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## Geotourism in the Alpine Arc: Inventory and Typology of the French Offers

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8 Text-Figures, 1 Table

*Frankreich  
Geopark  
Geotourismus  
Höhle  
Stratotypus*

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### Geotourismus im Alpenbogen: Verzeichnis und Charakteristik der französischen Angebote

#### Zusammenfassung

Betrachtet man das Spektrum der geotouristischen Angebote in den Alpenländern, stellt man Unterschiede sowohl in der Art der Projekte (Museum, Geopfad ...) als auch der Inhalte (Prähistorik, Geomorphologie, Paläontologie ...) fest, wodurch kulturelle Unterschiede in der Annäherung an die Thematik zum Ausdruck kommen. Unter Berücksichtigung der französischen Gesetze und der Netzwerkes der institutionellen Akteure, die sich mit Geotopschutz und Geotourismus beschäftigen, zeigt die Entwicklung trotz der „International Declaration of Land Memory Rights“ (unterzeichnet 1991 in Digne-les-bains), dass solche Absichten zur Ausweitung des touristischen Angebotes schwer umzusetzen sind. Die Beispiele in dieser Arbeit zeigen verschiedene Entwicklungsstrategien einiger geotouristischer Projekte in den Französischen Alpen.

#### Abstract

Analysing the spectrum of geotourism offered by the various countries of the Alps, some differences as the type of item put forward (museum, geopath ...) or as to the topics which are presented (prehistory, geomorphology, paleontology ...) thus revealing a certain diversity in cultural approaches. Presenting French laws as well as the network of institutional actors in charge of the protection of geosites and geotourism development shows to what extent, in spite of the “International Declaration of Land Memory Rights”, signed in Digne-les-bains in 1991, this way of diversifying the tourism offer is difficult to set up. The following examples allow to illustrate various development strategies of some geosites in the French Alps.

### 1. Introduction

The geological heritage of the Alpine arc is particularly rich and offers a multi faceted range of sites: paleontological (Monte San Giorgio in Tessin ), stratigraphic (Global Stratigraphic Point of the Hauterivian in France), mineralogical (Binntal in Valais), geomorphological (Breitachklamm in Bayern, Dachstein caves in the Salzburg province), tectonic (thrust fault in Glarus, Switzerland), prehistorical (cave and museum of Quinson, Alpes of Haute-

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Provence) and mining (lead mine in Mezica, Slovenia). This variety of aspects fosters expanding geotourism. The work presented here, after having carried out an assessment of this offer proposes some French examples in order to illustrate the diversity of practices.

## 2. Inventory of Geotopes

The inventory of this geodiversity has reached very different stages depending on the countries. The Geological survey of Austria as well as Bavaria already provide an on-line computer SIG of geotopes ([www.geologie.ac.at/geo\\_exkursionen/start.htm](http://www.geologie.ac.at/geo_exkursionen/start.htm), [www.geologie.bayern.de](http://www.geologie.bayern.de)). The inventory remains partial in Italy ([www.geomorfolab.it/pagine/cerca\\_geo\\_no\\_db.php](http://www.geomorfolab.it/pagine/cerca_geo_no_db.php)). Some regions such as the Trentino-Alto Adige provide a thorough inventory ([www.protezionecivile.tn.it/geologico/pages/Geositi/mapview/index.html](http://www.protezionecivile.tn.it/geologico/pages/Geositi/mapview/index.html)).

Switzerland has undertaken the same type of work initiated by some cantons. As for France and Slovenia, they do not yet provide such information, although the data collecting has already been completed.

Sometimes, these geotopes have become touristic sites through their own intrinsic quality which can be comprehended by all. Thus, the „mer de glace“ at the foot of Mont-Blanc yearly attracts around 1 million visitors although no geomorphological explanation is presented to them.

Other geotopes have become the focus of cultural tourism development, which requires scientific mediation by means of interpretation centers, museums sites. The work presented in this paper strictly deals with this type of geotourism offer.

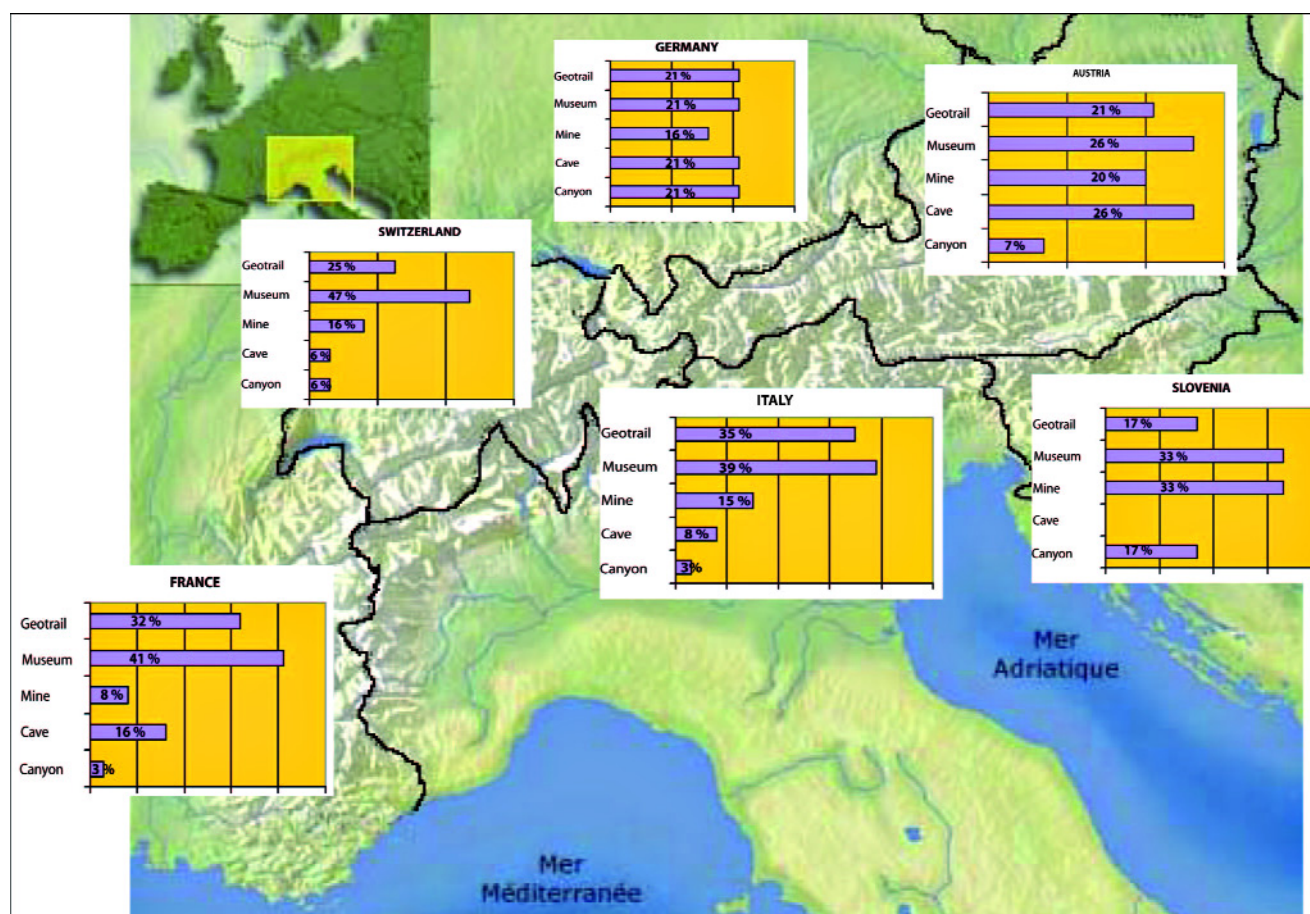
## 3. Inventory of Geotouristic Offers in the Alps

A comprehensive inventory has been undertaken to register the whole of this offer. The 100 most noteworthy sites are to be presented on an internet site created in the EDYTEM laboratory from the university of Savoy and it will soon be online.

Give or take a few differences, the geological potential of every country of the Alpine arc is similar. It can therefore be assumed that the mineral resources, the fossil deposits, the caves, the stratotypes are spread out similarly across the Alps. A first analysis shows that the unequal repartition of tourism approaches is mostly due to differences in the cultural backgrounds. Thus, it can be noted that statistically the museographic medium has been more promoted in Switzerland and in France, whereas natural geotopes such as caves and canyons are specifically dealt with in Germany and Austria. The mining past constitutes a definite focus point in Italy, Switzerland, Austria and Slovenia. Let us now consider the topics which are presented, an important awareness campaign as to what is called “natural hazard” in France, a marked interest for glaciers in Switzerland, Italy and Austria, whereas prehistory represents a key topic in France and Italy.

## 4. Protection and Development of Geological Heritage in France

In France as well as in many other Alpine countries, the protection of the geological heritage has been taking place progressively through a complex legal framework that has not always been specific (BILLET, 2002).



Text-Fig. 1.  
Typologic distribution of touristic geosites in the Alps (299 references).

Table 1.  
Main laws to protect the geological heritage in France.

Date	Law	Example
March 31, 1887, completed December 31, 1930	Historical monument protection	October 1, 1994 – Mines of Fournel at l'Argentière La Bessée (Hautes-Alpes)
April 21, 1906, completed May 2, 1930	Natural monument protection	June 19, 1939 – Caves of Sassenage (Isère)
July 22, 1960	National parks	3 national parks in the French Alps
March 1, 1967	Regional natural parks	6 regional natural parks in the French Alps
July 10, 1976	Natural reserve	3 natural reserves and one geological (1984 – Natural reserve of Haute-Provence) in the French Alps

Most of these laws address the protection of the fauna and flora rather than the geological items themselves. Thus, there are only 28 natural geological reservations out of a total 328 reserves in France.

Although this legal framework allows for the protection of the geological heritage, it still does not help with tourism development and more often than not, initiatives are down to favourable local conditions rather than to institutional programmes.

However, for the past few years, various national structures have been trying to sensitize people to the geological patrimony. In 1986 the natural reserves in France created a geological heritage commission which led to the production of many scientific popularization documents. A bit later, in 1998, the ministry for the environment and sustainable development created the “conférence permanente du patrimoine géologique” which brings together many institutional partners: the National Museum of Natural History, the French geological survey (Bureau de Recherche Géologique et Minière) and the French Geological Society. This commission being responsible for the French inventory, it has also been trying to support the rights of the French geological heritage.

In the French Alps, two centers for environmental education work specifically on the topic of geology :

- The center for mountain nature in the Rubins castle (Salanches – Haute-Savoie) ([www.rubinsnature.asso.fr](http://www.rubinsnature.asso.fr)) of-

fers a series of geologically-analysed landscapes, along with numerous trainings.

- The Briançon Alpine Geological Center ([www.cbga.net](http://www.cbga.net)) which for 20 years has been popularizing the local geology by organizing field trips and school training.

## 5. Panorama of Geotouristic Offers in the French Alps

Some examples will be presented to illustrate the various strategies of combining tourism with geology in the French Alps

### ● Museum of Cave Bear

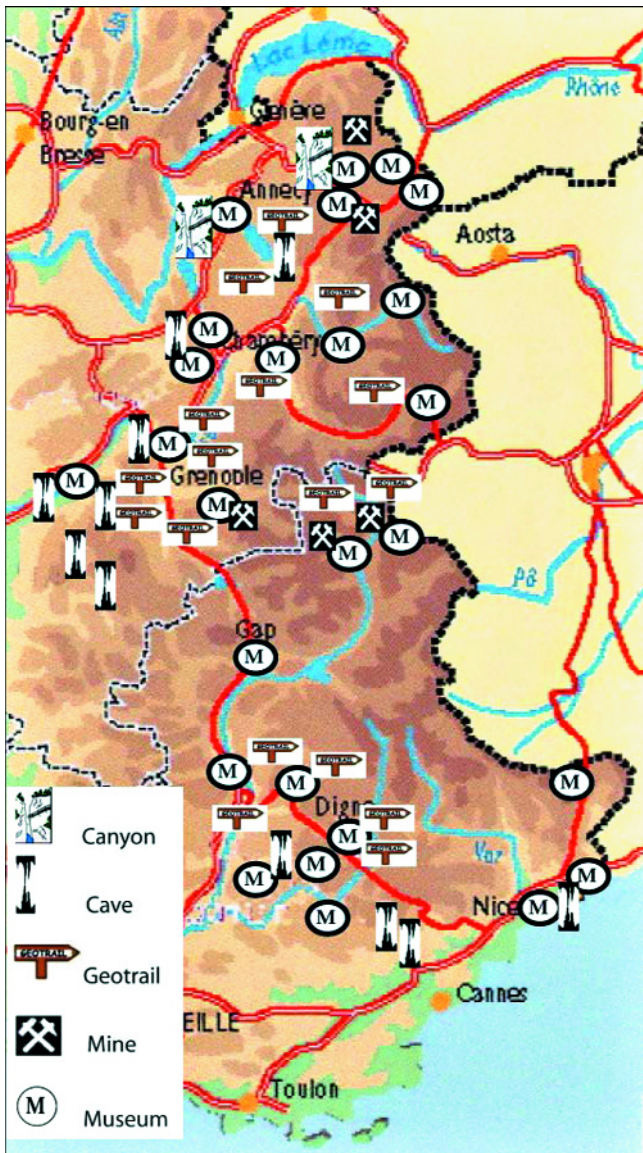
#### Entremont le vieux (Savoie – 73)

Thousands of tourists on their way to the summit of Mount Granier go through La Balme de Collomb every year. In autumn 1988, two members of the speleological club of Savoy found the extension of the karstic network there. In the first room they went through, a fantastic collection of cave bear bones was on display. Six years of excavation, led by Michel PHILIPPE, from the Natural History Museum of Lyon allowed the extraction of 12 000 bones which witness bear hibernation between 45 000 BC and 24 000 BC (PHILIPPE, 2004). At the same time, 1.5 million € have been invested by Europe, France, the Rhone-Alpes region, Savoy and the village so as to create a site museum close to Chambéry, which opened in



Text-Fig. 2.  
Examples of geotrails in natural protected areas.





Text-Fig. 3.  
Inventory of geotouristic offers in the French Alps.

2002 and welcomes on average of 20 000 visitors every year. The cave itself, which is 600 metres high, is not accessible, especially to protect it from plunderings. The museum has recreated the atmosphere of the cave and



Text-Fig. 4.  
Museum of Cave Bear (Musée de l'ours des cavernes Entremont-le-Vieux).

the walls nearly faithfully duplicate those of the original cave.

Such an achievement testifies to the fact that local authorities are keen on supporting a patrimony that was discovered by chance so as to ensure the sustainable development of a rural village of 500 inhabitants which is threatened by urban development and by the decline of winter tourism.

This example illustrates a bottom-up strategy of touristic development. A fantastic paleontological site discovered after a phase of scientific research could be used as a tool for touristic development by local authorities concerned by the importance of this „natural heritage“. It is thus always useful to continue the efforts of popularization and mediation concerning geology so that this natural resource can be considered by neophytes as a potential touristic resource – and not only in case of an exceptional geosite.

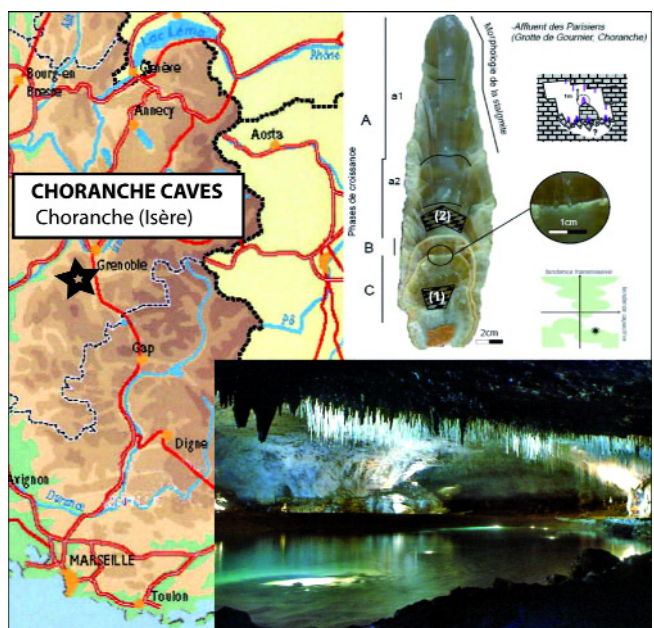
#### ● Choranche caves

##### Choranche (Isère – 38)

The first explorations were undertaken towards the end of the XIX<sup>th</sup> century, and covered the area of the current tourist visit now. In the 40s, they went on which led to the connection of two networks in 1968: the Chevaline cave one and the Coufin cave one. The speleological crossing is one of the most famous in the Vercors karstic area.

The exploitation society of the Choranche caves, which is private, was created in 1965. Currently, the tourist flow reaches 100 000 yearly visitors, after a peak at 200 000 in the 1990s. An underground laboratory has been set up inside the network and the existing convention between the exploitation society and the EDYTEM laboratory, aims at continuing with active research and allows to update the explanations given during the visits. Thus, a 1.4 m sample was taken in a speleothem in 1996. It provided not only paleoclimatic informations, but also elements which made it possible to retrace the history of human occupation of the karstic plate above (PERRETTE, 1999).

A working group is currently elaborating the classifying file for caves to be designated as World Heritage Site by the UNESCO. This file will include 18 french caves



Text-Fig. 5.  
Choranche caves (Grottes de Choranche).



which offer speleothems of an incredible richness. It will be the third natural site within the 30 World Heritage Sites that existed in France. This solution was selected with the aim to promote at a larger scale the most beautiful french caves certainly partly to fight against the decrease of visitors in that type of touristic offer since the 1990s (BIOT, 2006)

#### ● The Fournel mines in l'Argentière la Bessée (Hautes-Alpes – 05)

In the 1980s, some amateurs started getting interest in the mines which since the medieval times have allowed the exploitation of silverbearing galena in the Fournel valley, near the village of l' Argentière. Most of the galleries, as they were being progressively abandoned, got blocked by sediments from the nearby river. A series of excavations made it possible to release and recognize 14 kms of galleries and to find in the machine room some well preserved exploitation machinery. At the same time, a scientific and technical building was set up locally. A museum was built to present the mines and their exploitation and also to offer a guided tour. The project was a long-term one and the original 8000 visitors in 1998 are now up to 20 000. Bruno ANCEL, one of those in charge of the site concentrates for tourism development on research work on mining archaeology and anthracology analysis which have enabled them to reconstitute the history of the exploitation of the forest resource as well as that of the mines.

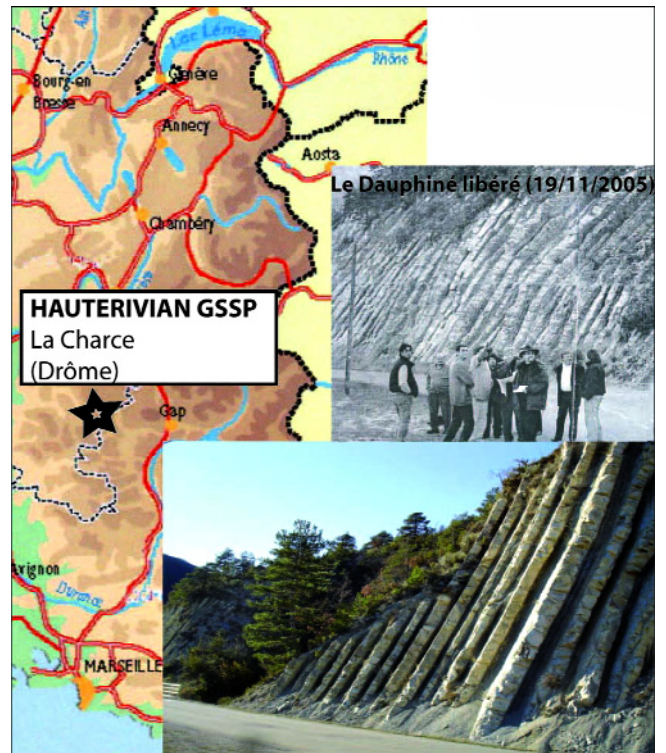
The original aspect here is the setting up of a close partnership between the actors of tourism and those of research (ANCEL, 2006). The former back up the latter who in turn contribute to the site development.



Text-Fig. 6.  
Fournel mines (l'Argentière-la-Bessée – Hautes-Alpes).

#### ● The Hauterivian Global Stratotype Section and Point (La Charce – Drôme)

The Serre de l'âne cross-section in the Drome area has been well-known since Charles LORY and Victor PAQUIER worked on it as a reference cross-section for the Hauterivian area defined in Hauterive, Switzerland.



Text-Fig. 7.  
Hauterivian GSSP.

From 1960 research has been developed on that parastatotype and it has been confirmed as a Global Stratotype by the International Commission on stratigraphy in 2004.

The National Natural History Museum has been keen on elaborating a project which aims at developing the Stratigraphic patrimony in France. It yearly backs up two sites which have been designated as global reference points by financing the corresponding research work and the publishing of high-quality books about the said stratotype. This type of mediation which is aimed at a knowledgeable public is a means to support local projects around less publicized geosites.

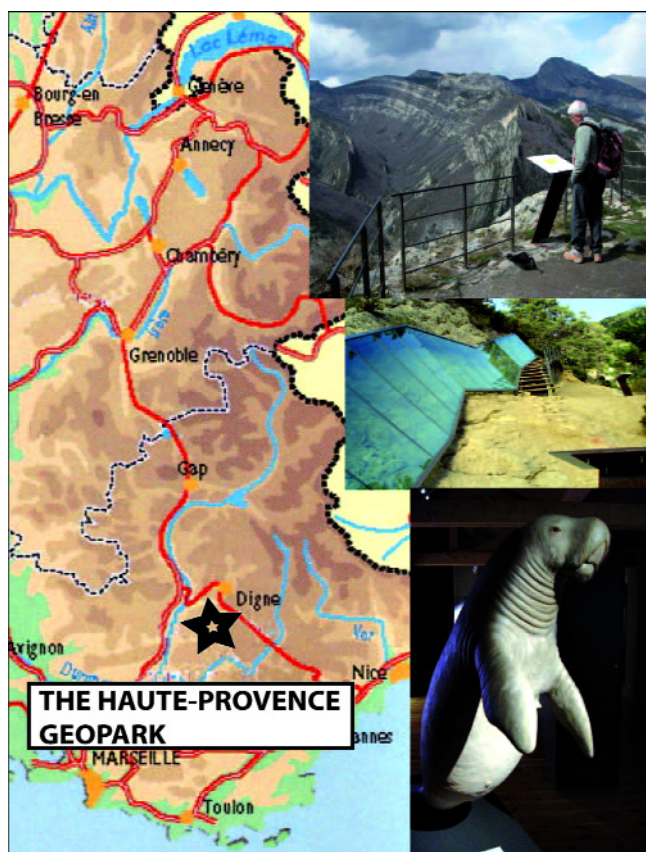
A top-down approach can be noted here. The international project carried out in France has made it possible to rekindle interest in a site which would otherwise have only been known to specialists.

#### ● The geopark of Haute-Provence

The Digne area offers a rich geological heritage (18 fully protected geotopes), on a paleontological level but also on a stratigraphic and tectonic level. The Haute Provence natural geological reserve aims at protecting these sites, but also, since it got the geopark labelling, at contributing to the local economic development through tourism enhancement. The park domain counts fifty-five municipalities on more than 2,000 km<sup>2</sup>. It is split into 3 areas around Sisteron, Digne-les-bains and Castellane. Each area has seen its tourism develop around its acknowledged geosites, geodidactic pathways (4) or interpretation museums (4) (VENZAL-BARDES, 2006).

It also comprises a network of officially-labelled actors:

- The “empreinte” association which consists in mediators trained by the park team.
- “Geol” housing which have a partnership agreement with the reserve, along with local information sites such as a local bakery.
- “Memory keeping” craftsmen who have developed a form of craftsmanship linked to the geological patrimony (such as chocolate in the shape of ammonites, or



Text-Fig. 5.  
Choranche caves (Grottes de Choranche).

jewellery with the article of the stem of a stalked crinoid).

In that case, we can speak of integrated tourism development founded on geological heritage but melting now various aspects of the cultural, natural, historical and artistic heritage. From this point of view the books created by the geopark always realize the synthesis between these different ways to discover a territory.

## 6. Conclusions

This overview of various French alpine geotourism sites allowed us to refer to the diversity of the existing projects and achievements. The local development agent can judge their success along the lines of local job creations. The

tourism development agent can use the visiting rate of these sites as criterium. Eventually, scientists can focus on the quality of the message that is being sent out. Which-ever way these experiences are viewed, it appears that each achievement is genuine and has developed its own scientific popularisation devices, however successfully.

The creation of a geodidactic pathway for instance focuses equally on the quality and relevance of the presented items, on the dynamics of movement initiated by the tour and on the type of scientific mediation chosen (KESTLER, 2005). The great heterogeneity which can currently be observed shows that geotourism development would sometimes benefit from proper supporting devices for the setting up of a project.

A network as the geoparks is a good way to share experiences but most of the geotourism sites are isolated. A means of improving quality of the geotouristic offer would be the creation of an observatory of the good practices where tools developed locally could be presented. Our differences in cultural approaches will be used to enrich our way of sharing with the greatest number our passion of geology.

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