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# Associating Field Actors in the Observation of Visitor Flows and Recreational Activities in Mountain Regions: Lessons Drawn from two Collaborative Projects in France and Switzerland

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## Introduction

- 1 The Alps are particularly affected by the effects of climate change. Indeed, the average temperature increase is twice as high as that observed at the global level (Beniston, 2012). Climate change is having a profound impact on tourism, sports and, more broadly, recreational activities in mountain regions. First of all, this concerns the rise in the rain-snow limit and the increasing scarcity of snow (Gonseth, 2013), leading ski lift companies to invest heavily in the production of artificial snow in order to sustain the activities of skiing and snowboarding (Abegg, 2011; Clivaz et al., 2015). However, climate change also has important repercussions for other sports and recreational pursuits in these regions, especially in summer (hiking, climbing, mountaineering, etc.).
- 2 Observing the effects of climate change on recreational activities in less-developed mountain regions proves complex. On the one hand, there is little research on these activities outside the developed mountainous regions; on the other, these pursuits are changing due to the effect of societal factors such as the development of social networks, digitization or the evolution of sports and leisure disciplines (equipment, techniques, knowledge exchange, etc.). Finally, the use of mountainous regions, outside

urbanized areas such as resorts, is very diffuse, and visitors are spread over a wide area via various activities (mountaineering, hiking, climbing, trail, etc.). In this context, an exploratory participatory research-action project, presented in more detail later, was carried out in 2019 with the objective of both taking stock of existing data on the use of less-developed mountain regions<sup>1</sup> and studying the feasibility of an approach involving field actors in the observation of the evolution of this use. This contribution is an opportunity to look back at this project and to show the challenges and difficulties linked to this deliberately collaborative approach, in particular by putting it into perspective with the French observation program "Refuges Sentinelles" (RS) (Sentinel Hut Program) from which it was inspired. More generally, it is also a question of examining the knowledge issues, for both research and field actors, linked to a collaborative research approach. The results in terms of data collected or issues identified (changes in visitor flows, the role of hut keepers, types of clientele, etc.) are not part of the subject of this contribution, even if they are mentioned from time to time in order to illustrate the topic.

- 3 Thus, this article is in line with the reflections on "participatory sciences", which for several decades have been in a phase known as the "participatory turning point". (Pestre, 2011). This author highlights a potential "return of the amateur" in contemporary scientific production (Bonneuil, Joly, 2013). This field has undergone a major transformation in recent decades, facilitated by the evolution of communication and information systems (Internet, Web 2.0, Open Sources, etc.), specific to the digital age (Doueiri, 2011; Blangy, 2017). Since then, the phenomenon has taken on such a magnitude that some authors no longer hesitate to speak of the "democratization of scientific culture" (Charvolin, 2009), and of "technical democratization" (Callon et al., 2001) in the context of a "knowledge society" (Breton, 2005).
- 4 This phenomenon can be observed in particular through the appearance of "citizen sciences" (Irwin, 1995), "participatory sciences" or the "scientific third sector" (Charvolin, 2009). These are part of a perspective of the co-construction of knowledge, especially present in environmental and health issues which have experienced a remarkable growth since the beginning of the 21st century. This type of approach refers to "knowledge production mechanisms based on voluntary collaborations between professional scientists, organized networks of amateur observers, and environmental NGOs" (Salles, 2014). Beyond involving ordinary citizens in scientific research, participatory sciences value the capacity of actors to produce knowledge, to challenge certain facts and to innovate in different fields. They thus question the exclusivity of experts in scientific production (Gibbon et al., 1994).
- 5 With this heuristic context in mind, our methodology is based on the final report of the participatory research-action project we conducted (Obin et al., 2020), on a student thesis on the feasibility of the Sentinel Hut program and of the approach to be implemented (Berthet, 2014), as well as on the minutes of various sessions and events related to this program. We supplemented these sources with a semi-structured interview conducted online in January 2021 with the scientific leader of this program, focusing specifically on the theme of the collaborative methodology utilised.
- 6 After having specified in the following section the issues that interests us, we will present the two projects, Swiss and French, mentioned above. We will then be able to summarize the main lessons concerning the collaborative approach that result from

their comparison before outlining in the conclusion some additional avenues for reflection.

## Evolution of visitor numbers and the use of recreational activities in less-developed mountain regions

- 7 Various academic studies have looked at the sorts of people who use the mountains for sporting activities. They have allowed us to understand the different types of activity as well as their related cultures or relationships with nature and the environment (Lefèvre, 2004b; Corneloup, 2016). Other studies have focused on the motivations of the participants in these activities, as for example those who go ski touring (Haberfellner et al., 2012; Kreziak, 2018). There are also anthropological (Seigneur, 2007) or historical (Hoibian, 2003, 2008; Hoibian & Defrance, 2008; De Bellefon, 1999) studies that focus on mountaineers and other users visiting high mountain regions. Seigneur's work focuses in particular on perceptions of the environment or of risk (Seigneur, 2003, 2006). In Switzerland, existing research has focused on the history of the mountain guide profession (Gamper, 2008; Hungerbühler, 2013), on the evolution of mountain huts in both their material and immaterial dimensions (Défayes, 2010), on the expectations of different types of clientele with regard to the infrastructure and services offered by mountain huts (Schwegler, 2011) or on the structuring of the professions of mountain guides and mountain leaders (Clivaz & Langenbach, 2020). While these various studies shed light on the types of user, and on the activities and motivations of those who undertake them, the questions of visitor numbers and their geographical dispersion or the evolution of the professions in less-developed mountain regions are addressed in only a very marginal manner.
- 8 Recreational activities in high mountain regions have developed through processes of appropriation of space (Debarbieux, 1988) and through sporting cultures that differ according to the activities considered (Lefèvre, 2002, 2004a). Thus, until the end of the 20<sup>th</sup> century, these developments took place in a relatively stable environment - i.e. one that changed little or not at all from one year to the next; the main factors influencing users in their choice of itineraries were meteorology, snow levels or avalanche risks. Today, sporting activities in high mountain regions, whether in developed or less developed areas, are also strongly dependent on weather conditions.
- 9 Moreover, the effects of climate change on the mountain environment are the subject of numerous publications. However, questions relating to the effects of climate change on visitor numbers, on the professions in high mountain regions, and the role that huts can play remain little explored. The particular field of visitor flows to less-developed mountain regions thus remains little studied (Bourdeau, 2017), particularly in Switzerland. Yet, climate change has a direct effect on the physiognomy and therefore the recreational use of many peaks and routes, especially in the Alps (Ravel et al., 2020). The retreat of glaciers (Bonet et al., 2016), the reduction of snow cover in the summer, the melting of permafrost and its consequences (modification of water flows, increased landslides) are radically changing the nature of the routes or the exposure of users to certain objective risks (avalanches, rock falls).

- 10 In this context, many questions arise. Today's users need to be able to adapt their choice of itineraries and the planning of their stays. Apart from autonomous users, the recreational pursuits in less-developed mountain regions concern several professions such as hut keepers, high mountain guides, mountain leaders or mountain rescuers who are also concerned by the effects of climate change. Few studies have focused on this issue, with the exception of recent studies conducted in France on the impact of climate change on mountaineering (Mourey et al., 2019, 2020), particularly commercial mountaineering (Salim et al., 2019). Such studies have not yet been duplicated in Switzerland.
- 11 From a methodological point of view, the observation of the use of less-developed mountain regions raises questions about how to understand activities that are both spatially and temporally dispersed. Thus, very few data, both quantitative and qualitative, allow for the precise, objective analysis of the use of these areas. Only the statistics on the number of huts visited, via the respective alpine clubs (Swiss Alpine Club and French Federation of Alpine Mountain Clubs) which are generally the owners or managers of these huts, a census of the itineraries and the number of people visiting them based on hut logbooks, or scattered accounts of high mountain trips on blogs seem to be easily accessible. The methods and tools for collecting data thus remain to be consolidated or adapted. In this context, we deemed it necessary, within the framework of the participatory research-action project described in the following section, to implement these methods and tools in partnership with the actors in the field. This was done both to improve the exhaustiveness of the information collected and to avoid blind spots in the research.
- 12 We postulate that the adhesion of these actors (hut keepers, mountain guides, mountain leaders, professional unions, alpine clubs) to a collaborative research program can be a solution to overcome the difficulties of observing dispersed patterns of use. As mentioned in the introduction, this contribution aims to report on the issues related to such a collaborative approach.

## **An exploratory and collaborative project on and around mountain huts in Switzerland**

### **Context and objectives**

- 13 The project "Huts as an observatory of the recreational transition in high mountainous regions" was carried out by the authors of this article during 2019. Supported by seed funding from the Interdisciplinary Centre for Mountain Research (CIRM) of the University of Lausanne, the aim of this project was to study the feasibility of a Franco-Swiss research program focusing on the evolution of recreational pursuits in mountainous regions in the context of climate change, using mountain huts as the main sites for observing this evolution. The focus was on the use of the mountain via these different activities, from or around the huts. The study deliberately did not focus on downhill skiing, for which the evolution in relation to climate change has been more widely explored scientifically (Bourdeau, 2007; François, 2007; Clivaz et al. 2015) and for which the huts are not a relevant place of observation anyway. Based on a review of the literature and current research in the field of tourism in less-developed mountain areas (Falaix & Corneloup, 2017; Corneloup, 2017), this question is subsumed within that of

the recreational transition to which tourist areas in high mountain regions are subject. This transition can take the form of a modification of the function of the place, no longer solely dependent on sports or recreation activities but now also attractive for scientific, cultural or artistic purposes. The transition can also lead to a broad modification of the nature of recreational activities in mountainous regions (hyper-connection or, conversely, disconnection, itinerant tourism, etc.).

- 14 The approach was intended to be participatory, in the sense that the hut keepers, but also other socio-professionals linked to this theme such as guides and mountain leaders, were considered stakeholders in the research. The project therefore intended to integrate the issues, interests and constraints of these actors, but also their capacity to participate in the collection of data. For this reason, it was decided from the outset of the research project to institute the co-construction, with the socio-professional actors, of the issues to be investigated. It was therefore never envisaged to tackle this research problem through a more "classical" approach where researchers determine the research issue and their approach in isolation. The precise nature of this co-construction is presented later in the article.
- 15 Given a lack of prior knowledge, in particular concerning the situation in Switzerland, the questions that guided us related in particular to the evolution of visits to the huts to the sports and recreational activities undertaken, and to the mountain routes that were used. Our questions also related to the transformation of the profession of the hut keeper, who has to deal with the effects of climate change, and to the possible evolution of his mission towards a role of scientific mediation in relation to these changes. These questions, as well as the type of approach chosen, reflected the "Sentinel Huts scientific program" that will be presented in the next section.

## Research design deployed and main results

- 16 Within the framework of the project "Huts as an observatory of the recreational transition in high mountain regions", the activities undertaken were essentially exploratory in order to probe the feasibility of the participatory approach in Switzerland and the possibilities of developing a larger research project in the alpine areas of the French-speaking cantons of Vaud and Valais. To this end, a campaign of interviews (17) was conducted with different types of actors (keepers, guides, first-aid workers, unions, alpine clubs, researchers) and four huts were visited during the summer period (interviews with keepers and observation of the functioning of the hut). Two collective workshops bringing together keepers, mountain leaders, guides and members of the Swiss Alpine Club were also organized, one in the spring and the other in the autumn of 2019. The aim of these meetings was not only to exchange with the actors in the field on the interest of setting up such an approach and to discuss the issues identified in their daily activities, but also to find partners ready to commit to the research. The workshops took place in the following manner: a round table presentation of each participant; a presentation of the project by the team in charge; a time of discussion with the participants, structured around specific themes identified beforehand (the different aspects of the impacts of climate change for the first session, the method and the indicators during the second session) and finally a time of free exchange or questioning available to the actors linked to the huts.

- 17 Although the exchanges were encouraging, in the sense that the field partners showed a willingness to invest and collaborate in such a scientific program, several constraints were identified. First of all, logistical and organizational difficulties were noted, including scheduling conflicts related to the intense nature of the field actors' activities from May to September. Making contact and presenting the project was also a challenge insofar as it was sometimes difficult to arouse the interest of the actors in order to mobilize them. For example, we noted apprehensions on the part of certain actors who feared that their involvement in this project would require too great a time commitment in addition to their usual activities. Others, notably guides, feared that the research would reinforce a negative image of the mountains by focusing solely on the issues of accidentology and increased risks linked to climate change. These observations refer more generally to interprofessional issues between field actors and researchers, but also between the field actors themselves, who may have different perceptions or expectations, as for example between keepers and guides.
- 18 In spite of the difficulties encountered, the exchanges with the actors in the field have partly confirmed our working hypotheses. Indeed, these actors have noted various consequences of climate change on their activity. These may concern logistical problems, such as the supply of water to the huts, safety problems with, for example, the increased risk of rock falls near certain routes, or seasonal problems involving a disruption of the activity calendar. Faced with these different phenomena, adaptation strategies have already been put in place by the actors, such as modifying the itineraries, moving the dates of races during the season, transforming routines etc. However, we also learned from our meetings with these actors that there are a series of other transformations affecting activities and those undertaking them that are not related to climate change. These have more to do with societal changes and more global trends, related in particular to the increasing use of digital tools and new technologies in mountain sports. This implies important professional changes such as hyper-connectivity, a strong reactivity to changes in the physical state of areas where sporting activities are undertaken, or an adaptation of actors' own life rhythms to the "new" seasons of mountain recreation (as for hut keepers and guides).

## **“Refuges Sentinelles”: a collaborative research program in France**

### **Presentation of the program**

- 19 The “Refuges Sentinelles” (RS) is a multidisciplinary and participatory observation and action-provoking program in high mountain regions where mountain huts, and the stakeholders who interact with them, are observatories of climate change and transformations in the way in which people visit the mountains. Philippe Bourdeau (Grenoble Alpes University) is the scientific director. The program has been implemented since 2016 in the huts of the Ecrins National Park (PNE) with the support of the Labex “Innovations and Territorial transitions in Mountainous Areas” research initiative (ITTEM), the “CDP<sup>2</sup> Trajectories” project of the University of Grenoble-Alpes, and the French Office of Biodiversity within the framework of the Alpine Sentinel program. It examines the whole range of environmental and cultural changes by promoting, coordinating and cross referencing research in natural and social sciences.

The five research themes which have been developed concern the use and recreational activities carried out in mountainous regions (in a similar way to the Swiss project presented above), environmental education and the dissemination of scientific culture, meteorology and climatology for the huts, biodiversity and vertical ecology, and geomorphology and risks. In addition to a scientific objective, the “RS program” also aims to accompany the transition in mountain areas by enhancing the value of the huts and helping socio-professionals to co-construct knowledge of their activities and those of their customers.

- 20 The main scientific knowledge acquired by the “RS project” concerns first of all the adaptability of measurement devices (eco-counters, presence sensors) and the possibility of identifying the effects of climate change in the adaptations made by professional actors in mountainous regions. They are also based on the experience acquired in the first theme of the project through the participation of non-academic actors who are also stakeholders in this field in the design of a scientific approach. These institutional or individual actors (keepers, sports federations, professional unions, protected area authorities, local authorities, tourism offices and observatories) have been involved from the outset in the design and orientation of the program, as well as in the implementation of scientific actions and the diffusion of the results.
- 21 Although not all of the research themes initially planned have been investigated, the results provided by the observation of visitor numbers and the ways in which activities have been undertaken are, from the point of view of the social sciences (theme 1), very stimulating<sup>3</sup>. The data (RefLab, 2017), collected in France (mainly in the Massif des Écrins), underline the trend towards a reduction in the seasonal character of tourist activity in mountainous regions and changes in the nature of activities undertaken as well as in the professions of guides (towards more adaptability and mobility) and hut keepers (towards risk management taking account of climate change or increasing the comfort of the huts).

### The collaborative system at the heart of the Sentinel Huts

- 22 The collaborative mechanism set up within the framework of the “RS” program has been present since the very first phases of its design. It was clearly identified as essential in the preliminary discussions between researchers from the University of Grenoble-Alpes and members of the Ecrins National Park’s scientific council. Indeed, both this latter body and the researchers started from the initial observation that research on the social and cultural phenomena linked to tourist and sporting activities in less-developed mountain regions can only be carried out by associating the main stakeholders in the scientific process. The idea was therefore to position the actors of these areas as co-researchers (Blangy, 2017), associated with the research activity from its conception (choice and design of the methodology) to the results and their dissemination, including as well the carrying out of surveys.
- 23 The process was effectively launched by a first collective event bringing together all the types of participants targeted by the project. This event, organized on a research site located in the mountains (the Jardin Alpin du Col du Lautaret<sup>4</sup>), and voluntarily very open in terms of discussion modes, constituted a founding and structuring starting point for the rest of the project. The organization of this event in a mountain location, rather than in university buildings in town, was an important element in



getting the socio-professionals on board. Hut keepers, guides and mountain leaders thus came in large numbers to this first seminar "Sentinel huts, observatory of high mountain regions" held between 9 and 16 September 2016. The participants emphasized their interest in the issues discussed and agreed to be associated with the project.

- 24 Subsequently, the approach required a significant amount of facilitation work dedicated mainly to interactions with the stakeholders. This was carried out over four years by a Senior Research Officer who systematically established and maintained contact with the keepers of the huts located in the study areas. She met annually with the keepers at their place of work, patiently gained their acceptance by helping with daily tasks in the huts, verified with them the functioning of the observation devices and ensured their participation in the debriefings at the end of the season. These debriefings were designed to discuss and interpret the data collected during the period under consideration. This follow-up constituted a very important element in ensuring the link between the scientific managers and the actors involved in the co-construction of the project.
- 25 The collaborative approach clearly highlighted the fact that by involving the actors concerned by the research results, in this case mainly the hut keepers, the results were both more easily exploitable (more homogeneous, transversal and stable over time in particular) and translatable into action in the professions concerned. In this respect, the keepers were involved on several occasions in the design of the methodology, by proposing corrections or adaptations, and by testing it on site.
- 26 The main factors explaining the participation of the actors in this collaborative approach thus seem to be the following: the presence of actors who are truly open to a collaborative approach on the one hand, and on the other, a territorial identity shared by these actors and a willingness to exchange and collaborate at the scale of their territory.

## Comparing the French and Swiss projects

### **A similar problem but with partly different ambitions and starting points.**

- 27 Although the Swiss and French projects described above deal with a similar problem and both display a clearly expressed desire to adopt a collaborative approach by involving the mountain stakeholders concerned, they nevertheless differ in several respects.
- 28 Firstly, the ambition of the Swiss project was limited to an exploratory study, over a period of one year, with a view to studying the feasibility of a larger-scale research project. In the French program, after also having undergone an exploratory phase in the form of a master's thesis (Berthet, 2014), the aim was to collect data and gain knowledge on the issues of visitor flows and the evolution of the professions in less-developed mountain regions. It should be noted that, from the outset, the French experience served to adjust the approach on the Swiss side by precisely targeting the actors to be associated with the project. This was done through several exchanges with the scientific leader of the "RS" program.

- 29 Secondly, the starting points of the researchers involved were different. On the French side, the scientific leader had already met a good number of hut keepers or guides in the past while undertaking research. As a member of the scientific committee of the PNE, the leader had already had the opportunity to make these actors aware of certain scientific questions and of the issues involved in a collaborative project. It was therefore easier to obtain the support of the professionals for the proposed approach. In contrast, on the Swiss side, the project started without its leaders having any particular relations with the professionals of less-developed mountain regions, except for a few contacts established with the Swiss unions of guides and mountain leaders within the framework of previous work.
- 30 Thirdly, the PNE, as a permanent territorial institution in continuous contact with the hut keepers within its perimeter, played a "federating" role in the acceptance of the approach. On the Swiss side, such a "heavyweight" institutional actor was lacking, as the huts included in the study were located in different valleys without the existence of institutions similar to those of the Parks.
- 31 Finally, it should be noted that, with the exception of the Swiss Mountain Leader Association, the professional unions (of keepers, guides or mountain leaders) maintained a rather low profile in both countries despite their numerous members. This can be explained by the fact that the reasons for joining professional associations are primarily the commercial and insurance advantages they offer (Clivaz & Langenbach, 2020) and less the opportunities for exchange between professionals. On the Swiss side in particular, the professional associations of hut keepers (one for the French-speaking part, one for the German-speaking part) are not very active and not very visible, so that it was not possible to count on these associations to support our approach.

### What lessons can be learned from the collaborative approach?

- 32 Based on the feedback obtained from the two projects presented in this article, it is possible to highlight some factors that favour the mobilization of professional mountain actors, notably hut keepers, in a collaborative approach:
- *Having a leading actor*: in the case of the "RS" program, from the start, a keeper showed himself to be very enthusiastic and active with his colleagues, encouraging them to participate in the process, whereas on the Swiss side no actor took on this leadership role. The fact that a socio-professional commits himself with determination to a collaborative approach and tries to convince his colleagues to do the same can only strengthen the legitimacy of this approach with regard to these colleagues.
  - *Creating a climate of trust with stakeholders*: this is a central factor that requires a substantial and long-term investment on the part of researchers. As we mentioned in the previous section, the scientific leader of the French program had long-standing and regular contacts with the actors of less-developed mountainous regions, which was not the case for the Swiss project leaders. In addition, the fact that the project took place only during one summer season did not allow the building of a lasting relationship between the researchers and the keepers. In order to gain the trust of the latter, the French experience in particular has shown that it is essential to visit them regularly (at least once a year) in their huts, including the possibility of taking advantage of the journey to provide them with supplies. Such visits provide the opportunity to discuss with them on the spot, but also to share in their daily

lives; for example, by helping them with the washing up. This reinforces their acceptance of the researcher and confirms their adhesion to the project thus ensuring their approval of the methodological approach and the scientific objectives pursued, with the possibility also of adapting them if necessary. Remote contacts by telephone or email are clearly not enough and they can even be interpreted by the keepers as a sign of the researcher in his "ivory tower" seeking to distance himself from them.

- *Providing the means to bring a collaborative approach to life*: it is essential to have human and financial resources dedicated specifically to the activities of facilitation, information transformation, and the management of relations with field actors. To ensure the participation of the latter over time and to promote the proper functioning and cohesion of the group of actors, it is necessary to set up mechanisms (workshops, meetings, meals, newsletters, etc.) that require time, organizational know-how and a specific budget. In this sense, the "RS" program relies on a person in charge of animating the network who can also represent the "face" of the researchers for the actors of less-developed mountainous regions.
- *Taking into account the expectations and suggestions of the field actors*: during individual discussions as well as group sessions with the stakeholders, it is important that the researchers really listen to them. This means not only integrating their observations and their feelings about the problems brought up by the researchers, but also being constantly open to their proposals in terms of new questions or modifications to data collection protocols. On the French side, the actors have thus participated on many occasions in the analysis and interpretation of the results, often before the annual reviews carried out collectively. This can certainly complicate the task of the researchers, who are the guarantors of the initial project, but at the same time it allows the field actors to consolidate their commitment to the collaborative approach because they can see that the scientists understand their concerns, even when these do not correspond to their initial questions.

## Conclusion

- 33 Taking these lessons into account should help us to answer a question whose complexity should be recalled. Firstly, there is the need to observe visitor flows in less-developed mountainous regions and their evolution over time, and, secondly, to analyze the factors that can explain this evolution, in particular climate change. This implies the deployment of a research protocol involving socio-professionals, in particular hut keepers, over a long period of time (several years). The goal is to maintain the motivation of the keepers to ensure rigorous data collection despite the diversity of their situation (types of huts and clientele).
- 34 In view of the feedback from the two projects we have presented in this article, it seems premature to confirm our initial postulate which, as a reminder, proposed that "the adhesion of these actors (keepers, guides, mountain leaders, professional unions, alpine clubs) to a collaborative research program can be a solution to overcome the difficulties of observing dispersed uses of mountainous regions". The experiments carried out so far certainly suggest a real potential for a better understanding of the use of these areas thanks to an observation system that closely associates the actors in the field, but this potential still needs to be confirmed by additional analyses. This is one of the reasons why a project entitled "Mountain huts as observatories of tourism transition. The repositioning of less-developed mountain areas and their related

professions in the French-Swiss Alps" has been developed under the direction of Philippe Bourdeau and Christophe Clivaz. This project, co-financed by the French National Research Agency (ANR) and the Swiss National Science Foundation (SNSF) for a period from spring 2021 to spring 2025, provides for a resolutely collaborative mechanism of co-construction of both the research questions and the associated methodology. This project is designed to explore the hypothesis according to which the use of less-developed mountainous areas can be understood due to collaboration with the keepers and the actors who gravitate around the huts. It will also evaluate if and how the fact of associating these actors favours their appropriation of the results. This might lead for example in modifications to their understanding of the issues of visitor flows and a consequent adaptation of their professional activities.

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## NOTES

1. The term “less-developed mountain regions” refers to mountainous areas outside resorts which consequently have little or no tourist infrastructure with the exception of mountain huts.
2. CDP : Cross Disciplinary Program
3. See on this subject the internet site of the “Refuges Sentinelles” program : <http://refuges-sentinelles.org/>
4. <https://www.jardinalpindulautaret.fr/>

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## ABSTRACTS

The Alps are particularly affected by the effects of climate change. The average temperature increase is twice as high as that observed at the global level (Beniston, 2012). Climate change is having a profound impact on tourism, sports and, more broadly, recreational activities in mountain regions. First of all, this concerns the rise in the rain-snow limit and the increasing scarcity of snow (Gonseth, 2013), leading ski lift companies to invest heavily in the production of artificial snow in order to sustain the activities of skiing and snowboarding (Abegg, 2011; Clivaz et al., 2015). However, climate change also has important repercussions for other sports and recreational pursuits in these regions, especially in summer (hiking, climbing, mountaineering, etc.).

Observing the effects of climate change on recreational activities in less-developed mountain regions proves complex. In this context, an exploratory participatory research-action project, presented in this paper, was carried out in 2019 with the objective of both taking stock of existing data on the use of less-developed mountain regions and studying the feasibility of an approach involving field actors in the observation of the evolution of this use. This contribution is an opportunity to look back at this project and to show the challenges and difficulties linked to this deliberately collaborative approach, in particular by putting it into perspective with the French observation program “Refuges Sentinelles” (RS) (Sentinel Hut Program) from which it was inspired. More generally, it is also a question of examining the knowledge issues, for both research and field actors (hut keepers, mountain guides and leaders), linked to a collaborative research approach. The results in terms of data collected or issues identified (changes in visitor flows, the role of hut keepers, types of clientele, etc.) are not part of the subject of this contribution, even if they are mentioned from time to time in order to illustrate the topic.

Our methodology is based on the final report of the participatory research-action project we conducted (Obin et al., 2020), on a student thesis on the feasibility of the Sentinel Hut program

and of the approach to be implemented (Berthet, 2014), as well as on the minutes of various sessions and events related to this program. We supplemented these sources with a semi-structured interview conducted online in January 2021 with the scientific leader of this program, focusing specifically on the theme of the collaborative methodology utilised.

## INDEX

**Keywords:** climate change, less-developer mountain, mountain huts, recreational activities, collaborative perspective

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