



## CHAPTER 6

# People of the Cryosphere

## *A Cross-Regional, Cross-Disciplinary Approach to Icescapes in a Changing Climate*

*Hildegard Diemberger and Astrid Hovden*

### Living with Icescapes

The icy landscape in front of me was overwhelming in all its glittering whiteness; I was carefully putting one foot after the other with caution, as I was told. I was five, and it was my first experience on the glacier. I had seen glaciers many times before, bivouacking next to the icy waters of the lakes at their front but also casually looking at the patterned blue and white face of the Alpine giant that was a reassuring yet distant presence overlooking the place where I was born. But this time, it was different; it was the first time on the ice. The grown-ups had tied me with a reassuring rope like every other member of the team, and I was carefully walking between them. Nothing felt threatening. The murmur of the water, the beautiful icy sculptures we were walking by created an intriguing, enchanting presence. I was told not to go close to crevasses, they could be dangerous. I understood. I looked from a distance at those cracks in the ice with their infinite shades of blue. They were fascinating. At one point, I saw a smallish one. It looked harmless. It was almost a baby crevasse, I thought. It was not too far from our trail, so I ventured in its direction to look at it; I wanted to look into its depth, from a safe distance, I considered. I walked a few steps as far as the rope allowed. It was enticing. The grown-ups were clearly slightly

distracted as this was easy terrain, and I seemed to be following in their footsteps as I was told. So I walked those few steps quickly, just to give a peep into the icy depth. Suddenly, the reassuring icy terrain I was walking on cracked under my feet, and I fell, not much, into the azurine depth and landed on a small ice bridge. The rope promptly pulled me out of my predicament. Those few seconds, though, with the icy breath of the glacier rising from its depth, the murmur of the water running somewhere under my feet, and the sheer possibility of being swallowed by the gaping chasm will stay with me for the rest of my life. So will the trust and admiration for the people who pulled the rope and who knew how to read the glacier, its terrain, as well as the vagaries of the weather that could transform an enchanted landscape into a confusing and treacherous whiteness where cloud and fog merged with the icy terrain. But how did they know what they knew? And how did they anticipate the immediate and the long-term future of this landscape?

When presenting the oral version of this chapter, Hildegard Diemberger recalled her earliest experiences with ice in the Alps as these have informed her later academic interest in the Himalayas. She returned to this image again and again many years later, reading as an anthropologist about the icy breath of *sila* in Greenland so beautifully described by Kirsten Hastrup (2012: 227–30) or tinkering with the question ‘do glaciers listen?’ asked by Julie Cruickshank (2005) in her exploration of Athapaskan cosmology. She also returned to her childhood experiences with icescapes when sharing stories of icy encounters with the people of the Himalaya she lived with whilst studying their mountain landscapes. What had become a common theme by then, though, was the anxiety that disappearing icescapes were eliciting in the people who lived with them – the message that the vanishing ice, the swelling glacial lakes, the receding snowlines on mountains were conveying to people living next to them in the Alps, the Himalaya or the Arctic. The constantly changing icescapes were undergoing transformations that seemed out of kilter with past experiences of variability.<sup>1</sup> Moreover, people were trying to make sense of all this in many different ways. If walking is a mode of knowing, the intimate relationship with icescapes seemed to give access to one of the many souls of this ‘animate planet’ (Weston 2017) and its tribulations. It is this profound interest in icescapes and the people living with them that drew Hildegard and Astrid together.

Born in rural Norway, where the embodied knowledge of dealing with snow and ice is part of everyday life, Astrid developed a passion for the Himalayas. During her fieldwork in the Limi Valley

in northwestern Nepal, she had direct experience of a glacial lake outburst flood that caught the village of Halji, washing away several fields and houses and threatening to destroy the eleventh-century local Buddhist monastery. Hildegard and Astrid found themselves together asking questions about the rapid transformations of these landscapes and how changing icescapes, and the experience of people living with them in different geographical locations across the world, seem to resonate with each other.

In this chapter, we look at the Tibetan plateau and the Himalayas, focusing mainly on an area in northwestern Nepal where agro-pastoral communities have been increasingly threatened by glacial lakes outburst floods. On the basis of ethnographies and historical sources, we explore the ways in which the study of Himalayan regions can be set in dialogue with that of the Circumpolar North. In both instances, the mediation between local and scientific knowledge, cultural constructions of risk, and community action in contexts that are particularly vulnerable to climate change-related hazards seem to emerge as features of the social life of the cryosphere – that area where by virtue of high altitude or high latitude, ice is a formative and formidable force in people’s lives. What emerges through this comparison is that ice is the focus of different epistemic, moral and affective frameworks within cosmopolitical ecologies shaped by human and non-human actors.

## The Social Life of the Cryosphere in a Changing Climate

Climate change narratives have been increasingly informed by a range of terms that have travelled across disciplines, literary genres and cultural contexts. Most prominently, the notion of the ‘Anthropocene’, defining human impact on the globe in geological terms, from its original use within the natural sciences, has become a key concept that powerfully spans the social and natural sciences to address a range of threats at the planetary scale. In a similar way, a range of notions has emerged to bring together non-contiguous places in geographies of climate change that advocate cross-regional, cross-disciplinary approaches.

The notion of the ‘cryosphere’ (from the Greek κρύος *kryos*, ‘cold’, ‘frost’ or ‘ice’ and σφαῖρα *sphaira*, ‘globe, ball’), mentioned above, is used in the natural sciences<sup>2</sup> to refer to areas of the world where water is predominantly in the solid state and has increasingly been used in narratives of ‘climate change’ that bring together people

living at high altitude with people living at high latitude.<sup>3</sup> Proximity to ice formations affected by rising temperatures and vulnerability to changing weather patterns impacting livelihoods are some of the most striking common denominators. People inhabiting these areas have learned since time immemorial to observe and deal with their ever-changing icescapes – precious reservoirs of locked-in freshwater, a crucial element in local climate systems, the terrain on which to walk but also the source of a wide range of risks and hazards. These icescapes seem to have been recently undergoing unprecedented transformations and have become local and global proxies for climatic transformations.

As highlighted in a number of publications, in the study of the cryosphere, the human and social dimension have been neglected, and a genuine cross-disciplinary approach is called for: ‘To understand these dynamic intersections between people and the cryosphere, it is crucial to integrate disciplines, to talk across boundaries, and to embrace concepts and methods applicable to coupled natural-human social-ecological systems’ (Huggel, Carey, Clague and Kaab 2015). The notion of the ‘Third Pole,’ originally connected to a history of adventure and exploration (Dyhrenfurth 1953), has been mobilized by natural scientists and development agencies (e.g. International Centre for Integrated Mountain Development)<sup>4</sup> as the area on the planet with the largest accumulation of ice outside the Poles to promote an integrated approach to environmental challenges from conservation to responses to climate change (Qiu 2008; Huettmann 2012). The concept of the ‘Three Poles’ links the Himalaya-Karakorum-Hindukush Region to the North and the South Pole as drivers of regional and global weather systems as well as indicators of global processes. The inclusion of the ‘Third Pole’ in the International Polar Year (2007–2008) ensured that these icescapes were seen as connected on the global stage. The history of this concept is currently being explored in the framework of the project ‘The Third Pole as a Geographical Imaginary: its Historical, Cultural and Political Roots’ (PI Michael Bravo), Department of Geography, University of Cambridge.

The Arctic includes an extraordinary cultural and historical diversity and different modes of engaging with icescapes. While the skills of living on ice deployed by people who live in the extreme North relying on hunting skills are quite unique, more similarities can be seen between people who inhabit permafrost environments at high latitude and high altitude and between transhumant pastoralists living next to mountain glaciers. Even more, similarities can be found

among communities who are making a living, combining and recombining ancient skills with new technologies, materials and opportunities. Whatever the livelihood, however, they all share the fact that they live in places where ice matters and where small differences in temperature have a big impact. A reflection of this common feature is the fact that images of their predicaments are often used to illustrate the vulnerability of environments to climate change.

Just as island people far removed from one another are increasingly brought together by a shared sense of emergency linked to rising sea levels (and sometimes take joint action on the global stage), people of the cryosphere can be seen as linked by comparable experiences of human responses to vanishing ice. New geographies of 'climate change', therefore, raise important questions: in what ways is it fruitful to explore anthropologically notions such as the 'cryosphere', which have originated within the natural sciences but have developed a sort of social life on the global stage? In what ways is the 'cryosphere' part of an Anthropocene that seems increasingly messy, fractured and shaped by new geographic configurations?

A first approach can be identified as, broadly speaking, phenomenological. It revolves around the idea of 'sensing icescapes', exploring the wide range of sensory and conceptual experiences that are involved in knowing ice and snow: glacier views and snow lines, crackling ice and roaring avalanches, as well as the cold breath of crevasses and seracs or the life-supporting taste of unlocked fresh water – all these features are deeply connected to wider cosmological frameworks. Drawing inspiration from or resonating with Basso's ethnography of 'lived topography' (Basso 1996), this approach is both pragmatic and poetic and can be seen reflected not only in songs and tales but also in practical ways of going about life in the Arctic as well as in the Himalaya, in the Andes or the Alps. It is often also linked to profound affective reactions to landscape transformations in moral geography that is interpreted at multiple levels so as to anticipate nature both in the short and long term – sometimes with prophetic implications (see, e.g., Sehnalova 2019: 216–82; Diemberger, Hovden and Yeh 2015: 249–71; more generally see also Ingold 2000; Cruickshank 2005).

A second approach revolves around the political economy and political ecology of these regions, addressing the threats to ecosystems and livelihoods due not only to exposure to erratic weather patterns, vanishing ice, radical changes in the permafrost and glacial lake outbursts but also to the increasing dependence of communities from national and multinational organizations which often support strategies

for the adaptation to climate change while simultaneously promoting the exploitation of natural resources and more centralized governance (see, e.g., Yeh 2014: 61–74; Bravo and Rees 2006: 205–15).

A third approach focuses on the way in which people of the cryosphere have become proxies for global processes so that images of human livelihoods threatened by vanishing polar ice juxtaposed to those of retreating mountain glaciers in the Himalaya, the Andes or the Alps are deployed in global narratives potentially informing various forms of environmental activism. A vocabulary informed by the ways in which humans relate to the uncertainty of specific environments and the spiritual qualities of places can acquire new global relevance: from *tendrel* (*rten 'brel*) indicating interconnectedness of all phenomena in Tibetan Buddhist landscapes (see, e.g., The Karmapa 2017) to *imaka* meaning ‘perhaps, maybe’, framing Greenland’s narratives of human life’s icy settings (see below) and linking them to broader ideas of ‘anticipation’ (Nuttall 2010: 21–37).

These different dimensions are not mutually exclusive, and they instead inform each other. Perceptions rooted in local day-to-day observations and cosmological frameworks blend with a wide range of global scientific narratives and technological infrastructures that reach remote sites in bits and pieces, creating new ‘assemblages’ (see Makley 2014: 233); they are engaged with or not by the different epistemic communities involved in decision-making. The ‘cryosphere’ emerges thus as a site of flows and frictions (Tsing 2004) within global connections, where encounters are driven by different agendas, situated contingencies and cultural specificities in a variety of competing ‘scale-making projects’ and zones of ‘awkward engagement’. Practical issues of access to and engagement with icescapes and their surrounding shape distinctive forms of ‘remoteness’ co-created by global processes (see also Saxer and Anderson 2019). Both poetic and prosaic, powerful and vulnerable, life-supporting and life-destroying, ice defines this zone of engagement as a powerful agent shaping all kinds of human interaction, narratives and theories of the environment far beyond being an actor in the Latourian sense (see Hastrup 2012: 227).

## Moral, Poetic and Prophetic Icescapes

People living on or close to icescapes have learned how to read the ice and the snow. From testing the consistency of different ice or snow, noting distribution patterns, to observing the changing snowline on

mountains, all of these experiences shape what Ingold (2000) calls the ‘dwelling perspective’ of those who relate to this environment on a daily basis.

For the Canadian North, Julie Cruickshank’s fascinating exploration of the Athapaskan ‘ecological epistemology’, *Do Glaciers Listen?* (Cruickshank 2005), shows that glaciers were perceived as sentient and animate entities, prepared to respond to human behaviour. In a similar way, Himalayan and trans-Himalayan mountains covered in snow and ice can actively engage in social relations and be perceived at multiple levels. As ‘owners of the land’ (*sadag, sa bdag*), they protect specific territories, granting fertility and prosperity to all living beings.<sup>5</sup> They can be brothers, sisters, fathers, mothers or even ancestors, and they are often married to adjacent lakes. Erratic weather and environmental disasters are often attributed to a disturbed relationship with these landscape spirits, often described in a cumulative way as *lha lu (lha klu)*, i.e. ranging from the gods of the sky and the high mountains above (*lha*) to the spirits of the underground and the waters (*lu*) (see also Salick, Byg and Bauer 2012: 447–76, as well as Diemberger, 2021). Albeit converted to Buddhism in the process of the Buddhification of Tibetan landscapes, they are still the masters of places.

Empirical knowledge that provides the basis for walking competently on ice, avoiding treacherous terrain, assessing snow cover to deploy a strategy to look after domestic animals in case of storms, or estimating risks involved in glacial lakes bursting and flooding human settlements or encampments often combines with poetic perspectives that make these landscapes into a sort of canvas for visual, aural and tactile narratives with moral and even prophetic undertones – the stories that capture the spiritual sense of place.

Mt Kailash, a mountain that is sacred to several Asian religions and whose relevance cuts across several national boundaries, is a powerful example.<sup>6</sup>

Located in a mountain range that constitutes the headwaters of great rivers departing in all cardinal directions, it epitomizes the importance of ice and snow for human survival. A popular prophecy tells that at the beginning of time, the peak was white like a conch shell. In the middle time (now), it is striped like a *zi* stone, and at the end of time, it will be black like a piece of charcoal.<sup>7</sup> Local dwellers, mystics who have come from afar, and pilgrims all gaze in awe at his mighty presence – a lord of the place who also provides a powerful sense of time.



**Figure 6.1.** Mount Kailash with prayer flags. © Hildegard Diemberger



From Buddhist and Hindu perspectives a worldly embodiment of the cosmic mountain and seat of powerful deities, Mt Kailash alias Gang Tise is historically also understood as the embodiment of a more localized spiritual entity called Ge khod who used to protect the regional kingdom of Shangshung and its rulers (according to some local views, the name Tise can be translated in the Shangshung language as ‘water-god’).<sup>8</sup> Once integrated into the Tibetan empire in the seventh century, Mt Kailash became famous as one of the protecting deities of Tibet, the Land of Snow (lit. Gangjong, Gangs ljongs), together with a number of other mountain deities scattered across the Tibetan plateau. Through visual connection, it has the power to hallow, purify and even send off the dead exposed to its blessing via this visual connection on the top of high passes in its vicinity. Mt Kailash in the west, Chang Targo in the north and Nyanchen Thanglha in the northeast are considered to be three brothers married to the big lakes at their feet, whilst also being listed among the nine most famous Tibetan protectors of the world, the *sipa lha gu* (*srid pa lha dgu*).

Towering with glittering whiteness above boggy permafrost plains and high-altitude grasslands inhabited by Tibetan nomads with their Yak herds, Nyanchen Thanglha is one of these powerful protecting deities located further to the east, just north of Lhasa. Despite being located in a particular geographical area, this snow-capped mountain is worshipped across the Tibetan plateau and among the Buddhist communities of the Himalayas. An eleventh-century manuscript telling the story of how it was converted to Buddhism by the spiritual master Padmasambhava reveals that this snow mountain not only actively resisted its taming but did so by unleashing storms:

All the strong winds said: ‘let’s see the fight against the Buddhist master [Padmasambhava]’. The Buddhist master boiled the carcass of a bull in a copper cauldron, then he put his foot on top of it and made it disappear. Then, a cloud appeared on the snowy top of Thanglha in the middle of the month of winter. Wild flashes of lightning and thunderclaps came. Hail and round snowflakes fell [from the sky]. From then onwards, the area in that direction was brought into subjection [by the Buddhist master] and, even though they went on fighting [the winds] were meeker than before. (*dBa’ bzhed folio 11*)

Nyanchen Thanglha, like all the other sacred snow mountains protectors of Tibet, have indeed been masters of the weather as well as of all what makes human living possible on the Tibetan plateau. They kept these features after being subdued and converted to Buddhism

by spiritual masters – but were hierarchically downgraded to ‘worldly deities’ (in contrast to higher Buddhist deities ‘beyond the world’).<sup>9</sup>

As a powerful male mountain deity, Nyanchen Thanglha is married to the heavenly lake at its feet, the female Namtsho (lit. ‘sky-lake’), and they both protect the well-being of the place and its dwellers. This cosmological union has a remarkable resonance with climatological research carried out in the same area. A recent study of the microclimate around Mt Nyanchen Thanglha and Lake Namtsho (Nam Co) by atmospheric scientist Hans F. Graf, in the framework of the project Atmosphere - Ecology - Glaciology Cluster in the frame of TiP (DFG SPP 1372) ‘Tibetan Plateau: Formation, Climate, Ecosystems’, has shown that landscape features such as mountains and lakes are interconnected in shaping the local moisture circulation system, which drives the local weather and influences the local effect of the monsoon (see also Diemberger and Graf 2012: 233–34). Precipitation – its quantity, quality and timeliness – is key for vegetal and animal life in this terrain. Creating a feedback loop, deforestation and degradation of grassland also have an impact on weather, potentially aggravating the effects of global warming (see also Marin 2010: 162–76 for similar phenomena in the Mongolian setting). Local and global human impacts on climate are thus interconnected in multiple ways, and people who live in these environments are not only affected by but capture these entanglements in their innumerable observations.

The shepherd and the scientist look at the same mountain and its snow cover with different eyes but both sense that it reflects the well-being of the place. Different types of environmental knowledge that conceptualize environmental interconnectedness in different but not incompatible ways can dovetail and interfold. It is the politics of cultural mediation that may enable or disable negotiation, shaping the ‘partial connections’ (Strathern 2004) that link actors taking decisions about these landscapes against the background of very different epistemological traditions and potential ontological incommensurability.

Nyanchen Thanglha is both a local proxy for the understanding of wider environmental processes from a climatological perspective and the embodiment of a powerful spirit involved in human destiny since time immemorial. It has related to people inhabiting its land through mediums, divination practices (involving the shoulder blade of animals, mirrors, dice, birds and many other types of divination popular on the Tibetan plateau and across Inner Asia), as well as written and oral narratives (see Maurer, Rossi and Scheuermann 2019).



**Figure 6.2.** Oracle possessed by the Mountain Nyanchen Thanglha.  
© Carlo Meazza

He is the lord of domestic and wild yaks, and the passage above seems to evoke animal sacrifice, a common ritual practice through which human communities on the Tibetan plateau related to their mountain spirits before their conversion to Buddhism. As a mighty mountain and a powerful mountain god, it has been reimagined and reframed many times according to different traditions, with scientific understandings being just one of the many layers of interpretation. The negotiation of different perspectives has a long history and is not binary, i.e. traditional vs. modern, local vs. global, sacred vs. secular.

According to a common trope, the Buddhification of landscape deities involved the reform of animal sacrifice and its transformation into the offering of an effigy or the setting free of an animal. However, in some areas, animal sacrifice persisted up to very recent times or even the present day. This is the case of Mt Takyong, a peak in southwestern Tibet considered to be an emanation of Nyanchen Thangla's brother, Chang Targo, the lord of the northern plain, worshiped by the nomads of Porong. Until 1959 he used to receive the sacrifice of a white sheep during New Year celebrations. On that occasion, the local ruler of Porong and a ritual specialist called an Aya used to climb up the mountain to a particular sacred spot where the

sacrifice took place. The Aya priest read the entrails of the animal to give forecasts on the weather, health and challenges for the following year and called for good fortune and prosperity for the land, its people and its leaders. Subsequently, the animal was cooked and shared with the whole celebrating community. A prophecy linked the appearance of the mountain to the well-being of the land: as long as the dark reddish mountain kept its white tip (a small permanent ice field), there would be prosperity. If this disappeared, disaster would strike. In many ways, this echoes the narrative about Mt Kailash mentioned above and is probably a widespread trope based on both local observation and transmitted traditions from elsewhere.

Arguing against a clear-cut distinction between moral and ecological climate, Diemberger (2012) has suggested elsewhere that this understanding of climate is also highly political. According to the manuscript mentioned above (the *dBa' bzhed*, corroborated by other sources), a range of disastrous weather events and calamities prompted the consultation of diviners which in turn led to a political regime change and eventually to Buddhism becoming Tibet's state religion in the eighth century. Weather divination, both in terms of revealing the deeper meaning of past events and anticipating future ones, is thus a practice endowed with considerable power. As such, it is politically sensitive and predicated on a shared understanding of what constitutes authoritative knowledge; unsurprisingly, it can also be contested either as a superstitious practice from a secularist perspective or, more often, through a distinction between 'good' divination and 'bad' divination. Following a view that does not challenge the validity of divination as such, bad divination can be criticized in opposition to good divination; the latter is associated with a process that is carried out according to recognizable protocols for the wider good rather than for particular interests and manipulation. In his study on Tibetan divination, Rolf Sheuermann comments:

From a Buddhist doctrinal stance, spirit-mediumship should be considered as being inferior to most other methods as the information received is not based on a person of authority, such as a dharma guardian or *dharma-pāla* that is believed to have transcended the world (*'jig rten las 'das pa'i srung ma*), but on a worldly deity (*'jig rten pa'i lha*) or worldly *dharma-pāla* (*'jig rten pa'i srung ma*). As Réne de Nebesky-Wojkowitz noted, 'none of these high-ranking guardians of religion would condescend to interfere with more or less mundane affairs by speaking through the mouth of a medium', and a prediction cast by a spirit-medium invoking a worldly deity is deemed fallible since its source of information is not trustworthy. Such a deity may either have its personal motive to cast a

wrong prediction or its capacity of foreknowledge is flawed or limited. On the contrary, the majority of Tibetan cleromantic practices involve invocations of the blessing and inspiration of the Buddha, revered Buddhist deities, and/or Buddhist masters, which is meant to guarantee the efficacy of the divination. The assumed efficacy of the practice is grounded in the doctrine of *pratītyasamūtpāda* or dependent arising, the notion that things do not manifest randomly but occur due to an interplay of causes and conditions. (Maurer, Rossi and Scheuermann 2019: 163)

Whatever the process, as we shall see below, divination is still involved in decision-making in times of crisis (often related to extreme environmental events that characterize this region), allowing for a system of reflection and scenario thinking that is not easily dismissible in simplistic terms. Historical sources and ethnographic examples from Tibet and beyond show that divination practices can turn out to be powerful tools in making choices and achieving consensus within a community.

Despite but also thanks to their subordination to Buddhist authority, landscape deities have continued to reflect the intimate relationship between humans and the place they live in for centuries. They are not too dissimilar to the Tirakuna or Earth Beings described by De La Cadena (2015),<sup>10</sup> and are often central to divination practices that can be found across Asia and can be understood in the framework of environmental cosmopolitics involving non-human and/or other-than-human actors (see Sneath 2014; Sneath and Turk 2021). These deities are often conceptualized in terms of kinship relations. They can be married couples, mothers, fathers, children, brotherhoods and sisterhoods as well as ancestors and they are profoundly relational among themselves and towards the beings inhabiting their land (humans included). These features remained, whilst being continuously re-invented and re-enacted, after the Buddhification of Tibetan landscapes. In contrast to the South American settings, they have been integrated into politico-religious formations rather than suppressed by ontologically more rigid frameworks such as colonial Christianity.

As Mt Nyanchen Thangla is married to Lake Namtsho, so Mt Kailash is married to the sacred lake at its feet, Mapham Yumtsho. Consisting of a mountain and lake dyad, this site is endowed with a sanctity that is recognized far beyond the region itself, as witnessed by the millions of pilgrims who visit it every year. It is thus not surprising that prophecies linked to this mountain have acquired a global profile, linking it to the destiny of the world.

## Living with Icescapes under Threat

Whilst the prophetic narratives revolving around Mt Kailash point towards a distant future, the immediate one is often a site of contestation. As the mountain is a popular site for tourism, the rapid development of infrastructure projects, with the construction of a road replacing the ancient pilgrimage route around the mountain, has elicited strong emotional responses, both positive and negative. In addition, the increasing accessibility of this area rich in a wide range of minerals (including gold and rare earths) has promoted mining activities, which are even more likely to raise both cosmological and environmental issues in ways that resonate with what is happening in the Arctic. In this context, extreme climatic events are part of a much wider set of issues and transformations, with which they are often entangled, as we shall see below.

Not far from Mt Kailash is the massif of the Gurlha Mandata – a sacred peak whose relevance is much more local but which still dominates the horizon and is central to the lives of numerous communities in the western Tibetan borderland where the state borders of China, India and Nepal meet.

On the afternoon of 30 June 2011, a glacial lake in the Gurla Mandhata massif burst, and a flash flood thundered down the Limi valley towards Halji village, triggering severe landslides. Houses, fields, pastureland and village infrastructure were swept away as the riverbank disintegrated and the river approached the eleventh-century monastery at the heart of the village.

Flash floods are not new to the villagers, and the villages surrounding the mountain have maintained records of their management of floods and other environmental challenges over many centuries. However, the recent flood came with unprecedented strength, raising new questions about risk management and the dilemma of whether the village needs to be relocated at the cost of abandoning the monastery. Also new is the degree to which and the way in which religious authorities are responding, and the still limited but increasing awareness of the association of these disasters with anthropogenic climate change. This is occurring at the same historical moment in which motorable roads, telephone connections and new governance modes are arriving, changing the community's long-held perceptions of and responses to environmental hazards.

Astrid was in the village when the Glacial Lake Outburst Flood (GLOF) occurred and captured in images and writing the drama and its aftermath. Taken by surprise by these events (she was involved in



**Figure 6.3.** *Glacial lake outburst flood in Limi.* © Astrid Hovden

a different type of research), she observed how the local community responded to this challenge, drawing on different types of knowledge and expertise. Some of the strategies deployed on that occasion built on the social memory of the community; others drew on forms of knowledge (technical, scientific and political) that were perceived as new and unfamiliar and were associated with ‘new’ links to state and international agencies that were mobilized in the wake of this emergency. Located at the very margin of the country, an area which has a long history of self-sufficiency and a relatively disconnected local administrative system, the GLOFs have functioned as essential drivers for the community to reach out to the Nepali state and INGOs for support (see also Diemberger, Hovden and Yeh 2015: 249–71 and Hovden, in press).

In the aftermath of the flood, the villagers climbed up the valley to assess the glacier the flood had come from. They also involved in their evaluation of the situation foreign researchers with an interest in the area, while building protections according to locally transmitted knowledge and a combination of old and new technologies as well as organizing a religious service in the local monastery as a ritual response. Village meetings and informal decision-making processes involved people with very different views on the event, its causality and the appropriate way to deal with it, while the participation of higher-level administrators brought a regional perspective to bear. On specific divisive issues, divination contributed in finalizing decisions.

In Limi, divination remains an important resource for decision-making and for the negotiation of a consensus in the community around a particular course of action. Local ancestral mountain deities are appeased ritually and play an important role in local perceptions and practices of the environment as well as weather/climate, but it is the Buddhist divinized historical figure Achi Chokyi Dronma/Drolma who is the main spiritual reference for important decisions. She was the grandmother of Jigten Gonpo (1143–1217), the founder of the Drigying Kagyu sect of Tibetan Buddhism that is followed by the local monastery. The title *achi* (grandmother), however, gives her the aura of a female ancestor, and in fact, she also has a secret name that links her to one of the great ancestral clans of the Tibetan empire. Associated with specific sites of worship in the landscape as well as divination practices that take place in the monastery, she has been consulted in all momentous decisions of the community – including the negotiation with the Chinese authorities when the Limi people were invited, with very generous offers, to become part of the Chinese controlled Tibet. According to local accounts, Achi gave a



negative response to what seemed an enticing offer to a very poor agropastoralist community, and people followed her advice (for details on the history and politics of this area, see Hovden, in press; see also Yeh 2019).

Achi is consulted on all kinds of issues including those that concern the environment and the management of environmental risks and hazards. This process of consultation is one of the main instances in which different knowledge regimes are combined when debating causality and taking decisions on responses (see Hovden and Havnevik 2021). Whether the disaster is explained as a disturbance of *lha lu* spirits or an unusual accumulation of snowmelt, Achi seems to be able to mediate and unify people around a common strategy (in most cases), which often involves specific concrete actions in the landscape as well as ritual responses.

This process of mediation makes it possible to work out a course of action, drawing on a range of knowledges that may come from very different epistemological traditions. In practice, potentially non-reconcilable ontological assumptions do not necessarily matter: it is the negotiation between real-life actors who may navigate different forms of knowledge that turns out to be the determining factor in what can be seen as a ‘cosmopolitical ecology’ of practice (see also Kuyakanon, Diemberger and Sneath 2021). Relevance and processes of attribution matter in different ways and may shift over time.

After repeated floods, it seems that the ice formations in the glacier have slightly shifted, and the drainage channels are no longer blocked in winter so that no supraglacial lake is currently forming in spring (Kropáček et al. 2015). Thanks to the new flood defences, good glaciological fortune and the efficacious ritual response, the village, with its eleventh-century monastery, seems to be enjoying some respite. But for how long? And what about the many other places affected by similar circumstances?

### **The Social Life of the ‘Cryosphere’: Local and Global Connections**

Events such as the Glacial Lake Outburst Flood (GLOF) witnessed by Astrid are necessarily localized and their causality complex so that any attribution to wider climatic trends remains a matter open to interpretation and negotiation. At the same time, they constitute powerful images, epitomizing a sense of threat made acute by the awareness of ‘climate change’. They can therefore be framed within

wider narratives of climate change at the global level, as reflected for example in a recent article in Al Jazeera, ‘Climate Change Threatens 1,000-year-old Monastery in Remote Nepal’ (by Neema Vallangi, 24 January 2019). Framing environmental disasters in terms of climate change or global environmental threats is also reflected in calls for increased responsibility towards the planet by religious leaders such as the Dalai Lama. In one of his many statements to this effect, he pointed out that:

Global warming has brought changes in climate, including making perennial snow mountain melt, thereby adversely affecting not only human beings but also other living species. Older people say that these mountains were covered with thick snow when they were young and that the snows are getting sparser, which may be an indication of the end of the world. The harmful effect on the atmosphere brought about by emissions in industrialised countries is a very dangerous sign. (The Dalai Lama XIV 2009: 6)

And elsewhere, he highlights how we need to learn from the processes we are witnessing: ‘Our Mother Earth is now teaching us a critical evolutionary lesson – a lesson in universal responsibility. On it depends on the survival of millions of species, even our own’ (The Dalai Lama XIV 2009: 22).

For the Limi community, the voice of environmentalist Buddhism is embodied by the head of the Drigung Kagyu sect, the 37th Drikung Kyabgon Chetsang Rinpoche, who lives in India but has close links to the Limi monastic community. Deeply aware of global environmental challenges, he established projects such as ‘The Go Green & Go Organic project’ whose main purpose is ‘to revive the Himalayan and Tibetan Cultures and to protect the nature, animals, birds, and environment of the Himalayan Mountains’.<sup>11</sup>

Karmapa Ugyen Tinley Dorje addresses global environmental concerns in his book *Interconnected: Embracing Life in our Global Society*. As the editorial introduction points out:

The title of this book ... makes use of the term ‘interconnected’ rather than ‘interdependent’ precisely to draw attention to the human affective dimension of our interdependence, in contrast to the external phenomena more often referenced by the term ‘interdependence’. The Karmapa uses the term ‘interconnectedness’ and ‘interdependency’ almost interchangeably, and the Tibetan term itself (*rten cig ‘brel pa byung pa*) is a compound that includes the terms that denote dependence and connection. (Karmapa 2017: 4)

The notion of interconnectedness highlights not only interdependence of all worldly phenomena but also affective relationship. It seems thus to embrace multiple scales. It also underpins the way in which the ancient human relationship with landscape features as spiritual entities was accommodated within Buddhist cosmologies as truth could be perceived at multiple levels depending on the position of the beholder (within the distinction of conventional truth and ultimate truth associated with enlightenment). A more abstract notion of interconnectedness interfolds therefore with a situated affective relationality linking people to places.

The framing of landscape features in terms of kinship/relatedness/mutuality of being suggests a possible convergence of the anthropology of the environment and the anthropology of kinship and care. Beyond the Himalaya, this is powerfully reflected, for example, in Pope Francis' reference to San Francis of Assisi's *Canticum creaturarum* or *Cantico di Frate Sole* ('song of brother sun') in his *Laudato si* encyclical addressing the global environmental crisis. Whether it is 'brother sun' (It. *frate sole*), 'sister moon' (It. *sora luna*) and 'sister mother earth' (It. *sora madre terra*), or Tibetan landscape features such as the earth foundation mother (*sashi ama*) or mountains and lakes as mother/father/sister/brother, etc., addressing natural features in terms of kinship does not necessarily express an ontological claim but rather a relational and affective way of being in the world. It is telling that the subtitle of the encyclical is 'on the *care* of our common home' (my italics). In an oddly similar way, we find the same kind of language, for example, in funding schemes of the UK Research Councils promoting 'care for the future'.

In 2019, glaciers on different mountains across the globe were mourned as if they were dead or dying relatives, such as the glacier Okjokull in Iceland.<sup>12</sup> A flurry of requiems for glaciers across the Alps was organized by a variety of environmental organizations and local agencies. Christian and other rituals were repurposed to address this new issue, demonstrating a profoundly affective relationship to the landscape. Wide-ranging coverage in the press and social media has secured popular participation beyond the limited groups of mountain lovers who actually went to the glacial basins where the glaciers used to be to commemorate their demise with music and prayers.<sup>13</sup> In light of the disappearance or quasi disappearance of these majestic ice formations, people have been rediscovering their affective relationship to these landscapes. Looking at what is left of the Lys glacier on Mt Rosa, not far from where I was born, I couldn't help thinking about Julie Cruickshank's question, 'Do Glaciers

Listen?’ (Cruikshank 2005), elicited by the glacial landscapes of Mt Saint Elias in British Columbia. The sad look of mountain peaks stripped of their whiteness reminded me of a Tibetan song I heard in the Himalaya declaring that ‘the honour of the mountains is the snow’, which inspired a collaborative article on climate change in the Himalaya (see Diemberger, Hovden and, Yeh 2015: 249–71). These images also brought to mind inspiring conversations with, and a debt of gratitude towards, scholars such as Veerabhadran Ramanathan<sup>14</sup> and Charlie Kennel,<sup>15</sup> who have not only engaged scientifically with specific issues such as the impact of black carbon on mountain glaciers or the link between greenhouse gasses and climate change, but have also been promoting a dialogue across the sciences and with representatives of a range of religious traditions in the hope of promoting engagement towards common aims in caring for life on this planet.

### **Conclusion: The ‘Cryosphere’ as a Site of ‘Friction’ and ‘Affection’**

Both the polar areas and the Himalayan region drive global and regional climate, influencing respectively El Nino phenomena and the monsoon. These icescapes therefore have both a local and a global relevance that is difficult to assess due to the complexity of the phenomena involved but is undeniable. Like the Circumpolar North, the Himalayan region (as are other sites of the high-altitude cryosphere) is central to global processes driven by climatological factors and by entirely human needs and desires. People living on or next to these icescapes also share the fact that they are considered marginal in relation to current nation-states but are interconnected through regional networks that transcend national boundaries, reflecting historic links and shared ecologies so that looking at the Circumpolar North or the Himalayan region in this light offers a different perspective on conventional geopolitics. These regions are part of the cryosphere which can be looked at as a unified system whilst taking into account the specific environmental conditions and cultural vocabulary with which people respond to them.

The cryosphere therefore emerges as a particular site of encounter of different epistemic communities and an opportunity for interdisciplinary and cross-disciplinary exploration. Addressing the challenges of interdisciplinarity, Marilyn Strathern observed that:

The reason we have sometimes been looking in the wrong place is that we have been so focused on incommensurability, on the difficulties disciplines have as discrete entities in ‘talking’ to one another, that we do not see what we all know, namely that they are all alike in thinking that they have this problem. (Strathern 2006: 93)

Drawing from her experience in Papua New Guinea, she brings together the notion of ‘transplant’ from two different contexts as a constructive way forward:

the re-contextualisation of items of knowledge to create new knowledge and the transferring of plants or children from one clan land to another ... what that rendering of ‘transplant’ adds is the notion of generativity that comes from the way plants are thought to flourish precisely because of their outside origins. (Strathern 2006: 89)

Developing her argument on useful knowledge she comments: ‘Perhaps in the heat generated over interdisciplinarity, rather than taking differences between disciplines as our starting point, we might look to a critical distinction between research and management practices, and these are seen as “interfolding” rather than collapsing’ (Strathern 2006: 95).

As illustrated in the case of Limi, when urgent decisions need to be taken all available forms of knowledge are likely to be mobilized. Within this management logic, ontological and epistemological differences that may be cause for clashes may also offer ground for creative ‘transplants’, enabling localized solutions and creative re-combinations. In environments where small differences in temperature can have a great impact, shaped by the constant fluctuation of water between the solid, liquid and gaseous state, humans relate to the environment they live in through innumerable contingent decisions with which they respond to regular variability and exceptional extreme events. In this process, different forms of knowledge and moral frameworks, different scales and temporalities are brought to bear within cosmopolitical ecologies shaped by human and non-human actors. As in the Arctic, in the Himalaya, ‘human life takes place under the breath of ice. Depending on where one is, it may be a more or less permanent presence, but it is always on the horizon’ (Hastrup 2012: 227). As Kirsten Hastrup suggests, ice is its own argument and a powerful agent shaping all kinds of human interaction, narratives and theories of the environment far beyond being an actor in the Latourian sense.

Perceptions rooted in local day-to-day observations and cosmological frameworks blend with a wide range of global scientific narratives and technological infrastructures that reach remote sites in bits and pieces, creating new ‘assemblages’ (see Makley 2014: 233) and reflecting the different epistemic communities involved in decision-making. The ‘cryosphere’ emerges as a site of flows and frictions (Tsing 2004) within global connections, where encounters are driven by different agendas, situated contingencies and cultural specificities, and where practical issues of access and engagement make it also part of a distinctive form of ‘remoteness’ co-created by global processes (see also Saxer and Anderson 2019).

Against this background, attitudes that recognize the spiritual character of landscapes and the relevant human affective relationships with their features can be seen as an ontological provocation in light of rational scientific assumptions about nature and the world. However, if one moves beyond the question of unreconcilable ontological claims to appreciate the relationality of such positions, they can be seen as fruitful ways for mobilizing human and non-human communities around shared goals. As such they can operate at multiple levels and can be translated across epistemological boundaries.

Studying the social and cultural life of the cryosphere may therefore offer new perspectives for cross-regional, cross-disciplinary research linking arctic futures to that of comparably vulnerable environments in the world. Methodologically, the cryosphere may offer a framework for comparative projects focusing on the human, non-human and other-than-human engagement with icescapes. Exploring embodied knowledge, including verbal and non-verbal communication relating to ice and snow, creates opportunities for controlled comparative exercises that have the potential to de-centre the anglophone world or at least promote a critical engagement with it.

When discussing the workshop, Hildegard Diemberger recalled:

As a mountaineer, my father travelled from his native Alps to many mountains in the world and to the Arctic. He loved and still loves Greenland’s icescapes. From his travel in 1966, he brought home three Greenlandic words: *tesa*, *susa*, *imaka*. As he understood them in Umanak on the West coast of Greenland, their meaning was: *tesa*, it has happened, it is past; *susa*, don’t worry; *imaka*, maybe. When telling his story, with a smile he seemed to evoke the infinite creative possibility of uncertainty that he learnt when sharing his experience of ice with Greenlandic friends across language barriers.

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**Hildegard Diemberger** is the Research Director of Mongolia and Inner Asia Studies Unit (MIASU) at the University of Cambridge and a Fellow of Pembroke College. Trained as a social anthropologist and Tibetologist at Vienna University, she has published numerous books and articles on the anthropology and the history of Tibet and the Himalaya as well as on the Tibetan-Mongolian interface, including the monograph *When a Woman becomes a Religious Dynasty: The Samding Dorje Phagmo of Tibet* (Columbia University Press, 2007), the edited volume *Tibetan Printing – Comparisons, Continuities and Change* (Brill, 2016) and the English translation of two important Tibetan historical texts (Austrian Academy of Science, 1996, 2000). She has designed and coordinated a number of research projects funded by the UK Arts and Humanities Research Council, the British Academy, the Newton Trust, The Research Council of Norway, the Austrian Science Fund and the Italian National Research Council.

**Astrid Hovden** is an Associate Professor in Religious Studies at UiT – The Arctic University of Norway. Her main research interests include lived religion, social history, as well as climate change adaptation, explored through various published and forthcoming works. She has conducted several long-term ethnographic fieldwork projects on both sides of the Himalayas. Currently, she is part of the research project ‘Himalayan Connections: Melting Glaciers, Sacred Landscapes and Mobile Technologies in a Changing Climate’ funded by the Research Council of Norway.

## Notes

1. Snowstorms, droughts, floods are all phenomena that have shaped the life of human beings in the Himalayas and on the Tibetan plateau since time immemorial. They are not new. What seems to be unprecedented – as in so many other parts of the world – is the perceived variation in frequency and intensity of these events.
2. This term is most prominently connected to Antarctic explorations and the study of snow and ice-crystals by the Polish scientist A.B. Dobrowolski, considered to be the first cryospheric scientist (see Barry, Jania, and Birkenmajer 2011). He ‘defines the cryosphere – from the Greek word krios meaning icy cold – as a zone extending from the upper part of the troposphere, where ice crystals occur in clouds, to the base of the permafrost ... He introduced the concept of the cryosphere as a special part of the lithosphere, closely connected to the hydrosphere and the atmosphere. He also proposed the recognition of cryology as a separate science dealing with the solid phase of water in all its aspects, of whatever origin, and recommended that it form a part of physical geography’, *AB Dobrowolski – The First Cryospheric Scientist – And the Subsequent Development of Cryospheric Science* (PDF Download Available). Retrieved 23 March 2018 from [https://www.researchgate.net/publication/228519645\\_AB\\_Dobrowolski-the\\_first\\_cryospheric\\_scientist-and\\_the\\_subsequent\\_development\\_of\\_cryospheric\\_science](https://www.researchgate.net/publication/228519645_AB_Dobrowolski-the_first_cryospheric_scientist-and_the_subsequent_development_of_cryospheric_science).
3. See, for example, conferences organized with this focus: ‘High Altitudes meet High Latitudes: Globalizing Polar Issues’, <https://www.mountainresearchinitiative.org/news-page-all/112-global-news/1051-high-altitudes-meet-high-latitudes-globalizing-polar-issues> (last accessed 6 March 2022); ‘Vanishing Ice: Inquiring about the Past and Acting for the Future in the European Alps and the Arctic’, convened in June 2014 in the Department of Social Anthropology of Aberdeen University.
4. The International Centre for Integrated Mountain Development (ICIMOD) is a regional intergovernmental learning and knowledge sharing centre serving the eight regional member countries of the Hindu Kush Himalaya. See <http://www.icimod.org/> (last accessed 6 March 2022).
5. This category of spirits is widespread across Inner Asia, e.g. ‘lus savdag’ can be found in the Mongolian context (see also Sneath and Turk, in press). They have also been used as the basis for claims of legal personhood of topographic features (Studley 2018).
6. It is currently located in the Tibet Autonomous Region of the People’s Republic of China, but the relevant sacred geography extends over north-western Nepal and North India. It also has a wider global spiritual relevance.
7. The Bonpo spiritual master Lopon Tenzin Namdak mentioned this prophecy to Charles Ramble as reoccurring in ancient scriptures and being topical and evocative in relation to current global challenges.
8. Given how little is known of the Shangshung language and also how extensively it has been mythologized in later Bonpo traditions, the historical accuracy of this translation remains problematic. However, for the sake of this chapter, the mere fact that this explanation has become part of the



commentary elicited by the name of the mountain remains significant. I heard it several times from Tibetan Bonpo scholars, especially during a conference on Shangshung that took place in Lhasa in June 2018.

9. Local deities (mainly mountain gods) were integrated into the Buddhist framework through the binary classification of worldly deities (jigs rten pa'i lha/jigs rten pa'i 'das pa'l lha). The first instance of this distinction appears in the inscription that declared Buddhism the state religion of the Tibetan empire at the time of the construction of the first Buddhist monastery in the eighth century. At that time, these local deities were invited as witnesses to the event.
10. 'Earth Beings' is the translation of the word *tirakuna*, composed of the word land and the plural Quechua suffix *-kuna*. They are sentient entities that are mountains, rivers, lagoons and other visible marks of the landscape and that are in mutual relationships of care with the Runakuna.
11. <http://www.fao.org/mountain-partnership/members/members-detail/en/c/98621/>; <http://www.drikung.org/their-holiness/hh-kyabgoen-chetsang> (both last accessed 6 March 2022).
12. The funeral of the Iceland glacier had wide-ranging media coverage; see, for example, the BBC article 'Iceland's Okjokull glacier Commemorated with a Plaque' by Toby Luckhurst, 18 August 2019; <https://www.bbc.co.uk/news/world-europe-49345912> (accessed 22 September 2019). It also saw a sustained engagement by the anthropologists Cymene Howe and Dominic Boyer, who produced a documentary on the subject.
13. See, for example, Gressoney, *veglia funebre per il ghiacciaio del Lys: 'Ricordiamo ciò che di buono ci ha lasciato'*, 27 September 2019; <https://video.repubblica.it/edizione/torino/gressoney-veglia-funebre-per-il-ghiacciaio-del-lys-ricordiamo-cio-che-di-buono-ci-ha-lasciato/344599/345181> (accessed 22 September 2022).
14. Veerabhadran Ramanathan, Edward A. Frieman Endowed Presidential Chair in Climate Sustainability Scripps Institute of Oceanography, University of California, San Diego, has contributed to a wide range of research topics in atmospheric science. He was one of the scholars involved in the scientific debate at the Vatican Academy that provided the background for the Pope's Encyclical.
15. Charles Kennel, former director of the Scripps Institute of Oceanography, has been a regular visiting fellow at Cambridge where he promoted disciplinary engagement on climate change.

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