Thinking with Verticality: Making a High Place in the Alpine Cryosphere in the Anthropocene

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Abstract

This chapter explores the making of high places in the Alpine cryosphere in Tyrol, western Austria. In it, I propose that in our studies in and of mountain regions the three-dimensionality of space should become the focal point. Taking the Pitztal glacier ski resort as an ethnographic case study, I argue that, consequently, we must take the notion of "verticality" seriously if we wish to understand place-making in Alpine regions. What I claim particularly is to throw light on the "lived verticality", as experienced both by local research partners and anthropologists working in Alpine cryospheres. By employing a relational and multidimensional understanding of verticality I show the physical, social, moral and political dimensions of it. In doing so, we gain insights into the relational and flexible as well as self-determined making and manifestations of verticality and identity in high places in the European Alps.

Introduction: Verticality Matters

This chapter explores the making of high places in the Alpine cryosphere in western Austria. It is based on my research on the anthropology of snow in the Pitztal, an Alpine valley in the province of Tyrol. Taking the Pitztal glacier ski resort as an ethnographic case study, I discuss how its staff, mainly local men who build, engineer and maintain the tourist landscape, are making this particular high place into a workplace that has only begun to emerge in the recent history of Alpine regions. Highlighting their daily engagement in and with the cryosphere, and broadly contextualizing it, offers valuable

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insights into the current making of "high places"[1] (Cosgrove and della Dora, 2009) that are shaped by global tourism and climate change. Glacier ski areas provide numerous sites that are specifically defined for use by a variety of people, be it spaces for ski tourists and other visitors who consume and enjoy high places, spaces for alpinists and, last but not least, areas of environmental commons, such as water resources. All of those uses cannot be separated from "occupationscapes" (Hudson et al., 2011, p. 21[2]) based on snow and glaciers; rather, they intersect with each other in various ways.

Human–environmental dynamics in the Alpine cryosphere have only received scholarly attention in the last two decades or so (Orlove, Wiegandt and Luckman, 2008; Strauss, 2009; Dunbar et al., 2012; Elixhauser, 2015; Huggel et al., 2015; Beniston et al., 2018). However, until now anthropological enquiry has rarely focused on glacier ski areas. This is perhaps surprising, because, as I argue, glaciers provide important tourist spaces and are considered essential signifiers of climate change. As such they make a good entry point for learning more about the multifaceted processes, discrepancies and paradoxes shaping high places and human–cryosphere relations in the European Alps (see also Nöbauer, 2021, 2022).

While my chapter aims at a comprehensive understanding of current Alpine spaces and the prevailing political economy and political ecology therein, it also pursues methodological and theoretical goals. Referring to the overall theme of this book I show that through anthropological fieldwork we gain a variety of insights into larger transformations of the European Alps. This is made possible by grasping local people's points of view, their attitudes to life and work and their vision of their world (Malinowski, 1972, p. 25). Or to use Vered Amit's words instead, "[a]nthropology's strength is the ethnographic spotlight it focuses on particular lives, broadly contextualized" (Amit, 2000, p. 15).

1 High places are defined "either by high altitude or high latitude: they are mountain ranges and peaks or polar regions …: places of rock, snow and ice" (Cosgrove and della Dora, 2009, p. 3).

2 According to Hudson et al. (2011, p. 21) "occupationscapes" are "defined as landscapes formed and performed through histories of occupational behaviour". While this concept articulates the structural and political dimensions of landscape formation through labour, it also shares certain similarities with the phenomenological approach to landscape as proposed by Ingold (1993) in his theory of "taskscape". An ethnographic analysis of the Pitztal glacier resort as "occupationscape" is given by Nöbauer elsewhere (2021, 2022).

Acknowledging the large body of knowledge in the anthropology of space, I propose that especially in our studies in and of mountain regions the three-dimensionality of space should become the focal point. I argue that, consequently, we must take the notion of "verticality" seriously if we wish to understand place-making in Alpine regions in particular. According to mountain researchers from various disciplines, the three-dimensional space, shaped by altitude as an undeniably major feature, needs to be respected in empirical and theoretical terms (Orlove, 1977; Orlove and Guillet, 1985; Funnell and Parish, 2001; Rudaz, 2009; Mathieu, 2011; della Dora, 2016).[3] Following Michael Reidy's argument, "mountains teach us to take seriously the vertical as an analytical framework" (2017, p. 586). However, it is important to note that besides the attention on spaces above (height) a vertical analysis also engages with the subterranean spaces below (depth). "It acknowledges space as three-dimensional, with oceans and rivers, tunnels and caves, sanitation systems and mines, hills and mountains, skylines and airways" (ibid., p. 585). In doing so, "[v]erticality can give the spatial turn some vitality, some graininess, some needed texture" (ibid., pp. 586–587).

However, neither altitude nor verticality are given or natural categories; rather they are relational and historically constructed (Mathieu, 2011). If we accept the current popular understanding, which has its origin in science, verticality comprises altitude (the height measured from sea level) and depth (the dimension of what lies beneath the Earth's surface, be it soil, water or rock). Both topographical directions relate to the sea level and the Earth's surface. Besides this common scientific view, there are other vernacular understandings of "high" or "low" elevations throughout the world, which, depending on the respective social, cultural and natural environments, emanate from the perception of the relation between the two as a basic principle. From theoretical and ethnographic perspectives, verticality covers multiple physical, environmental, social and political dimensions, all of which gain significance in my analysis of the Pitztal glacier resort. The notion's usage, first and foremost, relates to the physical, geological, geomorphological and ecological characteristics of mountain environments, which are shaped by

3 I wish to mention here that the multi-dimensionality of space has been analyzed also through the perspective of volumetry. The editions by Franck Billé (2018, 2019, 2020) on voluminous states and sovereignty demonstrate a significant example of the volumetric approach.

relative altitude, slope and zonation (Rhoades and Thompson, 1975; Viazzo, 1989; Messerli and Ives, 1999; Montero, Mathieu and Singh, 2009; Mathieu, 2011; Price, 2015). Besides these physical and material dimensions (socially and historically constructed though they are), verticality's applications also encompass the social, political and psychological spheres. Accordingly, verticality may, first of all, indicate social structures, segregation and hierarchies (Graham and Hewitt, 2012; Lewis O'Neill and Fogarty-Valenzuela, 2013; Debarbieux and Rudaz, 2015; Harris, 2015; Cian, 2017). Linking ecology to the social, a special model of verticality has been applied by cultural ecologists in the anthropology of the Andes since the 1970s (Rhoades and Thompson, 1975; Orlove, 1977, 1987; Mathieu, 2011). It "claims that a sociopolitical unit maintains access to a number of different ecological zones. Membership in the units offers individuals access to the products of the different zones through mechanisms of reciprocity and redistribution" (Orlove, 1977, p. 88).[4] On the other hand, the political sense of verticality (which broadly overlaps with the social) addresses issues of power, control and surveillance through collective actions and public policies of targeting mountains (Debarbieux and Rudaz, 2015) and furthermore, exerting state and geopolitical power from above through modern technologies (based on the aerial gaze) such as illustrated by the concept of "politics of verticality" (Weizman, 2002). Conversely, the latter also tackles the exploration and exploitation of the subterranean (such as in mining). Drawing on my ethnographic research, I propose that there is a further variant of the politics of verticality that is expressed in spatial planning policies and environmental protection regimes in high Alpine regions. Last but not least, vertical-space positioning in its manifold dimensions is acknowledged in (anthropological) psychology as a basic human experience which is used for multiple metaphorical associations (such as hierarchy), more than any other physical dimensionality or location (Lakoff and Johnson, 1980, 1999; Cian, 2017). Reviewing the broad recognition of verticality in manifold disciplines and research fields, it seems even more surprising

4 However, when applying it to the question of global similarities in mountain agriculture, anthropologists failed to find answers for tropical and non-tropical mountain regions (Mathieu, 2011, p. 90).

to me that the significance of verticality in current anthropological research of and in Alpine regions has received so little attention to date.

Against this background and based on my research insights, I maintain that altitude, and particularly the relationship between higher and lower areas, gain pre-eminence in current place-making, in Alpine regions specifically. This includes the considerable attention the Alpine cryosphere has received in comparison to lower areas as a region where the impact of climate change has, unfortunately, become profoundly visible, first of all with the vanishing of glaciers. At the same time, the cryosphere, which in the Alpine past was regarded as useless land by the local farmers[5], is now considered useful by local people, tourists and the tourist industry because it provides the economically highly valued resource of snow more reliably than lower regions can. I therefore argue that despite climatic changes snow continues to make the cryosphere an essential ecological and socio-economic zone. What I claim particularly is to throw light on the "lived verticality", as experienced both by local research partners and anthropologists working in Alpine cryospheres specifically. Therefore, it will be of analytical significance to explain how and to which ends altitude/verticality is socially created and experienced in the Pitztal.

Studying place has been marginalized in anthropology in favour of space in recent decades. This shift occurred due to the overall focus on globalization and new conceptions of deterritorialized spaces and scapes. In a similar vein, so I argue, place finds itself put in a novel predicament in current approaches to planetary thinking (Chakrabarty, 2019). Notwithstanding, place is still "important in the lives of most people, if by place we mean the engagement with and experience of a particular location with some measure of groundedness (however unstable), boundaries (however permeable), and connections to everyday life, even if its identity is constructed and never fixed" (Escobar, 2008, p. 30). It is important to note that it is solely through these experiences of a certain amount of boundedness that a "sense of place" can also be facilitated. It is created by people's feelings of attachment and belonging to a place

5 There was an exception of using the glaciers though: local people used the crevasses of the Mittelberg Ferner, which in the past expanded down to the valley, as a fridge for meat until the 1950s. Sciences such as glaciology and ecology, in turn, considered glaciers as dead matter for a long time but acknowledge them as living matter now.

that arise from their emotional and cognitive experiences and cultural beliefs and practices (Low, 1992, p. 165).

Anthropologists share the view that place-making is a deeply social, constantly ongoing though contested endeavour which also includes the symbolic and emotional dimensions. However, along with some mountain researchers and anthropologists (Entrikin, 2009; Escobar, 2008) I argue that the material and environmental or ecological dimensions must equally be taken into account if we wish to understand high places specifically.[6] They appear particularly relevant in the increasingly contested efforts of place-making for touristic ends. In his investigation of territorial makings in the Colombian-Ecuadorian Pacific Arturo Escobar (2008, p. 23) emphasizes that "[a]ny territory is a territory of difference in that it entails unique place making and region making, ecologically, culturally, and socially". In accordance with Escobar (and many others committed to overcoming the dualistic thinking and binary categorization of nature versus culture predominant in Western thinking) I maintain that besides social life the non-organic and organic are also important for analyzing the production of place in its various dimensions (ibid., p. 35). To put it briefly, we can understand a high place (such as a glacier ski area) as a web of human and non-human relations implying different actors, forces and agentive powers.[7]

Having said this, developing a comprehensive notion of verticality requires consideration of its connection to global forces and spaces. Indeed, there are diverse local and global efforts targeting vertical spaces, both in their heights and depths (see below). This is especially true for the global capitalist economy in its endless search for and exploitation of natural (frontier) resources (cf. Ong and Collier, 2005; Tsing, 2001), including global tourism. Beyond that, the term "vertical globalization", which I have proposed elsewhere (Nöbauer, 2018, 2021), may help us to describe the increasing flows of people, ideas, infrastructure, communication technology, trade, and finance oriented towards high mountain areas and the sky.[8] While this orientation is

6 As emphasized by Nicholas Entrikin (2009, p. 217), bringing together the symbolic with the material is essential in analyzing high places.

7 For details about the agentive power of glacier water to destroy snowmaking technology and humans' plans to engineer the alpine cryosphere see Nöbauer (2021).

8 Increasing flows oriented towards the sky include for instance satellites, space flight and plans of climate engineering. I wish to add here that since that definition I have contin-

directed upwards in topographical terms, vertical globalization may also be directed downwards beneath the surface of the earth (e.g. towards maritime areas or focused on the extraction of diverse resources from beneath mountains or the earth).

High altitude matters in multiple and polymorphic ways in the Pitztal glacier ski resort. To briefly illustrate at this point: According to climate research, future snow reserves will be limited to high elevations, whereas snow at lower elevations will disappear. At the same time, glaciers are vanishing at unprecedented speed due to the impacts of climate change, and the retreat of permafrost is causing new dangers, such as increasingly frequent rockfalls and landslides. Furthermore, altitude is marketed by the tourist industry as the key feature in guaranteeing snow reliability, fantastic panoramic views, exceptional architecture, excitement and thrills for visitors. Moreover, the global circulation of images of snow and ice landscapes both by tourism professionals and tourists are paradigmatic visualizations of high places. Special infrastructure and technology are crucial for making, operating, accessing and consuming high places. At the same time, technological devices are exposed to numerous challenges caused by the unique atmospheric conditions high up, as are the particular techniques of snowmaking and glacier protection that the workers employ in the glacier ski resort. And last but not least, high places are characterized by physical and atmospheric conditions that place harsh demands on the human body due to the extreme weather in the form of biting wind and cold, burning sun, blinding snow and decreased air pressure (see also Cosgrove and della Dora, 2009, p. 10). Such a demanding physical environment affects the bodily experiences and health of the staff, tourists and me, as a field researcher, in undeniable and sometimes uncontrollable ways.

Having clarified my approach and focus in this introduction, I will next outline the ethnographic site of my research. Besides describing the settlement and socio-economic structure of Pitztal I will highlight the commitment to tourism and how it has contributed to the socio-economic transformation of the Pitztal region from extreme poverty to wealth. In the subsequent section,

ued to think more comprehensively and critically about the buzzword of "globalization", which has gained such prominence in anthropology and many other disciplines.

my methods of researching snow and vertical globalization and "doing the glacier ski resort", particularly, will be described. From the following section on, various topics related to and determined by verticality will be the focus. Beginning with the physicality of high altitude the unique physical and atmospheric conditions, the impacts of climate change on the Alpine cryosphere and spatial and safety policies at work in the glacier ski area will be presented. In the subsequent section the organization of the glacier ski company, the socio-structural dimensions of verticality are considered. Against this backdrop, I will then describe in more ethnographic detail the glacier ski resort, how it is made a high place and experienced as such. In doing so, the multiple dimensions of the lived and constructed verticality will be demonstrated. In the conclusion I will sum up the main analytical findings.

I have decided to design this chapter as a short journey to and through the Pitztal glacier ski area, thereby focusing on some ethnographic illustrations, broadly contextualized, in order to present the significance of verticality.

The Pitztal: From Agrarian Poverty to Prosperous Tourism

As mentioned above, the Pitztal is a high Alpine valley located in western Austria, in the province of Tyrol.[9] Beginning near the district capital of Imst, it follows a course for around 40 kilometres southwards from the river Inn, and stretches into the impressive Ötztaler Alps, which shape also the border between Austria and Italy in that area. Around 7,600 permanent residents currently live in the valley's four political communes.[10] Due to the high-altitude location the valley's settlement structure is very dispersed, requiring a steady up and down in daily mobility. With 3,158 permanent residents, Arzl is the biggest commune; it is located in the lower valley, near urban Imst, at an elevation of around 900 metres. At the other end, the commune of St. Leonhard is situated at the top of the valley and has 1,423 permanent residents settled in areas at more than 1,700 metres. In between we find the communes of Wenns (nearly 1,000 metres at its lowest) counting 2,123 permanent resi-

9 The geographic coordinates are: 47° 6′ N, 10° 49′ E.

10 As of 1 January 2022 (Statistik Austria – Bevölkerung zu Jahresbeginn 2002–2022 nach Gemeinden. Gebietsstand 1.1.2022).

dents and Jerzens (1,100 metres at its lowest), which has the smallest number of permanent residents (920).

Each commune is composed of a network of very small villages (and even single houses), some of which have large church buildings of their own and various social and cultural associations besides the main communal infrastructure. Settling at different altitudes has led to a specific social (infra-) structure that until recently has occasionally resulted in stark social distinctions and separation between even those tiny villages. The lower valley is characterized by a mixed economy balancing small trade, craft, diverse service companies, small-scale agriculture and tourism. In contrast, the upper valley is predominantly based and fully dependent on tourism, mainly winter tourism. All three Pitztal ski resorts – notably the Hochzeiger resort, the Rifflsee resort and, adjacent to it, the Pitztal Glacier ski resort – were established there, in Jerzens and St. Leonhard. Besides tourism, there is some Alpine pasture and sideline farming, which mostly participates in the tourism business in various ways. It was in the latter two communes that I carried out my fieldwork on the anthropology of snow and issues of vertical globalization between 2012 and 2019.

As in many mountainous regions in Austria and elsewhere, in the Pitztal snow provides the major rationale for the regional economy and identity. It constitutes the most important occupationscape both for the local permanent residents and the significant numbers of seasonal migrants who currently come mainly from Eastern European countries. Although some mountaineering in the Pitztal had already started in the nineteenth century (Pechtl, 2005, 2015), modern winter tourism was initiated by provincial politicians together with local inhabitants in the 1960s. They shared the socio-economic and political aim of reviving the Pitztal, which at the time was extremely poor, and of securing its economy. This ambitious goal was expressed in the following commitment by local people in 1966: "We will put our existence, our future, and all of our energy into tourism" (Hochzeiger Bergbahnen, 2009, p. 6).[11] The valley has undergone a profound socio-economic transformation since then: from an extremely poor high Alpine region, which in the past was primarily based on agriculture, into one whose wealth today de-

11 German original: "Wir legen unsere Existenz, unsere Zukunft und all unsere Kraft in den Tourismus" (Hochzeiger Bergbahnen, 2009, p. 6).

rives from the service-based tourist economy. In the past few decades, tourism has brought stability to residence levels in the valley as a whole, and even an increase in the population, with some in-migration to the mixed-economy lower valley. However, in the upper valley, which depends exclusively on tourism, while population fluctuates, overall population is decreasing. This poses a certain threat to the Pitztal, as it does to other Alpine regions in Austria and elsewhere. Therefore, the commitment to winter tourism which, in spite of retreating snow and glaciers, is still regarded to guarantee residential and economic stability, continues to have great economic, social, cultural and emotional power in the Pitztal. Modern winter tourism has changed the value of snow, transforming it into a commodity now known as "white gold" throughout the European Alps (Denning, 2015). Snow as a commodity and all the associated infrastructure and imaginations now circulate within global economic and cultural flows – in addition to the global mobility of the many thousands of tourists from all over the world who consume snowscapes.

"Doing the Glacier Ski Resort": Methods of Approaching the High Place

Despite considerable criticism on ethnography for various reasons from within the discipline, the significance of ethnography in/for anthropology still is paramount. The methodological attempt to enter and understand a different world by using the whole self physically, intellectually and emotionally as an instrument of knowledge constitutes a disciplinary consensus (Ortner, 2006).[12]

I felt (and still feel) deeply committed to this fundamental consensus when following my main question of how people live with snow and make a living from it in the Pitztal. Accordingly, in addition to conducting a range of interviews, I have adopted a mixture of qualitative methods, among them – and most importantly – taking part in as many meetings, joint adventures, events and informal talks with local and some non-local people as possible. The mutual building of reliable and trusting informal relationships was by

12 It should be mentioned at this point that the pandemic caused by the SARS-CoV-2 virus limits and even undermines this fundamental self-understanding of anthropology as a discipline.

far the approach most appreciated by my local interlocuters and myself as it was not mediated by a contract, in contrast to the informed consent forms that increasingly shape social research practices now (Stacul, 2018, p. 97). Participant observation took place in diverse settings, such as various public and family festivities and events, local council meetings, numerous days out hiking and skiing with locals, and environmentalist activities. In the glacier ski resort, I regularly accompanied some individual glacier workers in their daily work as well as "going along" (Kusenbach, 2003) with local mountain guides and passionate local alpinists in order to learn from their reflections on the changing cryosphere. Without doubt, the most physically challenging and intense fieldwork was in the glacier ski resort, basically due to the extreme weather and atmospheric conditions (lower air pressure, rapidly changing weather). My fieldwork stays as a single researcher took place between 2012 and 2018[13] (lasting between two and six weeks).

Although I had visited (and still visit) the Pitztal glacier resort during each of my fieldwork stays in Pitztal, making a broad range of contacts, and preparing fieldwork access, fieldwork in the glacier resort itself was carried out during the 2014 winter season, in the summer and early autumn season in 2015 and finally in winter 2019. The warmer season in particular is the most intensive time for the workers who maintain the overall infrastructure of the resort and prepare tourist snowscapes by engineering the landscape (see below). Although a seemingly paradoxical choice when researching snow and ice issues, the timing in the summer period was actually perfect for unlearning the significance of the temporality of snow and learning more about the deep transformations of the Alpine cryosphere.

13 In addition, I had four of two- or three-week stays in Pitztal between 2012 and 2019 in the course of fieldwork seminars with master students from the Department of Social and Cultural Anthropology at the University of Vienna. The research conducted by students has made valuable contributions to my own research and that of other students, as does my research to theirs.

Figure 1 – The “occupationscape” of the Pitztal glacier ski resort in summer 2015.

The Physicality of High Altitude: Between Nature, Climate Change and Policy

Glacier ski areas share many similarities with ski resorts in non-glaciated areas, such as lift and restaurant infrastructure, piste management, snowmaking and safety measures for skiing. At the same time, they differ from them in several respects: including the unique atmospheric, climatic and ecological conditions that characterize their environment. As I experienced and witnessed throughout my fieldwork, elevations of 3,000 metres and above pose myriad challenges to the human body and health, to technical apparatus, to snowmaking technology and to many of the plans humans make in order to engineer the cryospheric landscape.

Although glaciers in general have been shrinking since the end of the Little Ice Age in the nineteenth century, from the mid 1980s glaciers worldwide have undergone a more or less dramatic retreat (Bender et al., 2011, p. 407). Glacial loss and lack of snow cover not only affect the ecological balance, but

they also impact directly on people living in the vicinity, affecting their local economies, regional and global tourism, modes of perception and senses of place (Cruikshank, 2005; Dunbar et al., 2012; Orlove, Wiegandt and Luckman, 2008; Wiegandt and Lugon, 2008). The retreat of the glaciers in the Ötztaler Alps, which are (still) home to the largest continuous glaciated area of the Eastern Alps in Europe, is particularly drastic (Lieb and Kellerer-Pirklbauer, 2020). Nevertheless, glacier ski areas are marketed to tourists as providing "true snow reliability" when compared with resorts at lower elevations. In a similar vein, due to their high-altitude locations glacier ski resorts have mostly been considered in climate research and tourism as exclusive future skiing reservations. Climate-research models project that ski areas in Europe located below 1,200 metres will disappear towards the end of the century (APCC, 2014, p. 16, 25; Marty et al., 2017), though a recent study has revealed that there may also be a decrease in snow depth of about 50 per cent for elevations above 3,000 metres by then (Marty et al., 2017). As will be illustrated below, the extreme weather and atmospheric conditions prevailing in the Alpine cryosphere along with the dramatic climatic change pose a variety of challenges to the glacier workers in their daily work.

Glacier ski areas incorporate a whole range of legal provisions, including standard operating procedures, as a prerequisite for their establishment and maintenance and environmental protection regimes. While many of these predominantly province standard regulations relate to particular weather, ice and snow conditions[14], provincial, national and supranational EU environmental policies are directed at the proper use and protection of the cryosphere environment or landscape and its resources (such as water)[15]. Regional spatial planning policy defines, among other things, the areas to be protected: for example, "untouched" glaciers are considered highly vulnerable areas requiring protection. Familiarity with these regulations is very important when carrying out field research, in order to fully comprehend

14 Aiming at the safety of humans and infrastructure these include for instance the constant control of snow conditions, of the pistes, crevasses, ablation, wind.

15 To protect the environment or landscape against humans' disproportionate interventions into it, the provincial and national environmental protection authorities must assess the impacts of intended interventions on the environment (in German *Umweltverträglichkeitsprüfung* or *UVP*). Put in different words, before realizing plans such as building new infrastructure, expanding pistes and blasting off rock areas the glacier ski resort companies are legally obliged to apply for formal permission by the respective environment authorities.

the diverse tasks and narratives of the workers. For example, rapidly changing weather, snow and ice conditions must be monitored several times a day by the staff in order to make, and keep, the ski area safe for skiers. Besides the daily weather forecast, measurement of the wind is especially crucial, as members of the technical staff are individually responsible for immediately stopping the lifts once the wind speed becomes a risk factor. To put it more precisely, the unique and rapidly changing wind conditions at high elevations directly impact on the safety of mountain railways, and hence on the security of humans and the stability of the business economy. Thus, the relevant staff need to acquire and apply sound knowledge about the weather, wind, glaciers, snow and avalanches, among other things, and must observe them in detail so as to be able to act rapidly to risks. The movement of glaciers, crevasses and the breaking up of ice are further potential dangers to skiers, and thus must also be monitored and appropriately managed (Amt der Tiroler Landesregierung, n.d., pp. 21–22). In particular, so-called "atypical dangers" such as avalanches, a piste entirely freezing, crevasses that cannot be filled in or ablation (i.e. the melting of snow and ice cover over large areas) must be constantly safeguarded against and/or eliminated. If this is impossible, then pistes must be closed (ibid., p. 23). When glaciers move, as they do by natural way, they have an impact similar to that of melting permafrost and destabilize the towers of the T-bar lift. Consequently, each year workers must adjust and relocate the lift towers. Ablation poses another challenge, as I saw during my fieldwork: bare rock, debris or permafrost soil are exposed in ablated areas, which must then be adapted into a "piste-friendly" base by flattening the ground. Drilling and blasting technologies are used to break up the rocks, and vast amounts of stones are removed in trucks. In this context workers would warn me, again and again, "Pay attention and keep away for the next few minutes!" (see also Nöbauer, 2021).

While these tasks are mainly defined by provincial piste-security regulations, other practices (such as preparing the ski slopes, making snow depots, applying snowmaking technology) widely described as snow management, have emerged from the economic and competitive imperative for "snow reliability", and are interrelated with the changing global climate. However, both categories of practice intersect with each other, insofar as they share the safety of tourists and piste security as their prime objectives (Nöbauer, 2021).

Indeed, in the course of tourism history in the Pitztal glacier area, numerous accidents, including fatal ones, have already occurred as people – often due to carelessness and ignoring safety warnings – fell into crevasses or were crushed by avalanches.

Social Verticality: The Organization of the Glacier Ski Company

Counting around 100 employees, currently the glacier ski resort company is one of the biggest employers in the Pitztal. The great majority of employees are local people, mainly men. Some of them have been working there for as long as thirty years or more. So far, only a very few people, all in senior positions, are from other Tyrolean regions, and none of the significant numbers of seasonal migrants working in restaurants and hotels down in the valley are employed "high above" by the glacier company. This in turn accords with the contract concluded between the political commune St. Leonhard and the glacier company to give preference to locals' employment if more candidates are equally qualified. In the early years of the glacier resort the prevailing local narrative about glacier workers teased and attached little value to their jobs and professional skills (see also below). This former disrespect and devaluation of them has changed profoundly because their manifold skills of craftsmanship, technological, organisational and entrepreneurial ability and deep knowledge of the weather, snow and ice are widely acknowledged now. Against this background and compared to the elder generation of workers the younger one experiences more and better career-development options today. Similar, and related to the changes of locals' valuing glacier workers, the greatest majority of the Pitztal inhabitants now attribute also a high economic value to the glacier ski resort. Even those local people who reject any ideas and plans of expanding glacier ski tourism[16] profit from current glacier ski tourism by hosting tourists in their hotels and pensions down in the valley.

16 The Pitztal glacier ski company (supported by all Pitztal communes) together with the glacier ski resort company of Sölden in the neighboring Ötztal valley had a plan for many years to build the biggest glacier ski resort of Europe. However, after a recent communal vote in St. Leonhard in 2022 a majority of its permanent residents rejected that plan.

Beside the aforementioned generational and ethnic differences between workers health issues represent and indeed are another pre-eminent factor in experiencing age and high places particularly. Although high altitude affects also the health of younger staff elder ones reported more frequently about that burden. Among those working in the glacier ski resort for decades is Heinrich[17], a man in his late fifties who is responsible for security and piste management. He described the health implications of working in the cryosphere, especially with increasing age:

> In the long run, working up here is a health risk .... The extreme weather conditions at these altitudes make the workers sick. Worst of all is the wind, because it determines everything! And also the sun is much more dangerous up here. Look at my skin: it's like thick leather,

he pointed at his face. Then he continued: "Listen to me, you really must drink a lot of liquids! We have to drink five litres of water a day up here otherwise we get bad headaches, fatigue or dizziness." (interview, 14 November 2014)

In addition to the growing health risk, most of the older glacier workers also complained about the lack of respect for their work among many locals in past decades. Working high up on the glacier, for them, has only slowly begun to receive increasing appreciation down in the valley. In contrast to Heinrich and his generation, his young(er) colleagues emphasized their fitness and sporty attitude and passion (though also reiterating the importance of drinking sufficient water up there). Moreover, the younger ones still find working at such high elevations exciting. They not only feel fitter but also that their work is more appreciated. Unlike most of their older colleagues, many of them are offered various apprenticeships, professional training and careers. At the same time, some are keen to experience the pleasure of skiing at the end of their work day. Heiko, a young man in his late twenties, loves to work on the glacier, and had had the chance to progress into the responsible position of snow technology manager. "I really love it up here! Who else would be able to ski downhill in such a fantastic landscape at the end of a work day. Whenever possible I ski downhill after work", he enthused (field note, 7 February 2018).

17 All names are authentic names of my research partners/participants

Although nearly all employees are local people, and unlike the Hochzeiger ski resort in Jerzens, which is entirely in the hands of local shareholders, the glacier resort is owned by a private non-local, Tyrolean company with a variety of investors. However, the land on which the ski resort operates is owned by the political commune of St. Leonhard, which, back in the 1980s, assigned the right to use the land for an unlimited period to the company, providing that it offered as many jobs as possible to local people. However, the divergence between land use and ownership causes various ambiguities and conflicts today.

Besides generational and ethnic differences there is a gendered division of labour: Women and a few men work predominantly as part-time employees in the three restaurants/cafés up in the glacier area and in the tourist office down in the valley.[18] Only men hold leading positions,[19] personnel and technology manager, restaurant managers, security and piste manager and public relations manager. All the men who work up in the glacier area, and who have different tradesman skills and technical training or are semi-skilled, are employed full time all year round, quite in contrast to the seasonal female staff. The former are called "glacier workers" and it is with them that I spent most time during my fieldwork, thereby participating as a woman anthropologist in a men's world.[20] Their main tasks are: maintaining the "hard" technological infrastructure (such as cable cars, snowmaking technology, snow groomers, trucks and snow mobiles, the solar power plant); preparing, maintaining and securing the slopes; transporting tons of supplies up to the restaurants and garbage down to the valley again; transporting various construction materials and fuel for the snow groomers and snow mobiles (by using the underground train Glacier Express or trucks or helicopters).

The glacier resort's ski season lasts eight months, usually from early September to early May – a period twice as long as that of ski resorts at lower elevations. The early season is dedicated to the training of competitive Alpine and cross-country skiers from various countries, including Austrian champi-

18 As recently as in 2022, a young local woman has started to drive the underground train Glacier Express.

19 After I completed my fieldwork, a non-local woman (the daughter of the former managing director) together with a non-local man became the managing directors. However, the managing director(s) did and do not have their offices in Pitztal.

20 Due to lack of space I cannot go into the details of this gendered constellation.

ons. Due to its expanded season, the glacier ski resort is the most prosperous of all three Pitztal ski resorts, generating the greatest economic value.

Uniqueness and Troubles in a High Place: Experiencing and Creating Verticality

During wintertime the Pitztal glacier ski resort is completely covered with snow. In contrast in the summer season the impressive landscape features the browns, reds and greys of seemingly endless glacial debris and soil, rocks and peaks; large grey and light-blue glacier fields carved by crevasses; numerous milky glacial streams; huge white snow depots; inactive snow cannons and a massive infrastructure of buildings and ropeways. As construction work is constantly being carried out, visitors frequently encounter noisy excavators, cranes, drills and trucks.

Staff and visitors can access the resort within ten minutes by riding the Pitztal Glacier Express; this underground funicular railroad departs from the tiny village of Mittelberg at 1,730 metres and arrives at its top station at 2,840 metres, with its views of the large Mittelberg Ferner[21]. As indicated here infrastructure and technology indeed take on a pivotal role in building this high place in Pitztal. Infrastructure and technology in turn intersect with a variety of physical, social, moral and environmental issues in constructing this particular high place. In the following this will be illustrated.

Physical and Social Strain of Working at High Altitude

According to Alois, one of the original workers (now retired) who participated in building the Glacier Express tunnel and the first buildings up in the glacier resort in the early 1980s:

> physically and socially [it was] a brutally hard time, full of physical and mental strain .… In the summer we stayed up there for long periods without going down to the valley. We felt extremely lonely and had a cute little pig to keep us company. We named it Ms. Daisy. But you know, at least I had a job again. … However, I

21 The regional term for glacier is *Ferner,* which literally means snow from previous years.

> must also say that all this wet, cold and wind destroyed my health, so that I had to retire prematurely due to the painful chronic illness I contracted. (interview, 6 August, 2015)

As already emphasized earlier by Heinrich, Alois also strongly and repeatedly lamented about the demanding physical conditions of working in the cryosphere environment and the serious effects of it on his health. However, quite in contrast to today, in the initial period working high up also had the social consequence of loneliness.

In the large building that houses the top station, there are also a couple of offices for the managers, cabins for workers and tourists, ski equipment shops and toilets. Nearby there are two big restaurants and, next to them, is Europe's highest photovoltaic power plant, which was built during my fieldwork stay in the summer of 2015. In our conversations, the male workers for the Austrian steel company that installed it emphasized that working at such high elevations had been by far their most strenuous working experience.

Social and moral values of higher and lower elevations

On its website the company claims that "[w]ith the construction of a modern photovoltaic system at Pitztal Glacier we have set a clear example for more sustainability and environmental protection in the Alpine region".[22] One of the managers, Reinhold, agreed suggesting that the plant (delivering one third of the company's electricity demand) provides a good example of the progressive and future-oriented attitude of the company and its director, in contrast to the valley, where many people oppose progress.

Prior to that, Wilhelm, the first general manager, originally from the northern part of Germany, became a key figure in promoting the new ski resort until his retirement in the early 2000s. He also identified the glacier ski resort with progress, ascribing "backwardness" to "the valley", and reported the many difficulties in the new glacier resort and him being accepted. According to Wilhelm, in the beginning there was strong resistance from a group headed by a Catholic priest: "There was and still is this 'church tower' mentality[23] here in the valley. Many won't accept people from outside, like

22 https://www.pitztal.com/en/en/photovoltaic-pitztal-glacier (accessed 5 February 2021).

23 In German original *Kirchturmmentalität*.

me, and they try to prevent and stop progress. It's like thinking only as far as the church tower but not beyond it". He described his experiences in an insulted though haughty tone. (interview, 7 February 2014)

The heated relationship constructed and performed between high and low that these quotations address by way of ascribing progress to the high place and resistance to progress and even "backwardness" to the lower places reverses the stark but by now restored dichotomy constructed from the eighteenth century on between rural (or Alpine) and tradition versus urban and modernity. As I have argued in more detail elsewhere (Nöbauer, 2022, p. 228) modern winter tourism (coming along with various processes of turning natural snow into the commodity of "white gold") became part of a broader process of configuring and pushing modernity and capitalist economy in the European Alps and beyond. Modern technology and transport infrastructure have, among others, become intensely associated with modernity and progress, as echoed above by the glacier workers and managers. But while the dichotomy in its reversed variant still remains a frame for values for them, a more differentiated analysis must be considered. By linking Arturo Escobar's (2008) understanding of territory (see above) with an analytical perspective on verticality, as I proposed at the outset, I argue that through the vernacular ascriptions of values addressed above (which are part of wider cultural ideas of modernity) we gain insights into the relational and flexible and self-determined making and manifestations of verticality and identity.

The above-mentioned competition between high and low echoes also Alois's experiences. In the above-mentioned interview (6 August 2015) he recounted that he was regarded as a traitor by some people in Jerzens, his home village, because they saw the glacier ski resort as a big competitor to the Hochzeiger ski resort. This uneasy relation is also reflected in what one of the local Jerzens women explained to me some days later: up on the glacier there would simply be plain, boring highways for the masses of rather unskilled skiers, whereas the Hochzeiger resort would offer a variety of attractive slopes for better skilled skiers (field note, 16 August 2015).

Even prior to his work in the glacier company, so Alois admitted in one of our many informal talks (field note, 8 August 2015), people in Jerzens were envious about his leaving the valley for the big wide world and accused him of arrogance and of thus trying "to be better than the locals". Alois, who grew

up on a small high Alpine farm, became a ski instructor in various huge resorts in the Tyrol, the USA and Japan. He frequently and passionately told me about his many experiences abroad and, in particular, his fascination for Japanese culture. Later he owned a hotel in Jerzens for some time before he lost it. Back then, in a time of deep personal crisis, the construction of the glacier ski resort (including the tunnel) provided him with a highly welcome new employment option.

Especially Alois's narrations reveal multiple dimensions of local and global experiences of verticality. Looking at them in chronological order, we first find him growing up on a small farm located high up on a steep mountain slope (which he showed to me) with its extensive view of the outer Pitztal. Next, he participated in and actively contributed to the global spread of skiing, both in his home country and abroad. As a glacier worker he then reached out to new heights and depths with a conquering attitude. As he explained to me: "You know, there was nothing there before. Nothing. Just ice! And now there is big business" (interview, 6 August 2015). After this initial phase he continued to engineer, reconstruct and modify that place for touristic ends, until his premature retirement. In doing so, he became an important and still well remembered part of the novel high place. However, leaving the local sense of "lived verticality" of Jerzens and expanding the senses of verticality caused social trouble to him. In particular, Alois personally experienced the harshly competitive relationship which is still going on between the lower Hochzeiger ski resort and the glacier ski resort above it. In addition, the new spaces on top of and beneath the glacier area have severely harmed his health even though he previously was a very fit and sporty person.

Climate Change and Frontier Technology at High Altitude

Continuing our journey through the glacier area, nearby buildings buzz with activity. Enclosed in one of them is a unique, huge snowmaking machine called the All Weather Snowmaker (Figure 2).

Figure 2 – The All Weather Snowmaker installed inside a special building.

This machine attracted my interest from the very outset because I was curious about why a machine was desired that, as its name indicates, is able to produce snow even at very warm temperatures and claims to be independent of the weather. By researching the machine's special vacuum-ice tech-

nology[24] and its history through written sources I learned about its different uses in several countries around the world. Combining this knowledge with my fieldwork insights it turned out that it was a globally dispersed frontier technology deployed in extreme environments for accessing new spaces and various resources, both at high altitudes and high latitudes (such as the polar regions). The paths of this freezing-separation method started in particular from the Arctic Ocean in Siberia and the Mediterranean Sea in Israel – two regions where sea water was transformed into drinking water by means of this method in the 1940s and 1950s, respectively. Its path then takes us to South Africa, where for some decades it has been employed to cool the hitherto deepest gold mine (reaching down as far as 4,000 metres). Finally, this special technology has arrived at Europe's glaciers, where the All Weather Snowmaker is currently used to produce snow for skiers. More specifically, this special *all weather snow* facilitates the early season start in two glacier ski resorts in Europe: one in Zermatt in Switzerland, the other in Pitztal (details see Nöbauer, 2018). As Reinhold, the chief technical manager, reported to me, their company had acquired the 30-ton, 15-metre-high machine "in order to counter the effects of climate change" (field note, 31 August 2016) and allow the ski season to start in September. In fact, during the last few decades the glacier had vanished (also) in the particular moraine area at 2,900 metres, where all weather snow is produced and employed. After countless problems due to its emplacement at high altitudes, it began operating for the first time in the Alpine cryosphere environment in 2009. However, it requires a very high amount of energy, which is why some glacier workers criticize the Snowmaker, Heinrich in particular. He explained that this machine "goes against nature because it is unnatural to have snow at warm temperatures" (interview, 14 November 2014). According to him "technology should always go along with nature and not against it". Quite in contrast, his colleague Markus, a technician, reaffirmed his strong conviction that "any technology available in the market should be used for guaranteeing snow" (interview, 2 November 2016). After I had been in the field for some time it became ap-

24 In this case, the production of all weather snow is based on the vacuum-ice-principle. For details see: https://www.prnewswire.com/il/news-releases/ide-is-offering-vim-all-weather-snow-maker-a-sustainable-and-environmentally-friendly-solution-for-all-snowmaking-applications-800827151.html (accessed 10 January, 2022). This system differs from the one operating in snow cannons.

parent that the machine could not function properly as it "was not compatible with glacier water" and "could not handle glacier water" (field notes, 16, 20, 21 August 2015). In fact, the glacier water, which naturally contains sediments from the rocky environment, hardened into a kind of cement in the turbine and as a result regularly impeded and even destroyed it. As I have analyzed elsewhere, glacier water has emerged as an agentive force in the cryosphere environment (Nöbauer, 2021). The particular problems arising in that high place could not be solved in a satisfactory way until my latest fieldwork stay in late 2019.

Environmental Policy at High Altitudes

Environmental policy in high Alpine altitudes comprises a whole range of regional, national and supranational (EU) prescriptions and regulations. Among others, defining areas, such as glacier areas, to be protected, measuring of landscape intervention and of the use of natural, common resources such as water, as well as assessing the impacts of man-made environmental changes, are paramount. Both, water policy and environmental impact assessment play a particularly important role in glacier ski resorts in Austria. In Tyrol, the provincial government's *Wasserbuch* (waterbook) strictly prescribes the use of water (in high areas glacier water, in lower areas spring water) for snowmaking. In addition, the regional (and national) authorities, through the environmental impact assessment, permit or prohibit the building of special infrastructure such as water-storage pools for snowmaking and humans' interventions into the (protected) landscape such as rock blasting. During my fieldwork the managers clearly articulated their growing problems with water. Above all, the rapid retreat of the snow cover caused problems and thus made them claim additional quantities of water for snowmaking.[25] The second water problem emerged due to the above-mentioned incompatibility of glacier water with the All Weather Snowmaker.[26]

25 The glacier company's managers had already applied for the formal permission to build an additional water storage system. They were stressed and angry that they had to wait for a considerable time for the permission to access an alternative source of water from a lower area. However, they had still not received this permit by the end of my fieldwork in 2019 (personal comment Reinhold, 7 December 2019).

26 In order to cope with the ongoing problems that glacier water was causing to the snow-

Related to these problems and as analysed elsewhere (Nöbauer, 2021), both the Tyrolean water and environmental protection policy as well as the nature and power of glacier water have not appeared as passive material entities. Rather, they can and must be considered as materialities that are able to impede or block either the entire construction of a water-storage system or the use of water for snowmaking.

A further problem emerged with the transport of the snowmaker to the high altitude. Prior to the installation of the snowmaker in the Alpine cryosphere, transporting it from Israel, its country of origin, up to the glacier in Austria was full of unprecedented challenges for the glacier company. After being shipped to Slovenia it was carried by special trucks to the Pitztal. On arrival, the smaller parts were transported up by the Glacier Express. The biggest parts, however, were driven in another special truck up a very steep path called *Notweg*[27], which was later renamed *Sicherheitsweg* (emergency path and security path). This path, which partly crosses a protected glacier area, became the subject of a, also publicly, highly disputed legal case[28] because its construction was approved by the commune of St. Leonhard, the landowner in 2006, without environmental assessment permission. It was intended to provide a path for bringing down skiers in the case of an emergency on the Glacier Express. As an ungroomed slope, it is currently used by skilled skiers to ski down to the valley in wintertime and as a path for the glacier company's trucks transporting various construction materials in summertime.

maker, the company decided, after the end of my fieldwork, to order a modified turbine model which was to be constructed and also adapt the snowmaker's water-storage pool. The proposed new pool material and technology would significantly reduce the amount of sediment in the pool (personal comment Reinhold, 14 September 2017), so that it would no longer block the turbine. During my visit in Pitztal in August 2022 I was told that the turbine was renewed and would be ready for operation this year. After year-long troubles, the company would have finally also received the formal permit for constructing another water-pool only very recently.

27 The slope gradients are up to 30 per cent.

28 In 2008, the Austrian Alpine Association filed a complaint to the European Commission against the Tyrolean authorities because of their approval of the emergency path and its construction without the obligatory environmental impact assessment. Although the construction violated EU law, the long-drawn-out proceedings were terminated in 2013 with no consequences for the province of Tyrol.

Collecting Snow and Covering Glaciers at High Altitudes

Another striking presence in the glacier resort immediately attracts attention: a significant number of huge white hills stand amidst the landscape. These are the snow depots. Glacier workers use snow groomers to collect the snow from previous seasons[29] and store it in these hills, covering them with white geotextiles to prevent the snow from melting too soon (Figures 3 and 4).

Before the beginning of the next season in September they distribute the stored snow in order to fill in and shut crevasses with it and to make pistes out of it. This method, which is widespread in glacier ski resorts in Europe and beyond, has been used in Pitztal since the early 2000s. These depots comprise natural and man-made snow. According to the glacier workers, the snow depots represent the most important technique for securing the early seasonal opening. Later, during the winter season, additional snow produced with snow cannons is employed to secure sufficient snow cover for the pistes. Moreover, snow depots are of social significance to workers, as illustrated by Heinrich, who emphatically stated that "[t]hese depots stand for my job's future!" (field note, 29 July 2015).

29 Harvesting snow for improved irrigation is increasingly used in various agricultural and environmental realms in different countries. In ski tourism, so-called harvesting snow or snow farming is a widely applied measure regarded as a key measure to save ski tourism in Europe and beyond, and, in particular, to expand the skiing season. In English, the term "harvesting snow" is commonly used. This is not the case with its German translation. Rather the vernacular expression used by the glacier workers and local people in Pitztal is "Schnee-Depots anlegen" (literally "making or mounting snow depots"). I never heard them using the expression "Schnee ernten" as termed in English with "harvesting snow".

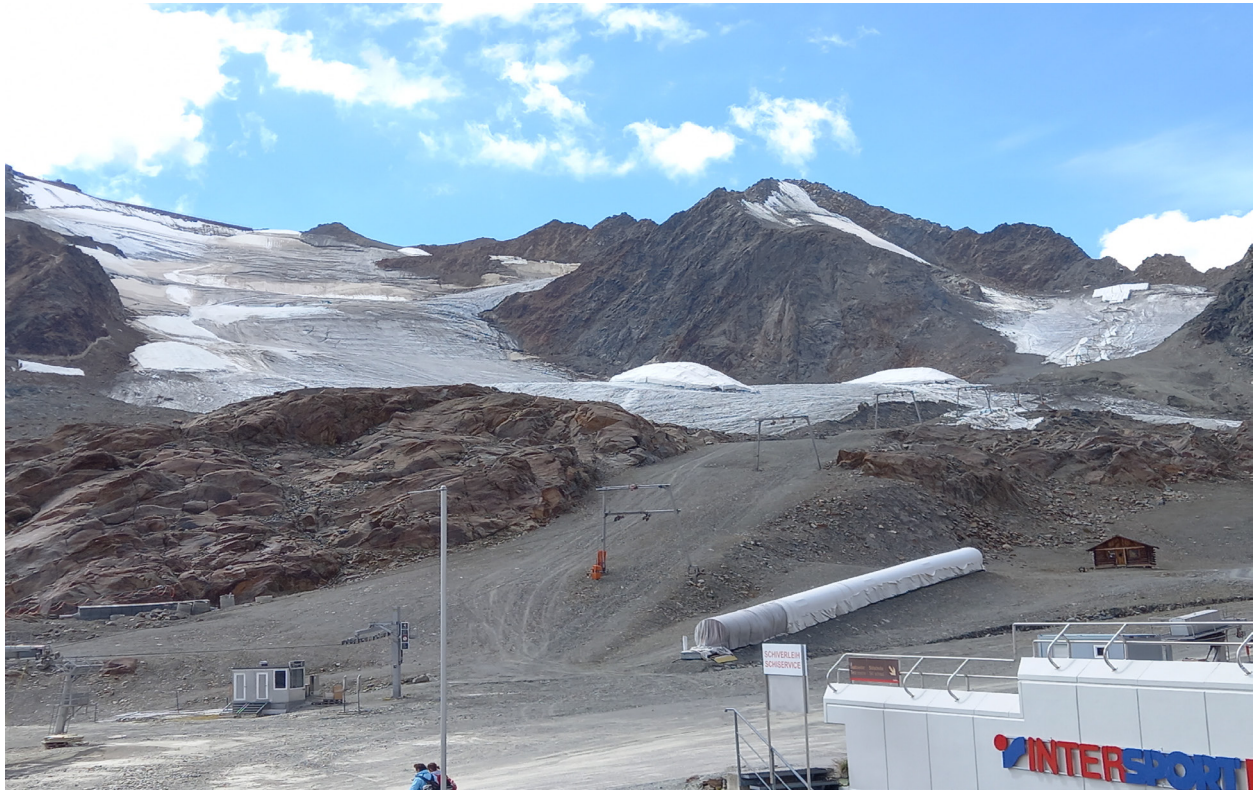

Figure 3 – Snow depots across the glacier landscape in summer 2022. Copyright 2022 by H. Nöbauer.

Figure 4 – Workers use a digger for removing geotextile covers in summer 2015.

Certain areas of the glacier and permafrost also have an extraordinary appearance. Like the snow depots, they are covered with textiles during the summer period. The aim of this is to slow the rapid retreat of the glaciers and permafrost, and thereby to keep the slopes safe. Indeed, the vanishing of glaciers and the degradation of permafrost are considered to be major hazards in Alpine regions. Both cause rocky slopes to break up, leading to deposits of large amounts of soil and debris as well as rock falls that endanger the built environment and infrastructure and cause casualties (Krautblatter and Leith, 2015, p. 147). The workers have constantly expressed their concerns about these dangers to me. Besides their daily control of and safeguarding against "atypical dangers" in glacier ski resorts such as avalanches, entire pistes freezing, crevasses and ablation (see above), they must now make even greater reconstruction and repair efforts in the face of the increasing effects of climate change (Figure 5).

Figure 5 – "Repairing" the glacier landscape in summer 2020.
Copyright 2020 by H. Nöbauer.

Severe damage occurred in 2018 at the highest point of the ski area when a huge glacier broke and destabilized a slope. In order to rebuild the damaged slope and enable the season opening, the company illegally blasted away a considerable area of rock that was defined as protected. Although the company was forced by the environmental authorities to close that particular slope, it was permitted to reopen it a few months later on the condition that it would "rebuild" the area as much as possible.

As Reinhold explained to me, the company was already cooperating with geologists in finding solutions. "We must find answers within the next five years otherwise we could be forced to close everything down", he commented dramatically when describing the profound geological changes (field note, 4 December 2018).[30]

30 During my visit in August 2022 I tried to find out details about the current state of future solutions. The latter appeared even more pressing because the vanishing of the glaciers has accelerated with more speed during the extremely hot summer 2022 than perceivable

Consumption at High Altitude

Visitors and some staff access that very same peak area, at nearly 3,500 metres, by means of Austria's highest gondola: the Wildspitzbahn. Building its top station and the café-restaurant, in 2012, presented the various workers, all of whom were men, with unprecedented challenges. Reinhold, the chief technical manager of the glacier company, with a proud tone, recalled in one of our talks: "Work at those altitudes was extremely tough. Even the strongest men were knocked down!" (field note, 14 September 2015).

Besides people, the gondola also transports food, drinking water and the like to the most promoted local tourist site, namely Austria's highest café-restaurant, Café 3.440. Here, during the day, visitors can consume drinks and home-made cakes. From the viewing platform located above the café, visitors, including myself, can experience the physical, emotional, mental and technological dimensions of lived verticality. As tourism communication is promising, standing at such a high point, one can indeed gaze at a fantastic panorama that takes in the impressive ranges and (white) peaks of the Austrian, Swiss and Italian Alps, including Tyrol's highest peak, the Wildspitze (3,774 metres). However, at the end of the day, after all visitors have gone, personnel transport sewage and the restaurant garbage to collection points next to the two restaurants further down. Transporting the sewage is a highly delicate and risky procedure and workers must wear mouth and nose protection and gloves.

Of all the sites in the glacier ski resort, the peak area described above, with all its ambiguities and contradictions, is the one that has been turned into the touristic place most extensively loaded – symbolically, materially and emotionally – with altitude as a key signifier. There the consumption of high places in modern tourism becomes a focused and special variant of lived verticality. The panoramic view provided by the café's architecture, which represents a big frozen wave made mainly from glass, and the terrace integrated into the café along with the adjacent panorama platform are all materializations of the modern visual techniques of consuming the Alps and experienc-

ever before. The response I received was that a regional geologist advised the company to wait with more substantial adaptations because the climate would turn around again towards cooling.

ing high places and space particularly from above (cf. della Dora, 2016).[31] As if this was not enough, this special view is combined with the consumption of food and beverages such as coffee or beer, both poured from fascinating machines adjusted to the lower air pressure at high elevations. Furthermore, the marketing of this high place includes such events as "the highest breakfast", "the highest wedding", "the highest wine tasting" and the end-of-season running contest Vertical 3,440. All together these experiences of verticality each year attract many thousands of visitors from various countries (except for the first two years of the pandemic).

Conclusion

In this chapter I have analysed the multiple ways of how and to which ends verticality comes into play and is experienced in the making of a high place such as the Pitztal glacier ski resort. Starting from a relational and multidimensional understanding of verticality I have demonstrated physical, social, moral and political dimensions of it. Considering the Pitztal valley as a whole, the relationship between lower and higher elevations runs through the whole region and its glacier resort as a significant marker of social, moral, economic and environmental differences. Altitude determines this high Alpine valley's settlement structure, economies and ecologies in fundamental ways and generates social, economic and environmental differences between even tiny villages. Amidst the paramount importance of winter tourism, the competition between the Hochzeiger ski resort, located at a lower but still high elevation, and the glacier ski area is a striking example in its own right. Attending to the Pitztal glacier ski resort, first and foremost, the unique physicality of glaciers, crevasses, snow and steep rocks, harsh atmospheric conditions and deep environmental and climatic changes present prime characteristics of this high place. These affect humans, non-humans, infrastructure

31 It should be mentioned here that this view became popular in the so-called Alpine paintings in the 18th and 19th century. Beyond that, it resembles the concept of the panoptic view of surveillance as proposed by Jeremy Bentham in the eighteenth and nineteenth centuries to be installed as a modern control system in institutional buildings. Later this concept was expanded by Michel Foucault in his analysis of social control of all citizens in everyday life in modern nation states.

and technology in essential and manifold ways. In particular, economic competition and accelerating climate change require manifold and increasingly challenging but also contested measures to be taken to guarantee an overall safe ski resort and a stable, profitable economy. The unique physical and atmospheric conditions also form the precondition for understanding the multiple dimensions of lived verticality as experienced by male glacier workers, on whom I focused in my contribution. Moreover, the physical and atmospheric overlap with further dimensions of verticality.

The social organization of the company running the glacier resort revealed a pronounced social and structural sense of verticality. It ranges from social differences – mainly in terms of gender, generation (or age) and ethnicity – within the organization of the glacier company to the distinction between locals and (seasonal) migrants. The most relevant differences of the lived verticality among male glacier workers emerged by age. Health problems, the change of values regarding glacier work(ers) and career options were portrayed as significant mismatches. Thereby health problems were experienced with increasing age due to the harsh physical and atmospheric conditions determining the cryosphere. The valuation of glacier work(ers), in turn, was, for a long time, dominated by the view taken on by locals down in the valley. Finally, career options were and are offered to a minor extent to the elder generation in the past and today, whereas younger staff gets better options today. The striking change of the valuation of glacier work(ers) by local people down in the valley must be viewed in relation to the high economic value that the glacier ski resort has gained for the Pitztal valley and its inhabitants over the decades. Relational social verticality here intersects with the changing value of the glacier from a formerly agriculturally "useless" area to an economically highly useful resource today.

Infrastructure and all associated technology referring to altitude such as the highest cable car, the highest café-restaurant, the highest photovoltaic power plant, unique frontier technology such as the All Weather Snowmaker, for their part, prove to be central in constructing – and indeed building in a material sense – this particular high place. At the same time, the emphasis on placing things "highest" forms an integral part of tourism that builds heavily on unique selling points and consumption of the high place. However, promotion strategies also have become fragile. A particular example of this

became obvious with the former public promotion of the unique all-weather snowmaking machine which, for the first time, was installed in the Pitztal cryosphere. As I illustrated, this technology has been causing problems to the company because an essential material entity of the cryosphere, notably glacier water, by its natural composition and force, blocked and destroyed that same machine.

Beyond that, modern technology at high altitude was used as a preeminent reference by glacier company's staff for attributing social and moral values to high and low elevations by ascribing progress to the glacier resort. In contrast, staff ascribed "backwardness" to the areas lower down in the valley. In doing so, they reversed the historically constructed myth which made a stark distinction between urban and lower regions associated with progress and modernity and, contrasted to it, rural (including Alpine) and higher regions associated with tradition and "backwardness". Understanding verticality as a relational, variable and analytical category proved to be particularly relevant for analysing this dualistic reversal.

Finally, the illustrated physical, social and environmental pressures conspicuously mingle with the current politics of verticality which prevail in the form of environmental protection legislation of glacier areas and water policy. Amidst the rapidly growing impacts of climate change on the Alpine cryosphere, discrepancies between the glacier company and environmental authorities have emerged in multiple ways. They involve opposite interests regarding the increase of water for snowmaking. Similar contrasts occur with human interventions into protected glacier areas and the projected (but very currently cancelled) expansion of the glacier ski resort.

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