Abstract Volume
8th Swiss Geoscience Meeting

Fribourg, 19th – 20th November 2010

20. Geotopes and Geoparks

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Geosciences
Platform of the Swiss Academy of Sciences

UNIVERSITAS FRIBURGENSIS
Department of Geosciences

20. Geotopes and Geoparks

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Swiss Working Group on Geotopes (Platform Geosciences, SCNAT)

20.1

Geotopes of national significance : report 2010

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Starting in 2006, the revision of the inventory of Geotopes of national significance (see Berger et al. 2008) comes to the last step. We present here the last report, which will be submitted to the BAFU at the end of this year.
Thank to the collaboration of several swiss earth scientists, this version will be considered as the first stable list on geotopes of national importance, including about 350 sites.
The present contribution will discuss the general list with some typical examples of problems occurring during the realization of the report.
We will also take the opportunity to discuss the present list as well as the different aspects concerning the future of this report : it is clear that this process need a regular update, concerning for example the following topics :

- procedure for adding new geotopes
- procedure for cancelling geotopes already listed (because of destruction, for example)
- database updating
- creation of a separate database concerning geotopes discussed but finally removed of the list during the years 2005-2010
- publication(s) of the results in local to international public
- future of the Working Group

We hope to see a lot of colleagues to participate to the discussion.

Special thanks to the BAFU and SCNAT for financial support and to all the colleagues who help us to compile and choice paleontological sites.

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20.2

Static and dynamic mapping of geosites

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The use of maps in the field of geoheritage research and promotion is growing. Several attempts to formalize the mapping process – especially for geotourist maps – have been proposed these last years (Coratza & Regolini-Bissig, 2009; Martin & Reynard, 2009; Regolini-Bissig, 2010). Until now, they are limited to traditional, static maps. However, dynamic tools such as web-mapping and web-GIS have been used to publish and communicate information about geosites.

Three different maps are presented and compared: a static map showing the Swiss geosites of national significance, a web-mapping tool based on the same inventory, and a geotourist and interpretive map of Tanaro Valley. The specific advantages of both static and dynamic maps are exposed, according to Cartwright & Peterson (1999) and Meng (2003).

Following Regolini-Bissig (2010), geosite maps are classified in three categories according to their objectives: inventory maps, geotourist maps and interpretive maps (tab. 1).

Map type	Objectives
Inventory maps	to localize sites; compare attributes (values)
Geotourist maps	to inform the public about tourist facilities and services and communicate geoscientific information
Interpretive maps	to visually transfer geoscientific knowledge between specialists and the public

Table 1. Typology of maps in the field of geoheritage research and promotion.

The first category is not well developed. Mostly static maps can be found, used as synthesis tools presenting the sites' localization and sometimes a few attributes of these. As a matter of fact, GIS are poorly used to manage geosite inventories and assessment, despite the fundamental spatial dimension of the objects.

We have carried out a web-mapping project based on the Swiss inventory of geosites of national significance. Compared with the static map, this project exemplifies the advantages of a dynamic and interactive map. While keeping the objectives of a basic inventory map, it also becomes a query tool, allowing spatial and thematic requests. Dynamically based on a database, the web-map is, thereby, not only a storage tool, but also an exploration and publication tool. The interface allows the user to choose which task he wants to perform. It is an attempt to design a tool intended for both specialists and amateurs.

The two last categories are designed for a non-specialist public. Geotourist maps aim to inform the reader whereas interpretive maps tend to communicate a message and explain a landscape's specificities.

The third example is a bird's-eye view map with two sides. In the front there is geotourist information on Tanaro Valley region (Italy), while the back is more interpretive, and explains the landscape's evolution using a series of drawings supported by synthetic text explanations. This example shows that a static map can also meet several objectives and illustrates the importance of focusing on one theme only.

As a conclusion, some perspectives are drawn for the use of dynamic tools to support geotourist and interpretive maps. Interactive maps allow the users to select the content according to their interests and competence, or the time they want to spend on it. Along with multimedia, interactivity gives the opportunity to dynamically show processes and the evolution of landscape. Finally, dynamic maps can be a good alternative to the frontal-teaching aspects of traditional maps, allowing the user to build his own knowledge of a theme.

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20.3

Geomorphology and geology in the Regional Nature Park (RNP) Pfyn-Finges (Valais): identification, assessment, educational and touristic promotion

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The Regional Nature Park (RNP) Pfyn-Finges project is located in central Valais and covers a surface of about 250 km^2 from the Bishorn summit in the Turtmann valley to the Plaine Morte glacier north of the Rhone river. The RNP perimeter also crosses the three main geological domains of the Swiss Alps (Austroalpine, Penninic, Helvetic nappes and crystalline basement).

During the first phase of the RNP project in 2008, a general inventory of landforms was realized. Due to the wide range of altitudinal zones (500 to 4'000 m. a.s.l.) and the geological diversity, numerous various geomorphic landforms and processes were identified. A database of scientific publications and thematic maps about geomorphology and geology in the Pfyn-Finges region was also performed.

The multi-thematic method for landscape assessment developed by the Federal Office of Environment was then used to evaluate the value of the geomorphic and geological landforms. Several of them have obtained a high notation, like the Illgraben scarp, the wild Rhone, the Siders Bergsturz and the glacial valley of Turtmann. Others well developed and preserved features like the uphill-facing scarps morphology in the Fäsilalpü, the pyramids of the Raspille, the narrow gorge of Feschel incised in the Helvetikum limestone nappes, the numerous rockglaciers of Turtmanntal or the hydro-karstic systems of the Russubrunnu are of particular interest. Some of these landforms are also important in term of marketing: the Illgraben for instance is now considered as the main geomorphic hotspot and one of the main visual identities of the RNP Pfyn-Finges.

On the basis of this assessment, several projects of educational and touristic promotion were developed. The panel of offers to discover geomorphology and geology was improved since a few years. In addition to guided excursions and information's flyers, a geological garden with 36 different rocks from the RNP was realized in the Nature and Landscape Center in Salgesch during summer 2010. Objectives of this permanent exposition are to show the long geological history of the Alps and to be used as educational tool for schools. Another project initiated this summer concerns the development of an educational place in collaboration with the three gravel companies located in the wild Rhone area. It will host an Illgraben model (in order to create artificial debris flows) and others didactical activities (rocks identification, understanding of aquifers…) for school classes. In the next years, the diversification and the improvement of the geotouristic offers is one of the main objectives of the RNP Pfyn-Finges.

20.4

Glacial heritage of the Chablais area (FR-CH): understanding glacier flows and identifying geosites

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The Chablais area possesses a very interesting glacial heritage. It is considered as one of the cradles of glaciology, theory elaborated with difficulty but widely
accepted since the middle of the XIXth century (De Charpentier 1841). Since then, several generations of researchers have focused on this region with various approaches like geology, hydrogeology, geomorphology, geophysics, etc. Today, the territory shows strong glacial characteristics, of which knowledge remains paradoxically incomplete, because most of the studies are very localized (Perret 2010) without a global overview of the system (Rhone and Dranse glaciers).

Within the framework of a territorial project including the creation of a regional geopark, an itinerant exhibition and an inventory of natural sites, we have a mandate to complete the knowledge on the regional Quaternary palaeogeography, and to present a coherent glacial history to the public, through a regional inventory of geosites.

To better understand the current indicators of the former glaciers, it is necessary to reconstruct the flows of ice, which followed each other in this area (Fig. 1). It will then be possible to explain the visible elements in the landscape and to identify key sites of the glacial history. This stage of reconstruction includes the study and mapping of the glacial and associated morphologies, through a geomorphological approach coupled with a more geological approach (study of natural and artificial cuttings). Although we are not looking to establish an absolute chronology of the events, it is also planned to date some landforms such as erratic blocks.

The objective of promoting geology through a territorial project (geopark) guided the choice of an approach by geosites as well as the constitution of an inventory. In this way, we select particularly representative or rare sites (Grandgirard, 1997), with a strong integrity, in order to present the most striking objects (Fig. 2) to the public but we try also to approach a wide panel of landforms capable of reporting all the glacial processes which operated in the region.

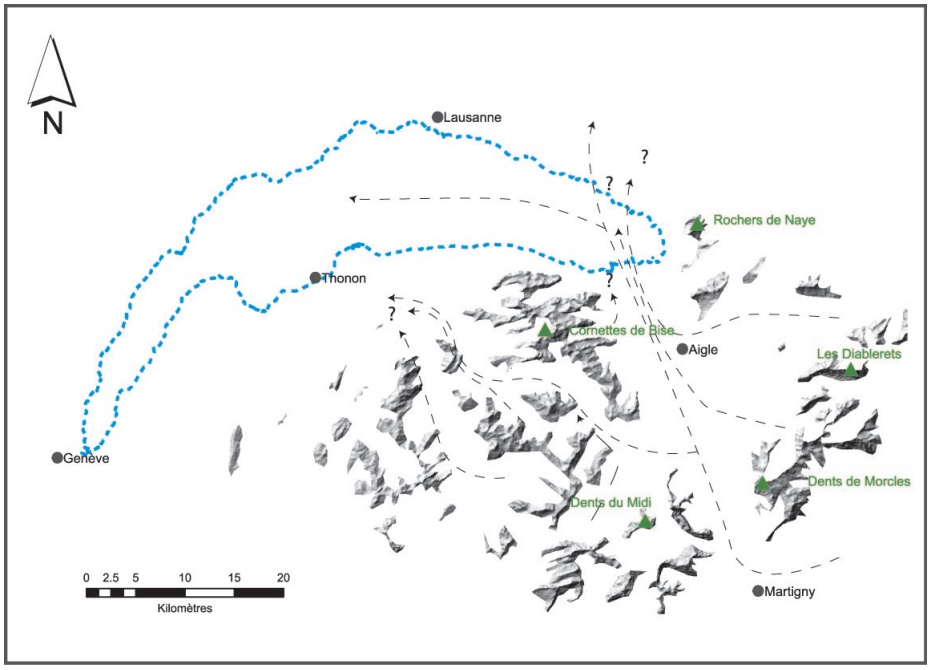

Figure 1. Map of the last width glacial extension in the Chablais area, after S. Coutterand, 2010.

Figure 2. The "Pierre à Martin" (Ballaison, FR), erratic block, potential geosite in the French Chablais.

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20.5

Quality assessment of natural heritage trails

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Natural heritage trails and educational panels are a widespread form of scientific communication. Commissioned by public entities as well as by private associations, they concern both local peculiarities and internationally known features. While some projects inventory the trails in a given region to more efficiently spread the information among the public (e.g. www.randonature.ch) other works analyse the scientific topics highlighted by trails (Cayla, 2009). Up to now, no method has been developed to assess their scientific and educational value. However, evaluation is important to guarantee products of quality and of high interest for the public (Martin et al., submitted).

In 2010, the natural sciences society of Valais (*La Murithienne*) launched a project to certify products about natural heritage in Valais, Switzerland. A label –Marque Valais – will be attributed to products of high scientific quality and a significant socio-economic impact within a sustainable development model. The assessment of the socio-economic impact will be carried out by the Institute of Economics & Tourism of HES-SO Valais and is not subject of this contribution.

Considering the directives of the awarding committee (Bernard & Kunz, 2009) – improvement of the product quality through a consulting service and labialisation – five evaluation categories (Fig. 1) were taken into account for the develop-

ment of the assessment method presented here. They regard the domains individuated as important for guiding the implementation process of a valorisation product (Martin et al., submitted). Each of these categories is composed of a set of criteria (Tab. 1) with explicitly formulated scores in order to reduce subjectivity as much as possible and, therefore, differences of appreciation among evaluators (Bruschi & Cendrero 2005). Six evaluators tested the method before applying it at a large scale (250 natural heritage trails, of which 80 have already been assessed as a priority). Their remarks helped us to reformulate some ambiguous criteria and to adapt the method to practical considerations of evaluation in the field.

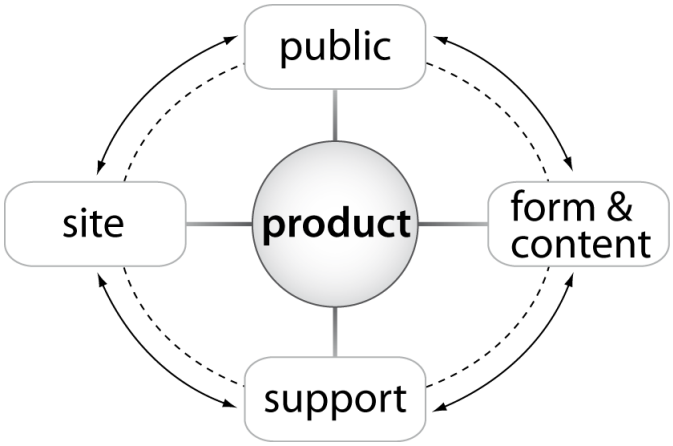

Figure 1. Evaluation categories for the assessment of the scientific and educational quality of natural heritage trails.

Domain	Criteria
1) site	a) rareness, b) integrity, c) cultural and historical value, d) educational interest
2) support	a) design (general appearance) *for permanent supports (ex. panels):* b) maintenance, c) location, d) integration *for mobile supports (ex. brochure, mobile phone, etc.):* *b) quality, c) navigation (structure), d) size*
3) form	a) layout, b) readability, c) information structure, d) diversity and quality of illustrations, e) relevance of illustration, f) available languages
4) content (theme and message)	a) preciseness of theme, b) coherence of the message, c) comprehension of natural complexity, d) general and social interest of the message
content (scientific content*)	a) accuracy and scientific rigour, b) honesty, c) scientific interest of the site or features, d) relevance of information, e) respect of intellectual property
content (educational content)	a) level of complexity, b) accessibility and complexity, c) attractivity, d) adequacy between quantity of information and length of the trail
5) public	a) visitors' orientation, b) site protection, c) car park management, d) vulnerability awareness message e) information availability
*this section has to be assessed by an expert	

Table 1. Evaluation categories and corresponding assessment criteria.

The analysis of the obtained results will provide an overview of the global value of products in Valais and help to develop the consulting service. Moreover, the presented assessment method could be modified to fit the evaluation of products other than trails.

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