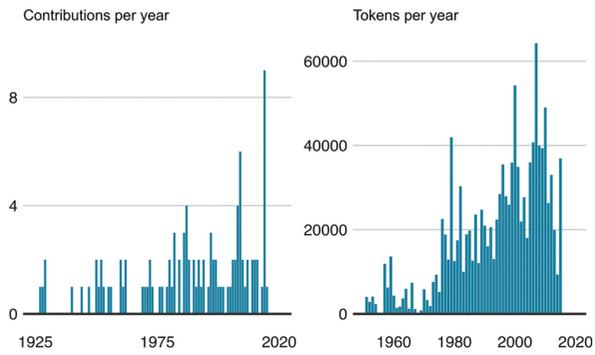
For our experiments, we extracted all articles and contributions to British parliamentary debates containing the term ‘glacier’ (in English) or ‘Gletscher’ (in German), including alternate forms, such as plurals. After pre-processing, the Spiegel corpus contained 600 articles with a total of 1,187,502 tokens, ranging from the year 1950 to 2015. The distribution of the articles with respect to the tokens per year is shown in Figure 5.1a. The number of articles per year steadily increases until the year 2000, at which it reaches a peak with 28 articles featuring the word ‘Gletscher’ or an alternate form.

The corpus based on UK Parliamentary debates features 105 contributions and a total of 122,489 tokens. It offers the widest temporal range of all three corpora, spanning the years 1919 to 2020. However, mentions of the word ‘glacier’ are less common than in the other corpora. The maximum numbers of contributions per year is nine in 2019 (Figure 5.1b).

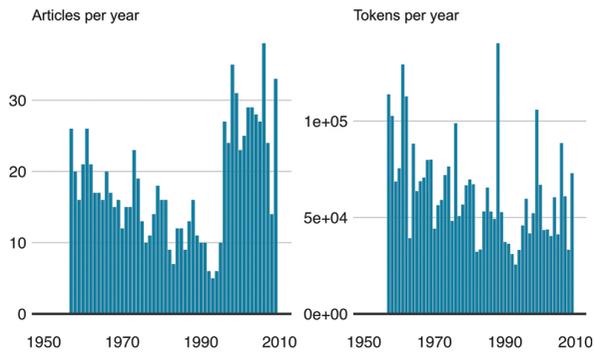
Finally, from the Text+Berg-Corpus, we used the German versions of the yearbook “Die Alpen”, beginning in 1957. This is the first year, in which the yearbook was published in two parallel versions, one in German, the other French. The last issue in the corpus we analysed dates from 2009. In total, 953 articles with 3,360,540 tokens are taken into account. Figure 5.1c shows the distribution of articles that feature forms of the word ‘Gletscher’ and the distribution of the tokens of these articles. There is a noticeable peak in the number of articles beginning with the year 1996, which however is not reflected in the



(a) Spiegel corpus



(b) Debates corpus



(c) Text+Berg corpus

Figure 5.1: Articles and tokens per year in the three corpora.

number of tokens. Overall, the articles that deal with glaciers seem to be more equally distributed than in the other two corpora, probably reflecting the specific focus of the journal on mountaineering-related issues.

5.2.2 *Word frequencies*

For a first look at the content of the corpora, we visualise the most frequent words appearing in the articles using word clouds. Figure 5.2 shows the most common words in each corpora (after removal of stop words). The corpora show quite significant differences, which can be related to the different genres of the three sources. For example, the Text+Berg corpus (Figure 5.2c) focuses on the mountain-related aspects of glaciers (as can be seen in words like ‘gipfel’- ‘peak’, ‘alpen’ - ‘alps’, and ‘schnee’ - ‘snow’ or ‘hütte’ - ‘hut’). It is the only corpus in which the target word (‘gletscher’ resp. ‘glacier’) is also the most frequent word in articles containing it. Thus, it seems likely that the articles of the ‘Alpen’-yearbook that feature glaciers treat them as a major theme, whereas they are more often only a side aspect in the texts of the other two corpora. Measurements (like ‘meter’, ‘jahr’ - ‘year’, ‘uhr’ - ‘clock’, ‘zeit’ - ‘time’) also appear in the Text+Berg corpus, but they are less central than in the Spiegel corpus (Figure 5.2a), where ‘jahre’ (‘years’) and especially ‘jahren’ (‘years’ in oblique case) are – a bit surprisingly – the most frequent words in the whole corpus. This points to a discourse about change, and presumably retreat or disappearance, in the Spiegel corpus, reflecting some of our introductory remarks. Besides measurements, it seems that the Spiegel corpus is also concerned with people and especially Germany in relation to Gletscher (‘menschen’ – ‘human beings’, ‘deutschen’ – ‘German’). As can be expected by its genre, the debates corpus (Figure 5.2b) is dominated by government-related words. Remarkably, it is the only corpus that features ‘climate’ and ‘change’ as highly frequent words.

5.2.3 *Diachronic keyness*

A more differentiated picture can be achieved by reflecting on the diachronic change of important words in the corpus. For the experiments in this subsection we first extracted a window of five words before and after the word ‘gletscher’ resp. ‘glacier’, to get a better picture of the collocations of our target word in the texts. In a second step we divided the corpora into two parts, one with texts that appear before January 2000 and one with texts appearing in or after 2000. We then calculated the keyness of the words in the younger sub-corpus compared to the older texts using the help of the Chi square measurement (Dunning, 1993) (Figure 5.3).

Interestingly, in both the Spiegel and the debates corpus, the synonymous words ‘schmelzend’ resp. ‘melting’ are the most distinctive between the younger

and the older texts. Words that describe the vanishing or retreating of glaciers are also amongst the other distinct words in both corpora (in the Spiegel corpus: 'schmelzen' – 'melt', 'verschwunden' – 'vanished', 'schrumpfen' – 'shrink' and also 'kalbenden' – 'calving'; in the debates corpus: 'melt' and 'retreating'). Although not as obvious as in the first two corpora, a similar trend can also be observed in the Text+Berg corpus (besides 'zurückgezogen' – 'retreated' the words 'kalbend' or 'kalbende' – 'calving' are very characteristic for the texts after 2000). Thus, our distant reading approach supports the qualitative assessment that there are changes in how people speak about glaciers in different times. It appears that glaciers are perceived more and more as vanishing, melting or retreating objects in the 21st century.

This gives a glimpse of the possibilities offered by such distant reading methods, which make it possible to carry out analyses, confirm certain hypotheses and identify interesting sub-parts of the corpus that require more attention.

However, there are inevitably cases in these documents where the word glacier is used with a different meaning. This is particularly true for the oldest texts of the Debates corpus as shown in examples (1.) and (2.). Here we note that it is often the case that glaciers are used metaphorically, representing slow, inexorable movement.

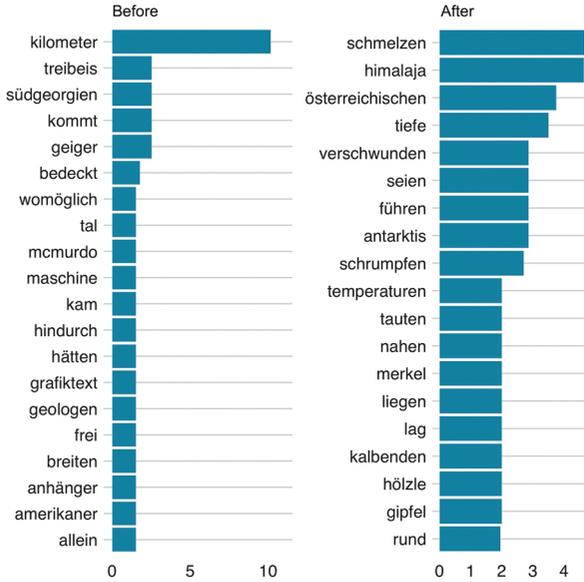
1. This is going on like a slowly moving glacier in spite of what is happening abroad and in spite of invitations to Conferences (Debates corpus, 1927).
2. ...it has the irresistible movement of a glacier and presents one of our most anxious problems (Debates corpus, 1940).

There are also more unexpected cases, such as the use of glacier as part of an organisational names (3.).

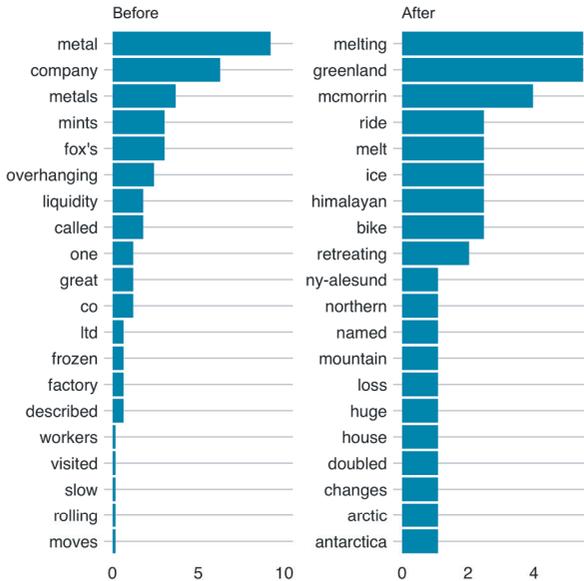
3. ...the Glacier Metal Company here in London...(Debates corpus, 1947).

Nonetheless, we also find many mentions of melting glaciers, both in older debates (e.g., 4. from 1929) and many more example from more recent years (see examples 5. to 8.).

4. I should like to take this further opportunity of expressing the deepest sympathy with the victims of the recent floods, which were due to a rain fall 10 times greater in the one month than is normal in the whole year, combined with the bursting of the Shyok Glacier in the Upper Indus Valley (Debates corpus, 1929).
5. Almost 90% of the glaciers have retreated since the 1960s when my father spent two years there with the British Antarctic Survey, but I am

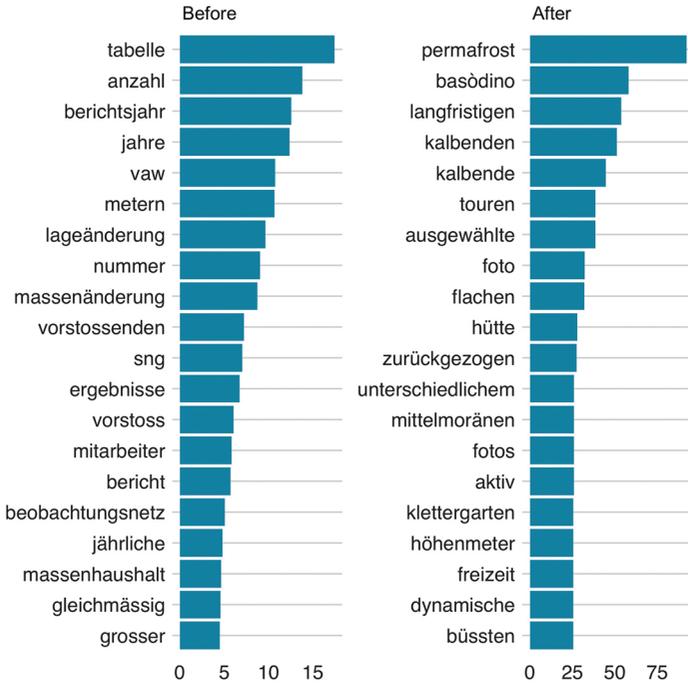


(a) Spiegel corpus



(b) Debates corpus

Figure 5.3: Most distinctive words for texts appearing before and after January 2000.



(c) Text+Berg corpus

Figure 5.3: (continued).

hopeful that the McMorrin glacier, which was named after him, will still be there when my children are older (Debates corpus, 2019).

6. Glaciers are retreating almost everywhere in the world, from the Alps to the Himalayas (Debates corpus, 2019).
7. Vast cracks have been spotted that could lead to a large part of the glacier breaking away (Debates corpus, 2020).
8. Two thirds of the world's glaciers will have melted, increasing sea levels and drying up rivers across the world (Debates corpus, 2020).

5.3 Discussion

In opening this chapter we set out to explore how glacial narratives can be captured. What became evident was how glaciers' biographical narratives are complex, depending on their changing mobility and how they express their existence regarding their environmental co-habitation. However, their narratives are also selective in terms of what we, as their neighbours, want to hear.

Sometimes we are also forced to listen to what they have to say, creating an aura of risk inherent in their narration, no matter whether they are speaking to us as natural or cultural beings. What is apparent today is that they not only threaten humans, but are also themselves an endangered species. In the era of climate change they have become a symbol for the irresponsible acts towards nature in the Western world. The magnitude of changes to glaciers forces us to listen, and has brought our everyday life into proximity with them. In that context people remind themselves about their destructive behaviour by travelling long distances to get directly in touch with glaciers or even to commemorate those that have already vanished, and by doing that continuing narratives that otherwise might be forever vanish as time passes.

To explore how the narratives that are told about glaciers can be captured, we employed digital methods in an exploratory study described in the second part of our paper. We analysed three different corpora, stemming from different regions and different genres. Our results indicated that a distant reading approach could be helpful as a means to track down traces of the multitude of voices that are hidden in large text corpora and which vary over different times and different places. However, although some of the changes in the discourse related to glaciers can be traced by computational means, we also found limitations of the methods. Firstly, larger digitised and openly accessible corpora are needed to gain a more comprehensive picture and to rule out factors such as genre-specific ways of talking about glaciers. Furthermore, our analyses only uncovered very coarse shifts in discourse, in stark contrast to the subtleties introduced in the first part of the paper. Digging deeper will require more close reading in combination with analysis of richer corpora – for example, recording oral traditions of those living in glaciated parts of the world.

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