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Emmanuel Salim, Christophe Gauchon, Ludovic Ravanel. Seeing the Ice. An Overview of Alpine Glacier Tourism Sites, Between Post-and Hyper-Modernity. *Revue de Géographie Alpine / Journal of Alpine Research*, 2021, 109 (4), 10.4000/rga.8383 . halshs-03209091

**HAL Id: halshs-03209091**

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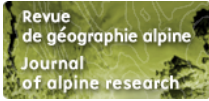
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**Electronic version**

URL: <http://journals.openedition.org/rga/8383>

ISSN: 1760-7426

**Publisher:**

Association pour la diffusion de la recherche alpine, UGA Éditions/Université Grenoble Alpes

**Electronic reference**

Emmanuel Salim, Christophe Gauchon and Ludovic Ravanel, "Seeing the Ice. An Overview of Alpine Glacier Tourism Sites, Between Post- and Hyper-Modernity", *Journal of Alpine Research | Revue de géographie alpine* [Online], Varia, Online since 22 April 2021, connection on 22 April 2021. URL: <http://journals.openedition.org/rga/8383>

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# Seeing the Ice. An Overview of Alpine Glacier Tourism Sites, Between Post- and Hyper-Modernity

Emmanuel Salim, Christophe Gauchon and Ludovic Ravanel

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*The authors thank Fenja Hildendrand for her help with the German translation of the manuscript and Sarah Voke for her help with the English translation. This work is part of a doctoral project supported by the ANR under the LABEX ITEM ANR-10-LABX-50-01 programme. This study has also received financial support from the EU ALCOTRA AdaPT Mont Blanc project (Adaptation of territorial planning to climate change in the Mont Blanc area) funded by the Interreg V-A Italy-France 2014-2020 programme*

## Introduction

- 1 Glacier have been a source of natural hazards and fears for mountain societies for a very long time (Engel & Vallot, 2016). In specific contexts, mainly outside Europe, it was (is sometimes) regarded as the incarnation of superior forces (Cruikshank, 2005). However, since the beginning of the 18<sup>th</sup> century, an increasing number of tourists have sought to reach and observe these ice masses. Although a first –relatively brief–description of the Rhone Glacier (Valais, Switzerland) was published by the scientist S. Münster in 1561, a precise description was made only in 1708 (Jorio, 2002). At the Mer de Glace (Mont Blanc massif, France), the visit by the two Englishmen W. Windham and R. Pococke in 1741 led to its development as a tourist destination (Joutard, 1986). Since then, Alpine glaciers have been invested and developed for both summer and winter tourism.
- 2 Mountain glaciers are currently of considerable importance as a tourist attraction. Glaciers around the world attract thousands –even millions– of visitors per year, such

as in New Zealand (Purdie, 2013), Canada (Groulx *et al.*, 2016), China (Wang *et al.*, 2010) and France (Salim & Ravanel, 2020).

- 3 However, current climate change and its significance in mountain areas (Einhorn *et al.*, 2015) is leading to an almost widespread glacier retreat throughout the world (Bosson *et al.*, 2019). The impacts on glacier tourism are increasingly well documented and include (but are not limited to): extensive degradation of access to tourist glaciers (Wang & Zhou, 2019), deep landscape changes (Diolaiuti & Smiraglia, 2010), increasing danger of glacier-based activities (Purdie *et al.*, 2015) and changes in visitors' motivations (Salim & Ravanel, 2020). In the Alps, given the particularly prompt glacier retreat (Haeberli *et al.*, 2019), adaptation strategies have been developed and are beginning to be studied (Salim *et al.*, 2021). At the same time, the profound and rapid evolution of glaciers raises questions about the organisation, values and spatial dynamics of Alpine glacier tourism sites.
- 4 Without necessarily being linked to climate change and its consequences, several concepts have been developed to question the evolution of tourism and recreational practices in mountains. Among them, the concepts of post- and hyper-tourism seem particularly adapted to the case of glacier tourism. For some authors, post-tourism refers to the phenomenon of leisure trips, where spaces built for tourism are invested by permanent inhabitants attracted by tourist amenities (Martin *et al.*, 2012). For others, post-tourism is built around the concept of post-modernity and is understood as a form of tourism defined by a logic of playful transgression and artifice (Bourdeau, 2012). This essay will favour the latter definition since it is widely observed in mountain resorts, as seen from the development of ultra-festive establishments such as *La Folie Douce* in several French ski resorts. These establishments see themselves as “day clubs” combining snack bar and club atmosphere<sup>1</sup>. More recently, the concept of hyper-tourism has been developed to refer to a form of tourism that is “always further, higher, stronger, and more expensive” (Bourdeau, 2018; p. 3). the example of space tourism perfectly illustrates this and could be relevant for glacier tourism.
- 5 These different concepts should not be read as exclusive, but rather as forms which can coexist both spatially and temporally.
- 6 In this context, the aim of this paper is to question the forms of development of Alpine glacier tourism in light of the concepts of post- and hyper-tourism, respectively understood as being turned towards a tourism of fun and games or towards a tourism of superlatives. It aims to define and spatialise glacier tourism sites throughout the Alps and, at the same time, to question the forms of tourism taking place there. As the majority of the sites only operate during the summer, this work emphasises on this season. This article also focuses on sites mainly visited by tourists, excluding special recreational practices such as alpinism.

## Alpine glacier tourism sites

- 7 It is first necessary to define what “glacier tourism” is. In their literature review, Welling *et al.* (2015) define it as a form of tourism where a glacier is the main tourist resource. However, authors working in this field of research differ on the types of activities that fall within the scope of glacier tourism. For some (*e.g.*, Furunes & Mykletun, 2012), only commercial activities taking place on the surface of the ice refer to this field. For others (*e.g.*, Groulx *et al.*, 2016; Purdie, 2013), any activity which feature

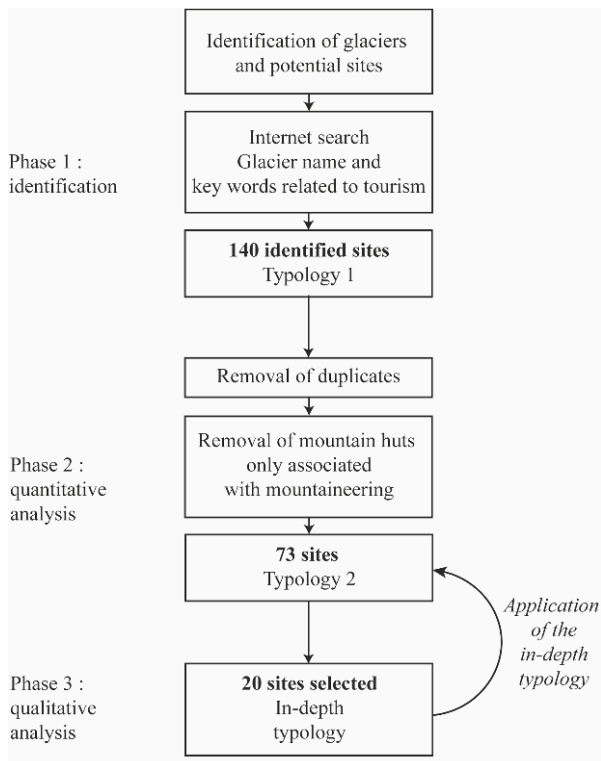
a glacier as main attraction may be related to glacier tourism. Finally, other authors (*e.g.*, Cayla, 2009; Reynard *et al.*, 2009) consider that tourist activities which are developed around remains or traces of the passage of former glaciers, and which have an educational component, is a form of glacier tourism. Considering that the interest in activities taking place only on ice is very restrictive regarding the history of the tourism around Alpine glaciers in Europe, largely built around the idea of contemplation, glacier tourism will here be understood as the set of tourist activities taking place on or around a glacier which constitutes one of the main attractions with regard to existing promotional elements. Tourist activities built around remains of past glaciations will not be taken into account here. In regards to summer ski resorts on glaciers, the glacier in question represents the main attraction; these infrastructures are part of glacier tourism.

- 8 The emphasis for this research lies on the summer population of 'tourists', defined in the sense of Knafou *et al.* (1997) as a population living in an off-daily space. This positioning limits the consideration of practices which, although they may be 'touristic', are more recreational in nature. The practice of alpinism is therefore excluded since it brings other values and relationships with the territory. The case of summer skiers is more complex since it sometimes involves the use of the same structures as those used by contemplative tourists. However, we believe that main objective of summer skiing, as part of glacier tourism, is not to "look at the ice". This population and the infrastructures exclusively related to this activity are therefore excluded from the analysis.

## Identifying Alpine glacier tourism sites

- 9 A specific method of inventory was developed in order to identify glacier tourism sites across the Alps with a near completeness (Figure 1). Glaciers in the Alps were identified using the GLIMS inventory (Raup *et al.*, 2007). Areas around the glaciers were visualised using topographic maps and aerial photographs in order to identify the potential presence of tourist infrastructures (buildings, paths, ski lifts, roads). At the same time, an Internet search was carried out associating the name of each glacier with the term "tourism" in French, English, Italian, German and Slovenian. This first phase made it possible to identify 140 "glacier tourist sites" (Figure 2).

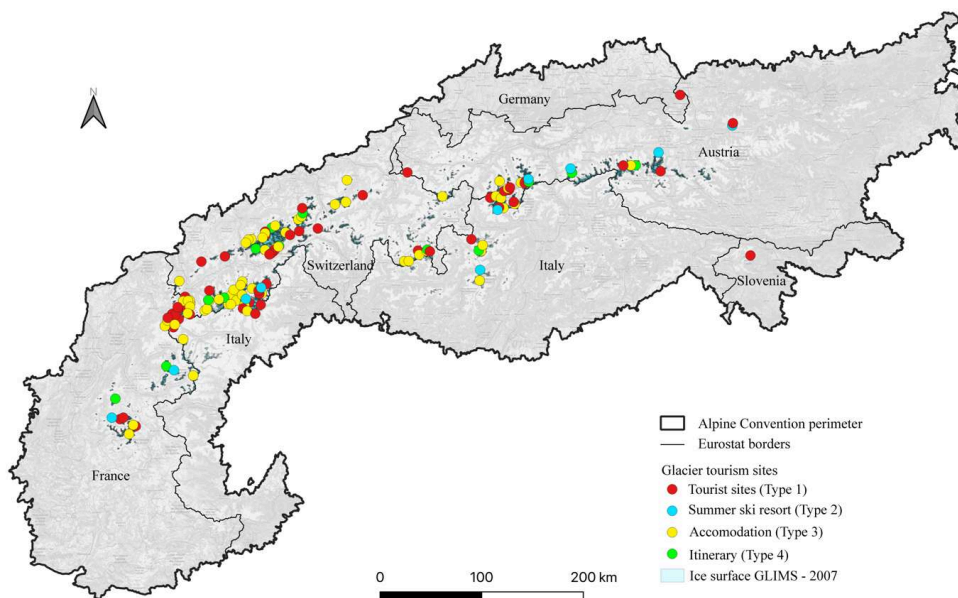
Figure 1: Identification, classification and analysis of Alpine glacier tourism sites



Credit : Salim E., Gauchon C. Ravanel L.

- 10 In a second phase, the 140 identified sites were classified on the basis of their main function. Type 1 are tourist sites in the sense of Knafou *et al.* (1997), *i.e.*, places mainly characterised by visitor practices, with the glacier as main attraction (*e.g.*, Montenvers, Gornergrat). Type 2 corresponds exclusively to glacier-based summer ski resorts (*e.g.*, Hintertux, Tignes). Type 3 involves accommodation, mainly huts, accessible without specific equipment and located close to a glacier (*e.g.*, Glacier Blanc, Gletscherstube). Finally, Type 4 corresponds to glacier interpretation itineraries (*e.g.*, *Espace Glacialis* in Champagny-en-Vanoise).

Figure 2: The 140 glacier tourism sites identified during the first inventory phase



Credit : Salim E., Gauchon C. Ravanel L.

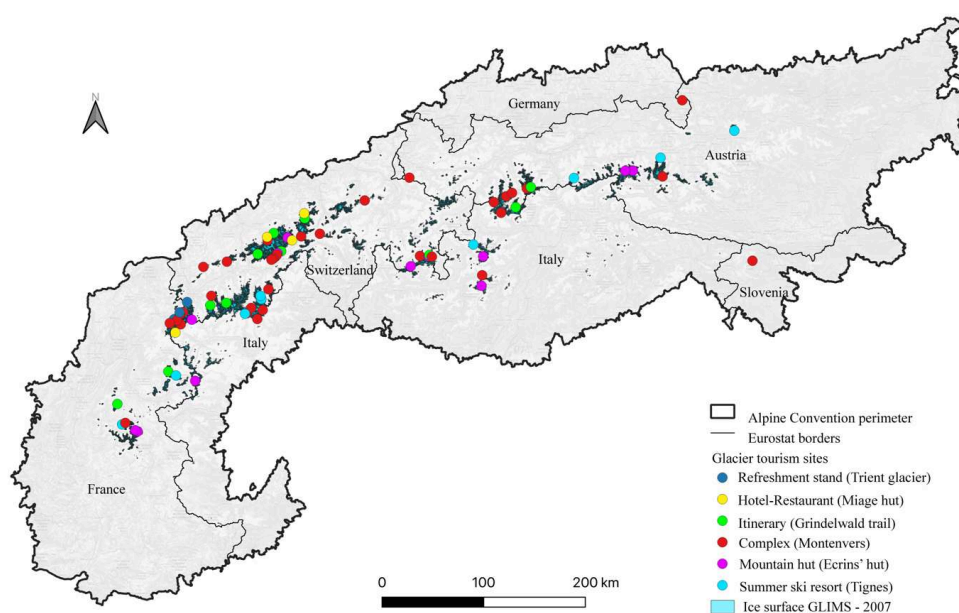
- 11 However, the inventory produced suffers from a number of shortcomings. On the one hand, it is quite possible that this method makes some very small sites “invisible”, interpretive trails in particular. The inventory cannot therefore be considered as exhaustive. On the other hand, even if particular attention was paid to this point, it is possible that the same site was counted multiples times (for example by including two nearby infrastructures separately) even though they are part of the same complex. Finally, many of the huts inventoried are used almost exclusively by alpinists who – although they may be considered to some extent as glacier tourism– are not of interest here. It is thus necessary to specify the selection criteria in order to obtain as complete and reliable inventory as possible.
- 12 To do so, the sites inventoried were studied through their website in order to verify that: i) the glacier indeed appears as a promotional element; ii) two nearby sites are not part of the same complex; and iii) the huts selected have another function than the one related to alpinism. This stage allowed the development of a more in-depth typology, based on the main function of the site. Six categories were then created: i) refreshment stands, ii) hotel restaurants, iii) interpretation trails, iv) mountain huts, v) glacier summer ski resorts, and vi) “complex” sites, a category which includes “large” glacier tourism sites for which no main function clearly stands out. This third step has reduced the number of glacier sites to 73 (Figure 3); their distribution across the different Alpine countries is detailed in Table 1.

Table 1. Distribution of the identified glacier tourism sites according to country, type and function.					
	Type 1	Type 2	Type 3	Type 4	

	Complex	Ski resort	Refreshment stand	Hotel-Restaurant	Hut	Trail	Total
Germany	1	0	0	0	0	0	1
Austria	7	2	0	0	2	2	13
France	5	2	2	0	3	2	14
Italy	5	2	0	1	4	0	12
Slovene	1	0	0	0	0	0	1
Switzerland	16	2	1	3	3	7	32
<b>Total</b>	<b>35</b>	<b>8</b>	<b>3</b>	<b>4</b>	<b>12</b>	<b>11</b>	<b>73</b>

Credit : Salim E., Gauchon C. Ravanel L.

Figure 3: The 73 glacier tourism sites with their main function, identified in phase 2



Credit : Salim E., Gauchon C. Ravanel L.

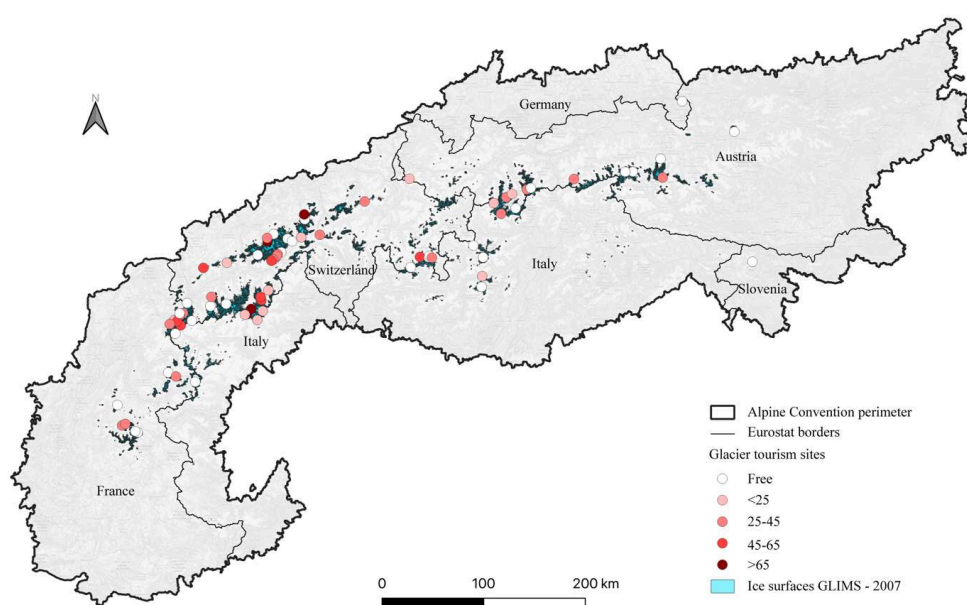
## The glacier tourism sites

- 13 The 73 identified sites are located between 1468 and 3880 m a.s.l. (mean: 2910 m). They provide access or views on glaciers with a front located between 1500 and 3200 m a.s.l. (mean: 2313 m), and with surface areas between 1 and 86 km<sup>2</sup> (mean: 16 km<sup>2</sup>).
- 14 Different types of access to glacier sites coexist within the inventory: 57% of sites are accessible by lifts (42 sites), whereas railways represent 6% (4), toll roads 4% (3) and finally, 33% of the sites (24) are accessible only by foot (hiking). While access by cable-



car is well distributed between France, Switzerland, Italy and Austria, there is a geographical disparity for road access which is only an Austrian feature, while access by train is only present in Switzerland and France. The fees to access these tourist sites vary considerably, ranging from a free access for some interpretative itineraries which are accessible by foot, to around €200 for a round trip to the Jungfrauoch (Bernese Alps) which is accessible in summer and winter thanks to heavy infrastructure requiring maintenance. Figure 4 shows a map of the access fees for the 73 tourist sites. The highest prices (> 65 €) are mainly seen in Switzerland with the Gornergrat, the Matterhorn Paradise or the Jungfrauoch. The other sections are spread throughout the Alps.

Figure 4: Access rates (round trip) to glacier tourism sites (summer 2020). Values in Swiss Francs have been converted into Euros



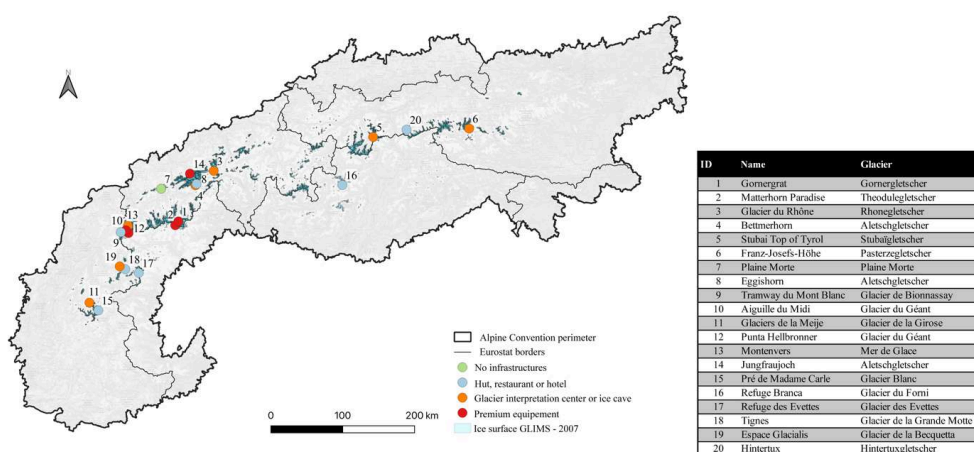
Credit : Salim E., Gauchon C. Ravanel L.

- 15 In order to better define tourism dynamics of the 73 listed sites, a new categorisation has been developed on the basis of the tourist infrastructures present on-site. Four levels of equipment were selected, excluding infrastructures exclusively ski-related: (1) no other equipment than access infrastructure for summer tourism; (2) presence of an altitude restaurant and/or a hut/hotel operating during the summer; (3) presence of an ice cave, a glacier interpretation centre or other equipment of the same type; (4) presence of premium equipment (luxury shop, cinema, *Pas dans le Vide* 'a footstep into the void'). The results of this categorisation show that sites with equipment of levels (2) and (3) predominate (49/73). Level 4 sites (7/73) are mainly located in Switzerland (4/7), while level 1 sites (17/73) are spread throughout the Alps.

## What are the tourism practices?

- 16 A qualitative analysis is required in order to precisely identify the tourism practices on sites. 20 glacier tourism sites out of 73 were selected according to their type and on the basis of their level of equipment in order to carry out an in-depth work. It requires *in situ* observation periods and the analysis of promotional material and the grey literature published on the subject (Figure 5). Each category is represented within the selected sites in order to ensure a good representativeness for the qualitative analysis.

Figure 5: Sites selected for the qualitative analysis



Credit : Salim E., Gauchon C. Ravel L.

- 17 The first tourism practice observed is related to contemplation. It is easily identifiable on the promotional features with titles such as “An unforgettable Alpine panorama and a unique view of the Matterhorn”<sup>2</sup> for the Gornergrat (Switzerland), the mention of “Viewpoints”<sup>3</sup> about the various tourist sites located on the left lateral moraine situated downstream from the Aletsch glacier (Switzerland), or the catchphrase on the website of Franz Josefs Höhe (Austria): “Panoramic view of the Grossglockner and Pasterze”<sup>4</sup>. These elements are in line with visitors’ main motivation to travel to various glacier tourism sites, both Alpine and non-Alpine – contemplation– (Stewart *et al.*, 2016; Lemieux *et al.*, 2018; Salim & Ravel, 2020; Welling *et al.*, 2020). This construction of the promotion/marketing around the landscape and its emblematic and unique character is a key feature of the 20 sites studied. The landscape therefore represents a common basis on which other practices and discourses are based. For many sites, this resource is coupled with restaurants that promote the unique view from their terraces or “refuges” that rely on the landscape as a guarantee of an unforgettable experience. The restaurant “Le Panoramique” at the Montenvers (France), the “Bistrot Panoramique” at the Punta Helbronner (Italy) or the “Matterhorn Glacier Paradise Restaurant” in Zermatt (Switzerland) are remarkable examples. The practice of contemplation is also built around a resource linked to altitude. Indeed, glacier tourism sites such as the Aiguille du Midi (3842 m a.s.l., France), the Jungfraujoch (3454 m a.s.l., Switzerland) or the Matterhorn Glacier Paradise (3883 m, Switzerland) use altitude as a strong added experiential value. The Matterhorn Paradise thus claims to be “the highest mountain resort in Europe”<sup>5</sup>.

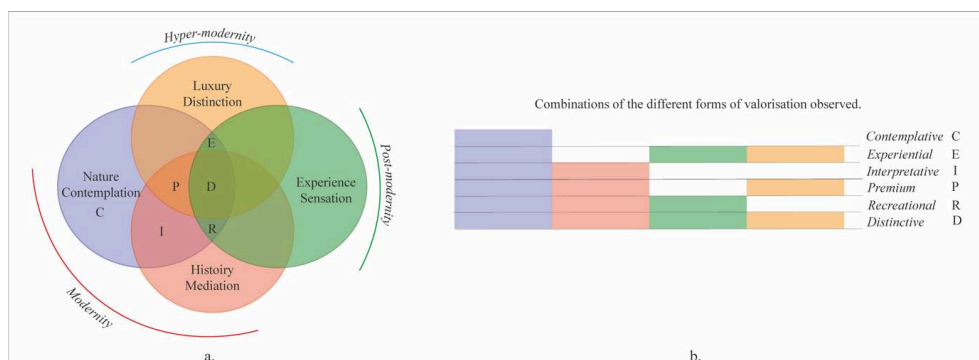
- 18 The second practice that is widely present pertains to visits of ice caves. While they remind us of the tourist attraction that was the Arveyron Cave at the front of the Mer de Glace (France) until the middle of the 19<sup>th</sup> century (Joutard, 1986), today's ice caves are becoming exhibition halls with, for example, the ephemeral sculptures of the *Palais de Glace* in the ice cave of the Jungfrauoch or the Montenvers. Such caves are becoming spaces for scientific mediation as it is the case in the *Eisgrat* at the Stubai-Top-of-Tyrol intermediate station. Some of them can even be converted into private areas for celebrations, such as the Matterhorn Paradise ice palace, which can accommodate up to 25 people and can be booked for drinks<sup>6</sup>. The ski resort of Hintertux (Austria) is a noteworthy case that deserves to be mentioned here. In addition to year-round skiing, the resort has also developed a caving activity in the natural crevasses of the glacier. In addition to visits, the Hintertux Glacier experience tour also offers activities such as paddling, kayaking and swimming into the sub-glacial torrents.
- 19 These activities, sold with the argument of “having fun”<sup>7</sup>, resonate with a third practice existing at many sites related to “fun parks”. They are similar to “snow tubing” slopes where visitors can descend the snow-covered slopes sitting on a large inflatable buoy. This is the case, for example, at Hintertux and the Matterhorn Paradise. Other activities include zip-lining over a glacier at the Jungfrauoch or, more recently, at the Mont Fort (Switzerland). In addition, a number of glacier resorts have cinemas, such as the “Cinema lounge” at the Matterhorn Paradise, the “360 cinema” at the Jungfrauoch or the “Alpine cinema” at the intermediate station (2713 m a.s.l.) of the cable-car reaching the Punta Helbronner.
- 20 More prevalent is the practice associated with environmental mediation; various forms coexist within the sites studied. Some have developed glacier interpretation centres such as the *Glaciorium* at Montenvers or the “Ice World” at Bettmerhorn (Switzerland). Some others have integrated interpretation elements into their ice caves, such as the Stubai glacier (Austria). Others, such as the Rhône Glacier (Switzerland), have placed interpretive elements along educational trails. Several sites have even developed mediation using audio-guides (Gornergrat), or “personified” mediation as at Montenvers where a glaciologist is present throughout the summer at the main viewpoint. Finally, certain operators located in the vicinity of the glacier tourist sites studied organise guided tours, such as the *ProNatura* Swiss association, which provide guided hikes around and on the Aletsch glacier.
- 21 Finally, some sites have opted for upmarket strategies that promote the consumption of luxury goods and services. They are expressed through different ways. Here are a few examples: a “shopping centre” at the Gornergrat, Tissot and Lindt shops at the summit of the Jungfrauoch, or the “Alpine Boutique” at the Punta Helbronner. They promote crafts, chocolates, perfumes and wines. This notion of luxury is also expressed in the marketing elements of the sites as it is the case in the gondola lift to the Matterhorn Paradise which gives “the feeling of being a star: exclusive Swarovski crystals both inside and outside the cabins”<sup>8</sup>. This is also expressed in the fees: in addition to the Jungfrauoch, the cost of the round ticket for the Aiguille du Midi (Chamonix) is €65 and CHF 95 (85 €) for the Matterhorn Paradise.

## Alpine glacier tourism, from modernity to hyper-modernity

- 22 The qualitative study of Alpine glacier tourism sites during summer shows that different practices may co-exist, from which 4 forms of valorisation can be identified: i) one form of valorisation focused directly on the elements of the environment (glaciers, moraines, peaks); ii) a construction around the history of the site or the interpretation of the landscape, in an educational approach; iii) a reliance on the notions of surpassing oneself, thrills and fun; and iv) a form turned towards luxury and the feeling of distinction.
- 23 The first of these forms of valorisation, largely linked to the glacier as a constitutive element of a “unique” landscape, represents an invariant of all the sites examined. Beyond highlighting the motivations for historical visits to an Alpine glacier such as the Mer de Glace (Joutard, 1986), this form of valorisation corresponds to the main motivations of visitors on glacier tourism sites (beauty of the landscape, glacier, and “naturalness”) (Stewart *et al.*, 2016; Salim & Ravel, 2020).
- 24 The second most widely represented form of valorisation, linked to the notion of landscape education or interpretation, is based on the historical and scientific values of the sites. In particular, it evokes the motivations that prevailed during the “discovery” of glaciers during the 18<sup>th</sup> and 19<sup>th</sup> centuries, especially with visitors such as J. J. Scheuchzer at the Rhône glacier in 1708 or H. B. de Saussure at the Mer de Glace in 1760 (Debarbieux & Gumuchian, 1988; Jorio, 2002). The development of the scientific interest of glaciers shows their potential as “geotouristic” resources (*e.g.* Pralong, 2005). These two forms of tourism are similar to modern tourism practices in the sense that they enhance the ideas of active contemplation and historical “conquest” (Corneloup, 2011).
- 25 The third form of valorisation is based on the development of a marketing approach related to the notions of fun and thrills and appears to be linked to the search for “experiences”, “playfulness” and even transgression. This is noticeable with the development of activities such as the summer toboggan runs at an altitude of 3000 m a.s.l. at the Jungfraujoeh, the zip lines above a glacier, or the reassignment of the use of infrastructures as, for example, the organisation of meals around a cheese fondue in the Matterhorn Paradise gondola or the possibility of privatising certain ice caves for aperitifs. These practices seem to be a form of post-tourism in the sense that they have a strong recreational component, an offer based on experience (Bourdeau, 2018), or bear the notions of festivity and community (Corneloup, 2012).
- 26 Finally, the fourth form of valorisation is based on marketing that emphasises an overbid for luxury, experiences and technologies. This would be a form of hyper-tourism as defined by Bourdeau (2018), *i.e.* the search for “always further, higher, stronger, and more expensive”. The development within these sites of high-altitude shopping centres or cinemas raises questions about the forms of alterity which are developed there: the “elsewhere” of this form of tourism takes up the codes of the “here” (Bourdeau, 2003). These sites can also be interpreted as places which join the concept of hyper-places (Lussault, 2017) insofar as they are places of “incessant over-cumulation” and “hyper-spatiality” since they appear as globalised tourist sites.
- 27 These different trajectories of tourism development are obviously not isolated; they very often coexist within the same site. Figure 6a summarises the links between the

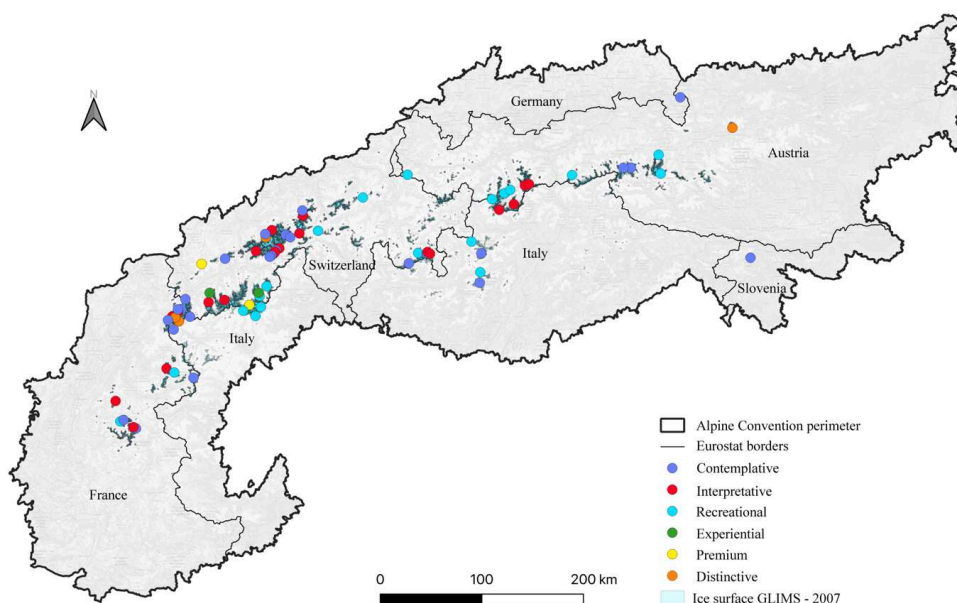
different forms of tourism observed. Each intersection between two forms, when observed on the sites studied, gives rise to the emergence of a new category. Figure 6b presents the different combinations of each of the four forms of valorisation observed. These combinations create 6 new categories of tourism: 1) contemplative sites as they are only focused on environmental elements; 2) experiential sites whose enhancement is centred on contemplation, playful and premium experiences; 3) interpretative sites which involve enhanced environmental elements through interpretative elements; 4) premium sites which add to the two previous ones an enhancement centred on proposed luxury services and goods; 5) recreational sites that enhance environmental elements, their interpretation and which also develop elements related to fun and games; 6) finally, distinctive sites which include all the forms of enhancement observed. The latter could also be placed within a luxury category that try to distinguish themselves. This framework of analysis thus constructed was applied to the inventoried 73 glacier tourism sites. On the one hand, the mapping of these sites according to the categories of tourism (Figure 7) shows that the spatial distribution of contemplative, interpretative and recreational sites is fairly homogeneous across the Alps. On the other hand, the more upmarket sites are mainly located around three major centres of Alpine tourism: Chamonix, Zermatt and Grindelwald. By extension, it can therefore suggest that, in the case of glacier tourism, modern and post-modern forms of tourism are present throughout the Alps, whereas hyper-modern forms remain spatially confined to the most internationally (well-)known destinations which can be considered as hot spots of Alpine tourism which, as defined by Piriou (2011), strongly mark the image of the destination and attract globalised clientele.

Figure 6: The different forms of tourism observed and their distribution



Credit : Salim E., Gauchon C. Ravanel L.

Figure 7: Glacier tourism sites identified and their forms of tourism



Credit : Salim E., Gauchon C. Ravanel L.

## Forms of tourism challenged by the climate change?

- 28 Climate change is leading to a rapid loss of glacial volumes and areas, particularly in the Alps (Bosson *et al.*, 2019). In this context, are the forms of tourism linked to glacier tourism impacted by climate change? Research conducted in an Alpine context is scarce but tends to show the negative impact that glacial retreat can have on the aesthetic value of the sites (*e.g.*, Moreau, 2010; Garavaglia *et al.*, 2012), or on the activities of high mountain guides (Salim *et al.*, 2019). In other areas, such as in New Zealand, glacier tourism has been reshaped, for example by transforming glacier walking into helicopter-assisted glacier trekking to avoid the constraints linked to their access that are exacerbated by climate change (Purdie, 2013; Stewart *et al.*, 2016). In the Alps, the results presented here suggest a development of glacier-related interpretive elements, which is consistent with the motivations of visitors, for example at the Mer de Glace where they are attracted - among others - by a desire to learn (Salim & Ravanel, 2020). New projects aiming at increasing the capability of landscape interpretation are underway with, for example, the project to redevelop the Nid d'Aigle site in the Mont Blanc massif<sup>9</sup> consisting in facilitating access to a panorama on the Bionnassay glacier and promoting landscape mediation tools. In other places, glaciers are used as educational tools for the local population, as it was the case for schools in Crans-Montana (Switzerland) which, in 2019, took 500 schoolchildren to the Plaine Morte glacier to raise their awareness on climate issues<sup>10</sup>. Conversely, the sites that related to hyper-tourism seem to be desynchronised from their historical resources by offering more and more “artificial” attractions such as cinemas or other high altitude shopping centres. The leading sites in this category (Jungfrauoch, Matterhorn Paradise or Aiguille du Midi) bear witness to this. The various sites studied here are different in

nature, whether they are of diverse natures in terms of economic potentials, types of clientele, vulnerabilities to climate change or their ability to adapt. These points have not been addressed here but merit further work. Moreover, the way in which various Alpine glacier tourism sites adapt to climate change and the foreseeable disappearance of the glaciers on which they build their promotion is a key point to be developed in future research.

- 29 Beyond the issue of climate change, the tourism crisis caused by the COVID-19 pandemic has the potential to stop some of the transformation processes in glacier tourism. Some tourism researchers believe that new models will emerge from the crisis (e.g., Lew *et al.*, 2020). While it is still now too early to predict how the post-COVID-19 era will affect glacier tourism, future research will have to take this into account.

## Conclusions

- 30 This article shed light on the many forms of tourism that are present around Alpine glaciers. Different trends can be observed: first of all, the historical form of glacier tourism in the Alps, based on the glacier itself, is still a common trait in all sites. However, additional forms have equally emerged. The one related to scientific values is the most frequently observed. Based on motivations existing since the beginning of glacier tourism, it seems to have become more important in the last two decades and to be a response to climate-related landscape changes.
- 31 Recreational sites appear as a more recent form but similar to what is observed in ski resorts: “fun parks” have appeared such as the one in Hintertux. This form is conceptualised through post-tourism. Finally, the most recent form seems to be luxury and hyper-tourism. Polarised around destinations with an international clientele, these sites are those which have become the most globalised in terms of their offer and positioning. At the same time, sites related to this form are also part of the “historic” destinations of glacier tourism (Chamonix, Grindelwald, Zermatt). However, several questions remain unanswered, especially concerning the relevance of interpreting the evolution of these forms of tourism through the prism of climate change. The current strong evolution of the glacial landscape could indeed lead sites to reduce their attachment to their “original” form while turning towards a hyper-touristic and deterritorialized form.
- 32 While none of the sites studied have so far detached themselves from their original form of contemplation, can the trend towards the development of hyper-tourism lead to a form of division? In other words, is it possible to imagine a glacier tourism site that no longer relies on the surrounding landscape to attract visitors? The “Panorama” cinema of the Jungfrauoch, for example, assures visitors that they can enjoy the “landscape” without any concern regardless of the weather, since what can be seen outside with good weather is shown on a 360° screen. Will this kind of future development lead sites to avoid a potential aesthetic loss linked to glacier retreat? We could for instance mention the exhibition “*Experience 2°C*” which was held from September 2019 to January 2020, and which allowed visitors to the UNESCO centre in Naters (Switzerland) to see the evolution of the Aletsch glacier up to 2100 with the help of virtual reality headsets<sup>11</sup>. It allowed visitors to experience the Aletsch Glacier and its transformation without necessarily being physically present. What kind of “visit” experience is then proposed in such a situation? Further research is needed, to explore

the issue of the visitor's experience and to better understand the tourism transformations taking place around the largest Alpine glaciers.

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## NOTES

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## ABSTRACTS

Glaciers have been popular tourist attractions for almost two centuries. However, current climate change is now posing a new threat. In this context, this paper aims to question the tourism forms which are currently identifiable within Alpine glacier tourism sites. An inventory carried out on an Alpine scale shows that different tourist practices (contemplation, visit of ice caves, recreational activities, environmental education, and luxury) can coexist. The analysis of the way various sites function demonstrates that these practices can be related to the different forms of tourism that exist in the scientific literature: modern, post-modern and hyper-modern tourism. The coexistence of these forms of tourism at glacier sites reveals six possible combinations, *i.e.* six types of sites: contemplative, experiential, recreational, interpretative, premium and distinctive. Spatial analysis also shows that the premium and distinctive sites are mainly located around the major Alpine tourist destinations (Chamonix, Zermatt and Grindelwald), while the others are more homogeneously distributed. These results raise questions about the way in which these sites was and will develop and the role climate change plays, both of which constitute potential research topics for the future.

## INDEX

**Keywords:** Glacier tourism; Post-modernity; Hyper-modernity; Glacier; Climate change

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