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Introduction

- 1 Mountain tourism in the Alps is restructuring and diversifying since the 2000s (Macchiavelli, 2008; Langenbach and Jaccard, 2019). During this transition, sporting activities in the so-called “less developed” mountains (ski touring, mountaineering, hiking, etc.), i.e., outside the urban centres that make up the resorts, play an important role (Tissot, 2000; Margaryan and Fredman, 2017; Clivaz and Langenbach, 2020). However, there is a significant lack of information surrounding the evolution of these practices, which justifies the need for quantitative and qualitative data concerning visitor numbers of less developed mountains over the long term.
- 2 A specific data in this field comes from visitor numbers of mountain huts (term used in Switzerland)—or refuges (term used in France). Because of their role as shelters and rest stops for nature sports enthusiasts, they are important locations in the organisation of practices. In this respect, the number, as well as socio-professional profile of the people who use them (Hoibian, 2020) provide crucial data for the study of the use and transformation of sports practices. However, this data is not always easily accessible, especially over a long period of time, and it presents several biases. In this article, we discuss the interest and the limits of the data on the use of mountain huts in Switzerland and in France for the study of the transformation of the use and the practices of the less-developed mountains. An analysis example of huts in the Valais

Alps (Switzerland) will be presented in order to identify the factors that explain the change in visitor attendance of the huts studied, as well as to discuss how they provide information on the frequentation and sporting practices of the less-developed mountains.

- 3 This article also aims to test a methodological approach, combining quantitative and qualitative analyses, in the framework of the research projects *Refuges Sentinelles* (French Alps) and *HutObsTour* – “Refuges as observatories of the tourism transition. Repositioning the less-developed mountain and its professions in the Franco-Swiss Alps.” One of the general objectives of this *HutObsTour* project is to study the role of the less-developed mountains in the current tourism transition, through the socio-spatial dynamics that can be observed around the huts (Clivaz *et al.*, 2021).

Definition and Functioning of Mountain Huts

- 4 In France, the “mountain refuge” and its uses are defined in articles D.326-1 to D.326-3 of the French Tourism Code (<https://www.legifrance.gouv.fr/jorf/id/JORFTEXT00000823107>). The operational definition is as follows:

A refuge is an accommodation establishment, whether it is managed by a keeper or not, which receives the public, located at altitude in a mountain area, in an isolated site characterised by the absence of access by road or ski lift, and by the fact that it is inaccessible for at least part of the year to rescue vehicles. It offers collective accommodation for people passing through, with a capacity limited to 150 berths, and can provide a restaurant service. As part of its general function as a shelter, the refuge has a permanent interior space open to the public. When the refuge is managed by a keeper, this space includes at least one room where people can eat their own food. When the refuge is not managed by a keeper, this space also offers basic accommodation.

- 5 In Switzerland, “mountain huts” are not defined in federal legislation. On the whole, they correspond to the French definition, with the exception of the conditions of access, insofar as some are accessible by road or by cable car.
- 6 The majority of mountain huts are open in summer from June to October with a keeper who welcomes guests and prepares meals during the day and evening. Some huts also open in the spring, from March to May, to welcome ski tourers. When the keeper is present, he/she keeps an accurate count of the number of overnight stays. When the keeper is not present (autumn-winter and spring in some cases), the hut is said to be “closed” and no system for counting the number of people is used. However, a so-called “winter room” remains open in principle with the necessary minimum—mattresses, blankets and in some cases cooking utensils, a little food and gas or wood—for passing users or in case of emergency. Financially, the keepers in most cases pay rent to the landlord and are paid from the sale of drinks and meals.
- 7 It should be noted that there are “bivouacs” which are small huts that are never managed by a keeper, and are accessible for free use by mountaineers/hikers. Theoretically, users have to pay for their overnight stay by leaving the corresponding sum in a box left on site.

Data of Hut Visits

- 8 In this section, we present the organisation and availability of the data according to the hut managers and then discuss how such data is significant for studying the use of the less-developed mountains, despite a certain number of biases and limitations that must be taken into account in the analysis and interpretation of the results.

Organization and Availability of Data

- 9 The data that is currently available on hut attendance consists of the number of overnight stays per season (spring-summer) and/or per year. Depending on who manages the huts, the length of time and precision of the available data vary greatly.
- 10 The data from the Swiss Alpine Club (SAC) is among the most complete and accurate. For each hut, the number of overnight stays per season (spring and summer), details of the rates applied (SAC members, non-members, SAC youth, children under 7, young people aged 7–18 and free overnight stays) and the average occupancy rate per berth (number of overnight stays recorded in a season divided by the number of berths) are given. Such data, which comes from the local sections that own the huts, have been archived by the SAC central committee since 1969 but remain incomplete until 1985. The database has been computerised since 1997. Unfortunately, this database only covers SAC huts. For the huts managed by another actor (public or private), generally located in the mid-range mountains, it was necessary to contact each manager individually and ask for access to the data, which may be formatted differently, and in some cases unavailable. Managers are often reluctant to provide this data, which is indirectly telling about the income associated with the management of the hut. It is therefore much more difficult to create a database for huts which are not managed by the SAC. In the canton of Valais, out of a total of 71 huts, 40 are owned by the SAC, which is 56% (Obin, 2020).
- 11 In France, the data from the Fédération Française des Clubs Alpains et de Montagne (FFCAM) is both less complete and less accurate. The database is exhaustive from 2001, when it was computerised. According to the FFCAM's Patrimoine Bâti department, earlier data has been lost, at least on a national scale. At the level of the local CAF sections, the archiving and storage of data varies greatly. The Club alpin de Briançon, which manages 11 huts, has recorded the number of overnight stays per year and per hut since 1946, and the section of Saint Gervais, which manages 4 huts, since 1995. On the other hand, the Chamonix and Grenoble Alpine clubs have no data prior to 2001. For some of the huts, occasional data has been found in issues of the magazine *La Montagne et Alpinisme*, published by the FFCAM and in reports by the Association pour la Recherche, l'Innovation et l'Adaptation en Montagne (APRIAM-Belden, 1988), the Agence Française de l'Ingénierie Touristique (AFIT-Giard, 1996; Steen *et al.*, 2001) and the Direction Tourisme Montagne et Parcs (DTMP, 2012), as well as in various works and studies and research projects. It should be noted that French data is generally less precise as it does not give details of the tariffs applied and does not separate the number of overnight stays recorded in the spring from the summer, indicating only an annualised number of overnight stays per refuge.

Biases and Limitations of the Data

- 12 The number of overnight stays in the huts does not represent the total number of visitors to the mountain. In addition to the fact that many sectors are not equipped with huts, a certain number of people visit the mountain for the day or bivouac without using the huts. For example, at the Col du Midi (3522 m, Mont Blanc massif), bivouac activity between June and September 2019 and 2020 represents an average of 3 tents per day with a maximum of 15 on Sunday 4 August 2019 (source: *La Chamoniarde*). Similarly, not all the people who use the hut during the day are counted and, conversely, the same person who uses the hut for several nights in a row or in the same season cannot be identified. Furthermore, the number of overnight stays counted outside the period when a keeper is present is very biased. Not all users pay or pay the amount indicated. It is therefore impossible to make an accurate count of non-custodial use. This problem is the same for bivouacs.
- 13 Furthermore, it is not always possible to establish a link between the number of overnight stays and a particular sport. A hut, especially in mid-range mountains, may be visited by mountaineers, hikers, mountain bikers, etc. The number of overnight stays is not always reliable. The number of overnight stays is only quantitative data and does not provide any information about the qualitative evolution of visitor numbers. For example, a stable number of overnight stays in a hut during the summer season may conceal a decrease in the number of mountaineers, compensated by an increase in the number of hikers or the number of family or school visitors. This limit does not apply to huts that provide for a single practice, such as certain high-altitude huts visited solely by mountaineers, or certain huts open in the spring, visited solely by ski tourers.
- 14 When they are recorded, it is difficult to use the different tariffs applied to characterise the type of clientele that visits each hut, as they are very generic and the same tariff may cover several different types of clients. For example, in the CAS or FFCAM huts, the rate for club members is the same as for mountain professionals (mountain guide, mountain leader, etc.). Similarly, in the SAC data, “children” have been included in the “young people” category since 2007. It should also be pointed out that the quality of the data is also dependent on the keepers and the consistency with which they record visits and forward them to the club or section that owns the hut.
- 15 Finally, ideally, the number of overnight stays should be analysed in relation to the length of time the huts are open (i.e., an occupancy rate), which can vary from one year to the next. Unfortunately, the opening and closing dates are difficult to obtain because they are not—or very rarely—kept by the manager or the keeper.

Value of the Data

- 16 Despite all of these limitations and biases, the number of overnight stays per season in the huts has the major advantage of being some of the only data which makes it possible to quantify and locate the number of people visiting the less-developed mountains. This data also has the greatest historical depth and therefore allows trends to be studied over several decades.
- 17 The number of nights spent in the huts is particularly interesting and has the fewest limitations in the sectors where the use of the huts is necessary for the vast majority of

users. In a study the choice of the study area is therefore particularly important. It will determine to what extent the data is representative of the practices in the field. Data from huts located in isolated high mountain areas, inaccessible from a ski lift and difficult to visit on a day trip, are therefore particularly suitable. Conversely, the number of overnight stays for mid-range mountain huts accessible by day trip or by car/lift will be much less representative of the actual number of visitors.

- 18 It is also possible to set up a methodology to reduce, at least in part, some of the limitations mentioned. For example, it is possible to carry out immersion observations in the huts in order to better understand how people use them, to distribute questionnaires to customers, to install webcam device or presence sensors to measure the number of people using the huts during the unguarded period, etc. In this study we have chosen to complement the quantitative data on the number of overnight stays with a qualitative approach by interviewing the hut keepers concerned, in order to ask them to explain the change in attendance based on their experience.

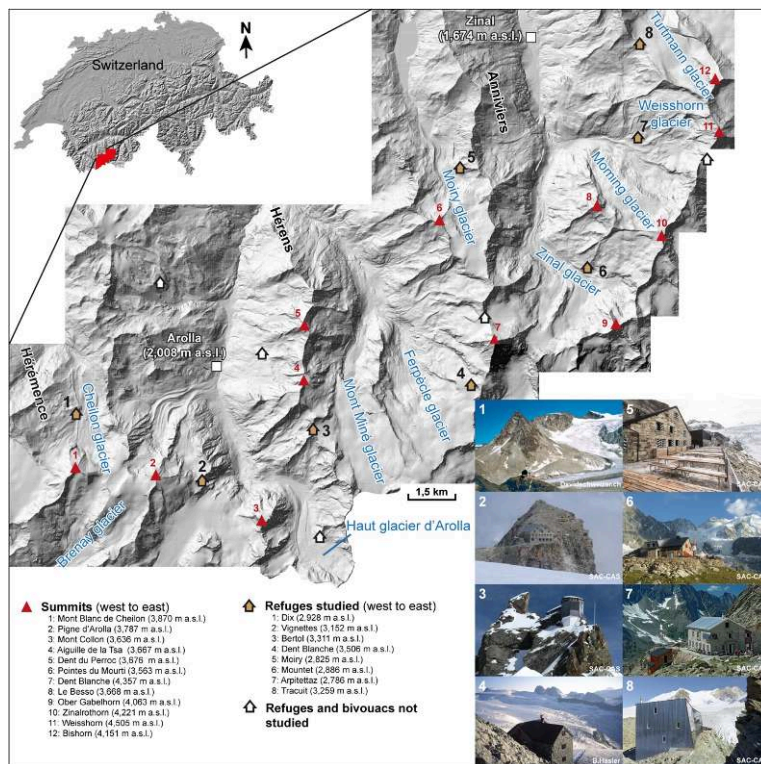
The Use of High Mountain Huts in Val d'Hérens and Val d'Anniviers

- 19 In this section, an example of analysis for the high mountain huts of the Val d'Hérens and Val d'Anniviers (Valais, Switzerland) will be presented in order to identify the factors that explain the evolution of the overnight stays, and to discuss the information they provide on the evolution of sports practices in less-developed mountains.

Sample of Huts Studied

- 20 To build a suitably robust database that is also best suited to the study of the transformation of mountain sports practices (cf. "Value of the Data" section), we selected the high mountain huts of the Hérens and Anniviers valleys. These two valleys are located in Switzerland, in the Valais Alps, on the left bank of the Rhône River and include numerous peaks that are over 3500 m, 5 peaks over 4000 m and 17 glaciers (Fig. 1). Each selected hut meets the following selection criteria: it is (i) isolated and inaccessible by car/lift; (ii) managed by the SAC; and (iii) a high mountain hut, defined in this work as any hut supporting mountaineering.
- 21 The sample consists of 8 huts (ranked from west to east; Fig. 1): Dix (2928 m), Vignettes (3153 m), Bertol (3311 m), Dent Blanche (3507 m), Moiry (2826 m), Mountet (2886 m), Arpitettaz (2786 m), and Tracuit (325 m). This sample thus includes all the high mountain huts in the two valleys studied, apart from the Tsa hut (2606 m; Fig. 1), and the Aiguilles Rouges d'Arolla (2814 m; Fig. 1). The latter two are respectively managed by the Société des guides du Val d'Hérens and the association of the Aiguilles Rouges hut, and we do not have their attendance data.

Figure 1. Location map of the huts studied



- 22 The main characteristics of the huts studied are presented in Table 1. All the huts are open in summer and are used by mountaineers. Five of the huts are also accessible to hikers, without the use of equipment (rope, harness, crampons, ice axes, etc.) and mountaineering techniques. With the exception of the Moiry hut which is quickly accessible from a car park (1.5 hrs) and is therefore very popular for lunch and day hikers, the huts studied are relatively long to reach with a walking time of between 3.5 hrs and 6 hrs. Consequently, the vast majority of mountaineers or hikers who visit these sectors sleep in the hut in the evening. Furthermore, there are no major open-air bivouac sites in the vicinity. Consequently, it can be estimated that the number of overnight stays in these huts represents almost all the mountaineers and/or hikers who visit these sectors.
- 23 In spring, 6 of the huts are open for ski touring, 3 of which are located on the emblematic Haute Route ski route which links Chamonix to Zermatt. As in summer, they are relatively long to reach, with ski ascent times of between 4 and 7 hours (Table 1). It can therefore also be assumed that the number of overnight stays in these huts in spring represents most of the ski tourers who visit these areas.

Table 1. Main characteristics of the huts studied

| Huts | Dix | Vignettes | Bertol | Dent Blanche | Moiry | Mountet | Arpittetaz | Tracuit |
|--|---|---|-------------------------|--------------------------|--|---|-------------------|---------------------|
| Section owner (2021) | SAC Monte Rosa | SAC Monte Rosa | SAC Neuchatel | SAC Jaman | SAC Montreux | SAC Diablerets | SAC La Dôle | SAC Chaussey |
| Construction date (and most recent renovation) | 1908 (1978) | 1924 (2008) | 1898 (2000) | 1931 (2014) | 1924 (2008) | 1887 (1996) | 1953 (2015) | 1929 (2013) |
| Localisation | Hérémece | Hérens | Hérens | Hérens | Anniviers | Anniviers | Anniviers | Anniviers |
| Altitude (m) | 2928 | 3153 | 3311 | 3507 | 2826 | 2886 | 2786 | 3259 |
| Nber of berths (2021) | 109 | 120 | 80 | 34 | 104 | 100 | 32 | 120 |
| Annual average of overnight stays between 2016-2019 | 5883 | 4386 | 3059 | 1182 | 5161 | 2483 | 1410 | 5855 |
| Spring opening (mid-March to mid-May) | Yes | Yes | Yes | No | No | Yes | Yes | Yes |
| Accessible for hikers | Yes | No | No | No | Yes | Yes | Yes | Yes |
| Time and difficulty of access (summer) | 3.5hrs - T4 | 3.5hrs - Easy | 4hrs - T5 | 6hrs - T5 | 1.5hrs - T3 | 4.5hrs - T3+ | 4.5hrs - T3 | 4.5hrs - T4 |
| Time and difficulty of access (spring) | 4hrs - Easy | 4hrs Moderate | 5hrs Moderate+ | n/a | 4hrs Quite Difficult- | 6hrs Moderate | 5hrs Moderate+ | 7hrs Moderate+ |
| Sporting activities when keepers are present | Mountaineering Trekking Ski touring | Mountaineering Ski touring | Mountaineering | Mountaineering | Mountaineering Trekking | Mountaineering Trekking Ski touring | | |
| Main routes from the hut | Haute Route (winter) Trek Chamonix - Zermatt (summer) | Haute Route (winter) Pigne d'Arolla (summer) | Haute Route (winter) | Dent Blanche (4358 m) | Pigne de la Lé (3395 m) Pointes de Mourty (3563 m) | Several possibilities in winter and summer | Hikers | Bishorn (4151 m) |

The time and difficulty of access indicated are those given on the SAC portal (<https://www.sac-cas.ch/fr/cabanes-et-courses/portail-des-courses-du-cas/>)

- 24 The number of overnight stays per year (spring and summer) is known for all the huts studied for the years 1970, 1975, 1976, 1979–1982 and 1985–2019 except for Arpittetaz where no data prior to 1985 has been found. The number of overnight stays per season (spring and summer) is known for the period 1995–2019 for the Dix and Vignettes huts, 1986–2019 for the Bertol, Dent Blanche, Moiry, Mountet and Tracuit huts and 1988–2019 for Arpittetaz. Some seasonal data prior to 1986 was also found. The database is therefore continuous for the 8 huts studied, from 1985 to 2019 (35 years) for the number of overnight stays per year and from 1995 to 2019 (25 years) for the number of overnight stays per season (spring and summer). The analysis presented in the following section will therefore only cover those periods where the database is complete and continuous for all huts.

Methodology

- 25 The number of overnight stays per year and per season for these 8 huts was provided to us by the SAC central committee. They have been statistically processed in Excel to quantitatively analyse the change in the number of visitors to the huts studied. The number of overnight stays per year or per season is presented as the average number of overnight stays over a period of 4 consecutive years/seasons, in order to eliminate inter-annual variations in attendance linked, for example, to weather and snow conditions. With the same objective, the inter-annual evolution of the number of visitors to each hut is calculated by a sliding average over 4 years. When analysing the inter-annual evolution of the number of overnight stays, a variation of 0.5% was considered as stable.

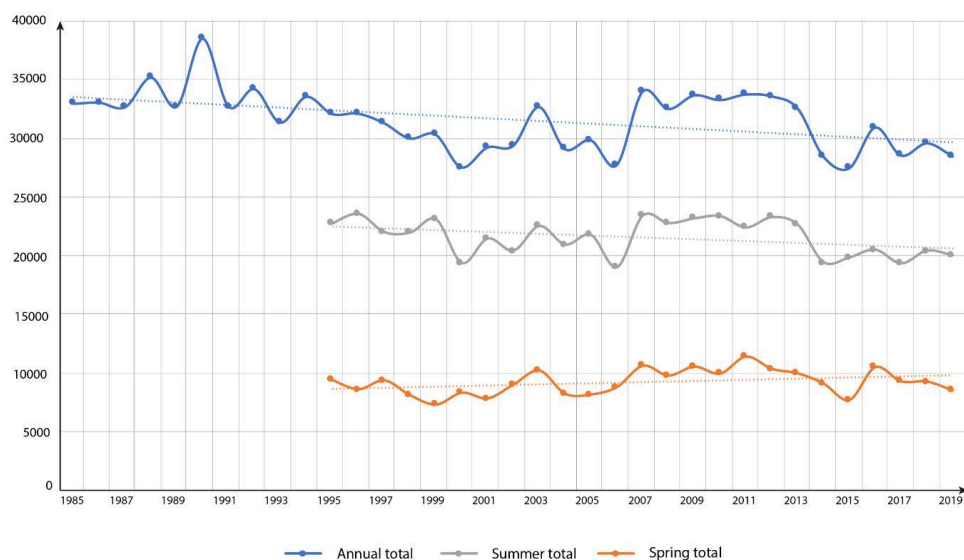
- 26 The quantitative analysis of the evolution of the number of overnight stays was then completed by a qualitative approach with 15 semi-directive interviews, carried out during the year 2021, with the keepers and owners of the huts studied. The evolution of the number of overnight stays of the hut(s) concerning the interviewee was presented to him/her and he/she was asked to explain this evolution. The aim of the interview was therefore to identify the factors that condition visitor numbers of each hut. The interviews lasted between 45 minutes and 1.5 hrs.

Results

Evolution of the Number of Visitors for all 8 Huts

- 27 During the period of 1985–2019 (35 years), the total number of overnight stays in the 8 huts considered represents an average of 31,612 nights per year, with a maximum of 39,575 nights in 1990 and a minimum of 26,116 in 2015. Between 2014–2015 and 2018–2019, the number of overnight stays recorded per year represents an average of 4% of the total annual tourist nights in the Val d'Hérens and Anniviers. This number of overnight stays shows a general downward trend over the entire period (Fig. 2). It fell from an average of 33,509 overnight stays per year between 1985–88 to 29,423 between 2016–2019, i.e., a decrease of 12% (4,087 overnight stays).
- 28 During the period 1995–2019 (25 years), summer stays represent 21,567 nights on average per year, i.e., 70% of annual visits. The number of overnight stays in summer is decreasing (Fig. 2). It fell from an average of 22,570 nights per summer between 1995–1998 to 20,050 between 2016–2019, a decrease of 11% (-2,520 nights).
- 29 Over the same period 1995–2019, spring visits represent 9,200 nights on average, i.e., 30% of annual visits. The number of overnight stays in spring is increasing (Fig. 2). It rose from an average of 8,854 nights per spring between 1995–1998 to 9,380 between 2016–2019, an increase of +6% (526 nights).
- 30 The share of summer stays in the total number of stays per year therefore decreases slightly between 1995 and 2019. Indeed, over the 1995–1998 period, summer represents on average 72% of annual attendance and spring 28%, whereas over the 2016–2019 period, summer represents 68% of annual attendance and spring 32%.

Figure 2. Change in the number of overnight stays (average over 4 seasons) for all 8 huts studied in summer, spring and the annual total

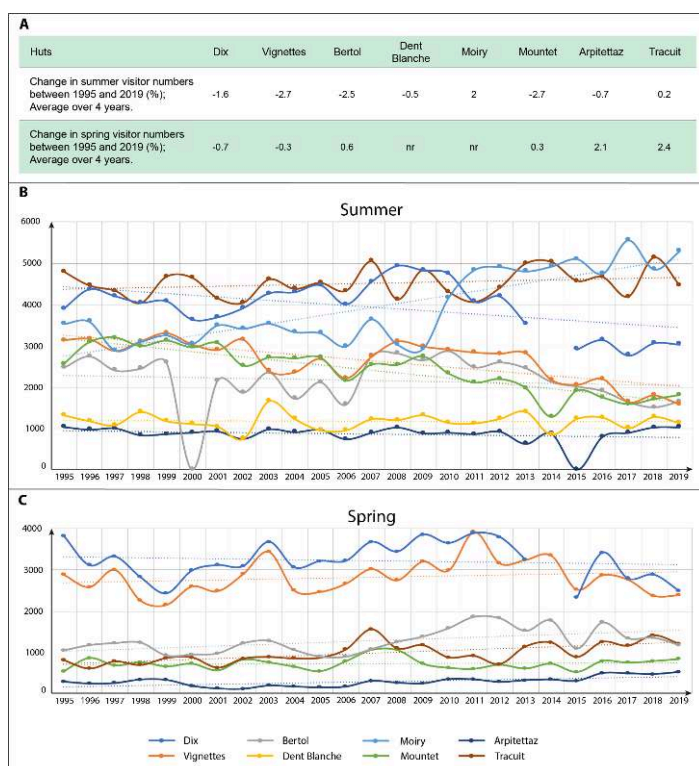


Swiss Alpine Club

Evolution of the Number of Visitors per Hut in Summer and Spring

- 31 In summer, there is a decrease in the number of visitors to five of the eight huts studied (Dix, Vignettes, Bertol, Mountet and Arpitettaz) (Fig. 3a and 3b). Visitor numbers are stable for the Dent Blanche hut and increase for the Moiry and Tracuit huts (Fig. 3a and 3b).
- 32 In spring, attendance increased for three huts (Bertol, Arpitettaz, Tracuit; Fig. 3a and 3c), stagnated for two huts (Vignettes, Mountet; Fig. 3a and 3c) and decreased in one case (Cabane des Dix). The spring attendance of two of the huts (Dent Blanche and Moiry) is not taken into account in this work, as these huts are not managed by a keeper in the spring.
- 33 The pattern of change in attendance that concerns the most huts (4 out of 8; Vignettes, Bertol, Mountet, Arpitettaz) is a drop in summer attendance and an increase or stagnation of attendance in spring. Since 2008, the Vignettes hut is even more visited in spring than in summer. The Dent Blanche, Moiry and Tracuit huts are the only ones where summer attendance is stagnant or increasing and the Dix hut is seeing a decrease in attendance in summer and spring.
- 34 However, the huts with similar trends do not have the same characteristics or the same way of functioning. For example, it is not possible to group these huts according to their clientele or their accessibility. It is therefore necessary to analyse the explanatory factors of the variations in attendance in more detail for each hut.

Figure 3. Change in the number of visitors per summer and spring season for the 8 huts



A. Table showing the average change of summer and spring attendance for each hut between 1995 and 2019.

B. Curves showing the change of summer attendance for each hut.

C. Curves showing the change of spring attendance at each hut.

Club Alpin Suisse

Identifying the Factors Influencing the Change in Visitor Numbers

- 35 Identifying the factors that explain the variations in the attendance of the huts studied is based on the semi-structured interviews conducted with the keepers and owners. The variations in the use of these huts are discussed in two different time scales: the trend over the whole study period and the annual variations.

Long-term Developments

- 36 According to the keepers of the Dix, Vignettes, Mountet, Bertol and Arpitettaz huts, the downward trend in the number of summer visitors is linked to a reduction in the number of mountaineers. The huts accessible to hikers (Dix, Mountet, Arpitettaz, Moiry, Tracuit) partly compensate for the drop in the number of mountaineers, which at best leads to a stagnation of summer attendance (e.g., Arpitettaz hut). The current keeper of the Dix hut estimates that in the nine years he has been keeper, the percentage of mountaineers compared to hikers has fallen from 50% to 30%. Hikers now represent 70% of the clientele. However, this reduction in the number of mountaineers in summer does not affect the Tracuit and Dent Blanche huts, which provide access to peaks above 4,000 m and are therefore still visited by a large number

of mountaineers. In fact, the latter are two of the three huts with a stable or increasing number of visitors during the summer.

- 37 According to all those interviewed, the increase in the number of visitors in the spring is linked to the growth of ski touring, which they consider having been significant since the mid-2000s. The military and sporting event of the “Patrouille des Glaciers” has also developed considerably in recent years, with 4,800 people registered in 2018 compared to 2,934 in 2004, and is thus increasingly publicising the Haute Route ski route.
- 38 The way in which the hut is managed, and in particular the way in which bookings are made, also has an impact on the evolution of the number of visitors. In the 1980s and 1990s, it was the custom for the keeper to accept more guests than the number of available bunks. People slept in the refectory and in the corridors if necessary. For example, at that time, the Dix hut, which had 140 bunks, regularly had more than 200 people per night. This type of practice has gradually disappeared, particularly since the beginning of the 2000s, in view of the changing expectations of the clientele, particularly in terms of comfort, and the obligation of the keepers not to exceed a maximum number of people present at the same time in the hut in order to comply with fire safety standards. The keepers also increasingly avoid overbooking so that they do not have to do two shifts for the evening meal. This leads to a significant reduction in customer comfort and limits the number of drinks. On the whole, avoiding overbooking means that the peaks in occupancy are lower.
- 39 The only hut studied that shows a strong increase in summer attendance is the Moiry hut with a 35% increase in overnight stays between the periods 2006–2009 and 2011–2014 (Fig. 3a and 3b). This increase follows the renovation of the hut in 2008 and the arrival of a new keeper in 2009. According to the keeper and the owner, this significant increase in attendance is related to a combination of factors. The renovation of the hut provides a good level of comfort, and the new keeper has worked hard to improve the services offered—especially the catering—and to equip new climbing routes in accessible technical levels near the hut. According to the keeper and the owner, the combination of these actions with the characteristics of the hut (Table 1)—quick and easy access, a good view of the glaciers, several easy and quickly achievable mountaineering routes from the hut—makes it attractive to several types of public: (i) hikers, often beginners, whose objective is to go up and spend a night in a comfortable high mountain hut in a beautiful environment; and (ii) amateur mountaineers and guides with their clients, interested in the accessibility of the hut and the fact that it allows them to practise various high mountain activities in easy or not very difficult technical levels and quickly achievable from the hut. Moreover, the keeper has worked to welcome mountaineers who come to the hut over several days to take advantage of the variety of possible activities. This example shows that the renovation of a hut and a change of keeper can lead to a long-term change in attendance, in connection with the quality of the services offered. These include the reception, the meals, and the relations the keeper maintains with his customers and the professionals of the sector. In the sample of huts studied, only the Bertol hut is also concerned by a phenomenon of this type. Between 2010 and 2015, the keeper had a good relationship with the guides, which was reported to contribute to a significant part of the hut’s attendance.
- 40 The effects of climate change are leading to changes in hut access routes (Mourey and Ravanel, 2017b; Mourey *et al.*, 2019a) and mountaineering routes (Mourey *et al.*, 2019b). This evolution is characterised by an increase in the technical difficulty and danger of

the routes and by a shift of the periods when conditions are most favourable for mountaineering and hiking at altitude, mainly in spring and autumn. The transformation of the routes leads to a decrease in the number of visitors to certain huts and contributes to a decrease in the number of mountaineers in favour of hikers. For example, access to the Bertol hut is becoming more technically difficult and more dangerous due to the melting of the Bertol Glacier and rock falls (Mourey *et al.*, 2019a). According to the hut owner, this helps to explain the decrease in the number of climbers using the hut, especially beginners for whom access has become too complicated. The 8 huts studied are facing similar problems due to the transformation of access to the hut or of mountaineering routes.

- 41 Finally, the macro-economic context can explain certain variations in clientele and therefore in attendance. The economic crisis of 2008, combined with the euro crisis between 2009 and 2015, led to a sharp drop in the exchange rate of the euro against the Swiss franc. Indeed, the rate went from 1.5 CHF for 1 euro on 2 January 2009 to 1.2 in 2012–2013 before experiencing a further fall of 0.2 on 15 January 2015. In 2021, the rate fluctuated between 1.07 and 1.1. This drop in the exchange rate has resulted in an increase in the value of prices in Switzerland for customers from the euro zone. For example, an overnight stay at 90 CHF was worth 60 EUR in 2009 and 84 EUR in 2021, an increase of 40%. According to all the keepers interviewed, this phenomenon has led to a significant drop in the number of customers from the euro zone.

Inter-annual Change

- 42 On an inter-annual scale, we have identified 5 main factors that explain the variations in attendance:
- Weather, snow and ice conditions unfavourable to mountain sports can lead to a drop in the number of huts visited.
 - Renovation work sometimes requires the hut to be closed for a season, or the number of places to be reduced. For example, the Bertol hut was closed during the summer of 2000 for renovation work, with a consequent zero attendance that season (Fig. 3.B.). For huts on the same route, such as the Haute Route ski tour or the Chamonix-Zermatt summer trek, the closure of a hut for renovation in one season can lead to a drop in the number of visitors to nearby huts, as a stage of the route is removed.
 - Sporting events attract several thousand participants and require a very heavy logistical set-up that relies greatly on the huts. In the area studied, the military ski-mountaineering race “La Patrouille des Glaciers”, which links Zermatt to Verbier (4,800 competitors in 2018), takes place in even-numbered years, bringing more people during these periods—participants coming to investigate the route, military personnel for the management of the race, organisers—in the huts located on the route (Dix, Vignettes). During the race, the Bertol hut is completely reserved for the logistics of the event, which represents about 200 nights.
 - Television programmes have given the Haute-Route considerable publicity. In 2006, the programme “Passe-moi les jumelles” (RTS) devoted a series of 30-minute episodes to the Haute Route in summer, and three years later (2009) to the Haute Route on skis in spring. According to Jean-Marc Schouller, a hut attendant for the Neuchâtel section of the SAC, the increase in visitor numbers to the Bertol hut of +937 overnight stays (+30%) between 2004–2006 and 2007–2009 (Fig. 3) is largely due to these broadcasts.

- Specialised social networks (skitour, CamptoCamp) provide additional visibility for an ascent route, which, depending on the keeper, can lead to additional visitor flows on a more or less permanent basis for the hut.

Changes in the Number of Visitors and Sporting Activities in the Less-developed High Mountains

- 43 In the previous section we showed that many interacting factors explain the variations in hut attendance. The identification of these factors, in particular those expressed over a long period of time, combined with the analysis of variations in attendance, provides information on the transformation of the way sports activities are practised in the sectors concerned.
- 44 The attendance data for the 8 high mountain huts studied confirm a decrease in summer attendance in the high mountains, with an 11% drop in the number of overnight stays between 1995–1998 and 2016–2019. According to the interviewees, this decrease is largely due to a drop in the number of mountaineers in the high mountain huts. However, the decline in the number of mountaineers during the summer does not apply to huts with access to peaks above 4,000 m, or to introductory courses, which remain emblematic destinations for mountaineers. These two observations confirm the work of Hoibian (2008) and Bourdeau (2014) who identify a decrease in the number of mountaineers and a concentration of climbers on technically easy and/or emblematic and/or rapidly accessible routes. This transformation in the practice of mountaineering can be explained in part by the transformation of the ways in which sports activities are practised which, in the current socio-cultural context, are not in line with the foundations of mountaineering and are characterised by the rise of multi-practices oriented towards more technically accessible and limited risk-taking playful activities, within the framework of reduced time sequences, favourable to spaces peripheral to the high mountains. This decrease in the number of mountaineers is also favoured by the effects of climate change, which acts as an accelerator of this trend, implying an increase in the technicality and danger of the routes and an increased need for commitment in the practice.
- 45 The data on hut attendance also supports the observation that ski touring is growing, with a 6% increase in the number of overnight stays in spring between 1995–1998 and 2016–2019. This observation is unanimously confirmed by the actors interviewed and corroborates with the conclusions of Muller (2019) and Lamprechet (2020) as well as many observers (Krésiak *et al.* 2022). However, according to our study, the increase in attendance in spring does not compensate for the decrease in attendance in summer (Fig. 2).

Conclusions and Perspectives

- 46 This article has discussed the relevance of high mountain hut attendance data for the study of mountain sports transformation and, more generally, of the tourism transition underway in the so-called “less-developed mountains”. We have shown that this material has several biases and limitations and is particularly well suited to the study of high mountain sectors where the use of huts is necessary for the vast majority of sports enthusiasts. The analysis developed through the example of 8 high mountain huts in

the Valais Alps thus makes it possible to quantify the number of visitors in the sector under study and to identify the factors which explain its evolution. This is characterised by a decrease in the summer and an increase in the spring, in connection with a decrease in the number of mountaineers and an increase in the number of ski tourers.

- 47 Putting this into perspective, the inter- and transdisciplinary programmes *Refuges Sentinelles* (<https://refuges-sentinelles.org>, since 2016) and *HutObsTour* (<https://wp.unil.ch/hutobstour>, since 2020), aim to fill in some of the biases and limitations of the visitor data presented in this article. Through a collaborative process involving hut keepers, guides, mountain leaders and alpine clubs, more extensive and accurate visitor data than the number of nights per season will be acquired, including the number of daily nights and the destination (practice, summit, route) of each person sleeping in the hut. These records of destinations, collected and interpreted with those involved in the field, are intended to provide a much more detailed analysis of the ways in which sporting activities are practised in less-developed mountains and how they are changing. In total, 35 huts are concerned by at least one of these two programmes in the French Alps (Ecrins, Vanoise and Mont Blanc massifs) and in Switzerland (Valais).

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ABSTRACTS

Mountain sports (skiing, mountaineering, hiking, etc.) play an important role in the restructuring and diversification of tourism in the Alps. However, the transformation of these practices is subject to a significant lack of information, especially concerning how many people visit the “less-developed” mountains, outside the urban centres that make up the resorts. For mountain areas, there is specific data for mountain huts (term used in Switzerland), or refuges (term used in France). This data shows the location and the number of visitors of “less-developed” mountain areas, allowing to study the transformation of outdoor sports in these sectors. However, this data is not always easily accessible, especially over a long period of time, and it presents several biases. In this paper, we discuss the interest and the limits of the data on visitor numbers in mountain huts in Switzerland and in France for the study of the change of visitor numbers in the “less-developed” mountains and more particularly of the sporting practices which take place there. An example of analyses, based on statistical processing of the number of overnight stays, as well as semi-structured interviews with hut keepers and owners, will be presented for a sample of huts in the Valais Alps (Switzerland). This analysis allowed us to confirm (i) the general decline in the number of mountaineers visiting the high mountains in summer, with an 11% drop in the number of overnight stays between 1995–1998 and 2016–2019 in the 8 huts studied; (ii) the concentration of mountaineers on technically easy and/or emblematic and/or quickly accessible routes; and (iii) the development of ski touring, with a 6% increase in the number of overnight stays in spring between 1995–1998 and 2016–2019.

Les pratiques sportives de montagne (ski, alpinisme, randonnée pédestre, etc.) jouent un rôle important dans la restructuration et la diversification du tourisme dans les Alpes. Toutefois, l'évolution de ces pratiques fait l'objet d'un déficit de connaissance majeur, notamment sur la fréquentation de la montagne « peu aménagée », en dehors des pôles urbains que constituent les stations.

Pour les espaces de montagnes, il existe une donnée spécifique qui est la fréquentation des cabanes (terme utilisé en Suisse) — ou refuges (terme utilisé en France) — de montagne. C'est une donnée qui permet de localiser et de quantifier la fréquentation en montagne « peu aménagée » et ainsi d'étudier l'évolution des pratiques sportives de plein air dans ces secteurs. Toutefois, c'est une donnée qui n'est pas toujours facilement accessible, notamment sur le temps long et qui présente plusieurs biais.

Dans cette communication, nous proposons de discuter de l'intérêt et des limites des données de fréquentation des cabanes de montagne en Suisse et en France pour l'étude de l'évolution de la fréquentation de la montagne « peu aménagée » et plus particulièrement des pratiques sportives

qui s'y déroulent. Un exemple d'analyse, basée sur un traitement statistique du nombre de nuitées et des entretiens semi-directifs avec des gardiens et les propriétaires des cabanes, sera présenté pour un échantillon de cabanes dans les Alpes valaisannes (Suisse). Cette analyse nous a permis de confirmer (i) la diminution généralisée de la fréquentation de la haute montagne par les alpinistes l'été, avec une baisse de 11 % du nombre de nuitées entre 1995–1998 et 2016–2019 dans les 8 cabanes étudiées, (ii) la concentration des pratiquants sur les courses faciles techniquement et/ou emblématique et/ou rapidement accessibles et (iii) le développement du ski de randonnée, avec une hausse de 6 % du nombre de nuitées au printemps entre 1995–1998 et 2016–2019.

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