

## “PRE-GEOSITE” BIBLIOGRAPHY: A PROPOSAL OF EXPLOITATION

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ABSTRACT: A. Carton *et al.*, “Pre-Geosite” bibliography: a proposal of exploitation. (IT ISSN 0394-3356, 2005).

This paper is a proposal for a reasoned cataloguing of the published bibliography before the existence of the concepts of geosite and geoconservation. The bibliography considered regards landforms located only in alpine area. This is aimed at identifying landscape evidences of a geological and geomorphological type. The material found is very varied and published by numerous administration boards and institutions. It seems that in recent times the organisations that have been most active in spreading knowledge and exploiting geological and geomorphological resources are the Tourism Promotion Agencies and, where present, the Parks and Natural History Museums. The proposal to exploit this bibliographical material foresees, besides a database cataloguing, the possibility of using GIS systems. The aim of this type of bibliographical collection is to provide a detailed bibliography to whoever requires information on a particular geographical area. This information can also be popularised in form and accompany the excursionist during a visit to the areas. This will be particularly useful for more out of the way areas that receive fewer visits. The bibliography chosen, in GIS form, will also be useful to those working in the field of tourism (Provincial Tourist Boards, graduates in ecotourism, tourist guides etc.) for the production of leaflets, brochures or for those interested in teaching activities that are outside of the classic boundaries of the classroom.

RIASSUNTO: A. Carton *et al.*, La bibliografia “pre-geosito”: una proposta di valorizzazione. (IT ISSN 0394-3356, 2005).

Viene proposta una catalogazione ragionata della bibliografia edita prima dell'avvento del concetto di geosito e di geoconservazione, finalizzata comunque alla segnalazione di evidenze paesaggistiche di tipo geologico e geomorfologico. Il materiale bibliografico preso in considerazione, che riguarda elementi del territorio situati esclusivamente nelle Alpi, è assai vario e pubblicato da numerosi enti ed istituzioni. Sembra che negli ultimi tempi, gli organi più attivi nel far conoscere e fruire i beni geologici e geomorfologici siano stati le Aziende di Promozione Turistica e, ove presenti, i Parchi ed i Musei naturalistici. La proposta di valorizzazione del materiale bibliografico in oggetto prevede, oltre ad una catalogazione mediante data base, la possibilità di interrogare lo spazio territoriale con sistemi GIS. Lo scopo che si propone questo tipo di raccolta bibliografica è quello di fornire a chiunque desideri conoscere un determinato territorio, una bibliografia mirata, anche se a volte divulgativa, che lo accompagni nella visita. Ciò risulterà tanto più utile a coloro che si recheranno in territori non abitualmente frequentati. La bibliografia scelta, gestita in modo informatico, risulterà utile anche agli operatori del settore turistico (Aziende Provinciali per il Turismo, laureati in Ecoturismo, accompagnatori turistici ecc.) per la realizzazione di depliant, brochures o a chi vorrà fare della didattica sul terreno al di fuori dei confini abituali.

Key words: Cataloguing, Bibliography, Geosites, Geographic Information Systems, Alps.

Parole chiave: Catalogazione, Bibliografia, Geositi, Sistemi informativi Territoriali, Alpi.

### 1. INTRODUCTION

Within the context of the Programme of Scientific Research of Relevant National Interest known as “Geosites in the Italian landscape: research, assessment and exploitation” one of the tasks set for the various Operative Units at the preliminary stage was to research a bibliography for geosites located in their respective study areas. The bibliography considered in this paper regards only the alpine area (Fig. 1).

In reality, the bibliography aimed at this naturalistic aspect turned out to be fairly limited because the concept of geoconservation, and therefore also of geosite, is still young. However, there are previous works which indicated relevant situations, without using specifically the terms “geosite” or “geotope”. This is due to the fact that often, also in the past, it was felt that there was a need to describe and/or identify specific physical elements or features of the landscape that were parti-

cularly spectacular or fascinating. Subsequently further naturalistic, cultural and historical descriptions were added to make a richer description of these features.

The custom of portraying landscapes with naturalistic backgrounds in paintings, etchings and sketches (Fig. 2), often without human subjects as the main feature, illustrates the need felt by the author to transmit the existence of a natural “object” of particular interest to the public at large. In a certain sense we can consider this form of representation a first means of identifying a geosite.

In the light of these considerations, we paid particular attention to researching both scientific and popular bibliographies produced before the existence of the concept of geosite and geoconservation. This was with the aim of re-evaluating the works in question, of making them known and using them as a discriminating element at the moment of identifying and choosing the geosite.

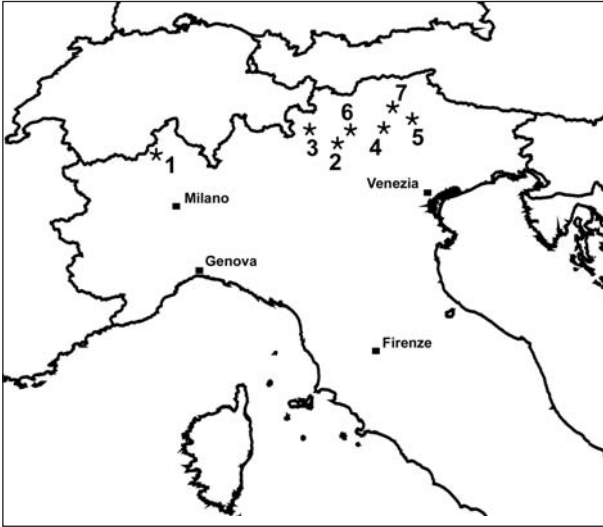


Fig. 1 - Geographical location of the bibliographical material. (1) Belvedere Glacier (cfr. Fig. 2); (2) Potholes "Ai Giardini di Trento" (cfr. Fig. 3); (3) Forni Glacier (cfr. Fig. 5); (4) Geological footpath of Dos Capel (cfr. Fig. 6); (5) Vajont (cfr. Fig. 7); (6) Molveno Lake (cfr. Fig. 8); (7) Sass Pordoi (cfr. Fig. 9).

*Ubicazione geografica del materiale bibliografico citato nel testo. (1) Ghiacciaio del Belvedere (cfr. Fig. 2); (2) Marmitte dei Giganti "Ai Giardini di Trento" (cfr. Fig. 3); (3) Ghiacciaio dei Forni (cfr. Fig. 5); (4) Sentiero Geologico del Dos Capel (cfr. Fig. 6); (5) Vajont (cfr. Fig. 7); (6) Lago di Molveno (cfr. Fig. 8); (7) Sass Pordoi (cfr. Fig. 9).*



Fig. 2 - Front of the Belvedere Glacier, Macugnaga - M. Rosa (drawing from Stoppani, 1873). Representation of particular and unusual geomorphological phenomenon: a *jökulhlaup*. The catastrophic event was observed in 1870 by Stoppani and described in his book "Il Bel Paese".

*Fronte del ghiacciaio del Belvedere, Macugnaga - M. Rosa (disegno tratto da Stoppani, 1873). Rappresentazione di un fenomeno geomorfologico particolare ed insolito: una rotta glaciale. L'evento catastrofico fu visto nel 1870 dallo Stoppani e descritto nella sua opera "Il Bel Paese".*

The operation of bibliographical analysis in fact enables us to identify that geomorphological and/or geological evidence spontaneously indicated in the past without any particular "forcing" which at times can create a "bias" in the identification of a geosite.

The frequency or not of repetition in referring to a

particular site of naturalistic interest in the bibliography represents a historical value and can be an indication as to its importance and significance. This provides help therefore in choosing one site rather than another. For instance, in Lombardy one of the objects regularly indicated as a naturalistic rarity and example of paleogeographical reconstruction are the erratic boulders, whilst in Trentino one of the most commonly cited landforms are the potholes (Tomasi, 2000) (Fig. 3). In some cases, the choice at a local level as to which landforms should be chosen as geosite would have been problematic if the "historical value" of the indication had not been taken into consideration.

Also in literature there are various references to geosites. Examples are the great landslide of Lavini di Marco in the Trentino region, mentioned by Dante Alighieri in the *Inferno* and already by Petrarch in 1362 in the *Epistola sexta*, or the crag of Bismantova, also cited by Dante in the *Purgatorio*.

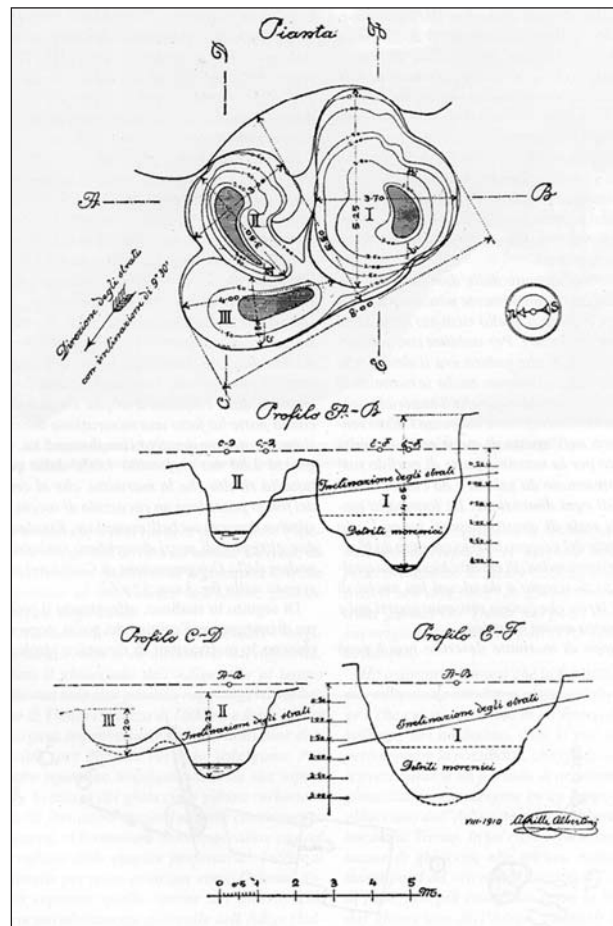


Fig. 3 - Sketch of some potholes found in the "Ai Giardini" district of Trento (drawing from Tomasi, 2000). The discovery and surveying of the triple well was carried out in 1910. Its fame and location in the centre of a town can be elements that determine the choice of this site.

*Disegno al tratto di alcune marmitte rinvenute nella località "Ai Giardini" a Trento (disegno tratto da Tomasi, 2000). La segnalazione ed il rilevamento del triplice pozzo fu effettuato nel 1910. La notorietà e l'ubicazione nel centro di una città possono essere elementi di scelta del geomorfosito.*

*"...divina ruina  
che di qua da Trento l'Adige percosse,..."*

(Dante, Inferno, XII, 4-9)

*"...vassi in San Leo e descendesi in Noli  
montasi di Bismantova in cacume con esso  
i piè: ma qui convien ch'uom voli..."*

(Dante, Purgatorio, IV, 25-27)

The need to make the general public more aware of this type of problem was already expressed in 1890 by Stoppani in his book, *Il Bel Paese* (Stoppani, 1890). In his introduction the author maintains that learned and well-educated persons are often unaware of the basic notions of physical geography, geology and the origin of the most common natural phenomena;

*"...the very same cultured and better educated persons, frequently lack the most elementary notions regarding physical conditions, geological phenomena, natural beauties, scientific researches ..."*

his book is therefore to be considered a rare essay that illustrates simply but with scientific rigour the physical geographical aspects of Italy.

*"...if not the first, certainly one of the few popular books that deal with knowledge of the physical aspects of his own country."*

*Il Bel Paese* (Fig. 4), therefore, from a certain point of view, fully deserves to take a place in the bibliography of geosites and effectively represents a first census at a national level of such sites.



Fig. 4 - Cover of one of the many editions of *Il Bel Paese* di A. Stoppani. In the book, without following a regular and systematic explanatory course as would be done in a scientific text, the writer imparts to his nephews, in the role of a naturalist uncle, the natural beauties of Italy *"...il bel paese ch'Appennin parte, e'l mar circonda e l'Alpe..."* (...Italy, split in two by the Apennines, and surrounded by the sea and the Alps...) pausing to explain the nature and causes of various natural phenomena. *Copertina di una delle innumerevoli edizioni de "Il Bel Paese" di A. Stoppani. Nel libro, senza percorrere una traccia regolare e sistematica come si farebbe in un trattato scientifico, lo scrittore racconta ai nipoti, nel ruolo di uno zio naturalista, le bellezze naturali dell'Italia "...il bel paese ch'Appennin parte, e'l mar circonda e l'Alpe..." soffermandosi sui principali fenomeni dei quali cerca di rendere comprensibile la natura e le cause.*

*"...the great landslide  
that rushed downward, shaking the bank of Adige on this side  
Trento,..."*

*"...You can mount up to San Leo, or to Noli scramble down  
You can tackle tall Bismantova and clamber to the top  
On your two flat feet: but this way has to be flown..."*

## 2. BIBLIOGRAPHY COLLECTED

With the aim to collect all the bibliographical material that in varying ways has contributed in the past and contributes now to the identification and exploitation of geomorphosites<sup>1</sup>, we were faced with a massive amount of data which was not always easily managed due to the diverse range of sources. We consulted scientific publications, internal reports, brief notes, often published in non-specialised magazines or periodicals, leaflets, simple illustrated sheets and Internet sites.

Only a few works, the most recent, were written from the viewpoint of geoconservation and exploitation. These are popularised works that originate from scientific studies or observations. Their aim is to illustrate areas, itineraries or physical "objects" that are of particular interest. An example for the Lombardy region is the guide that indicates a glaciological itinerary across the Forni Glacier (Smiraglia, 1995) (Fig. 5) and for Trentino a guide illustrating a geological trek which traces the fascinating history of the Dolomites (Dell'Antonio & Roghi, 2001) (Fig. 6).

Paradoxically, among the recently produced works, with the aim of identifying and exploiting geosites, there is a wide range of leaflets, brochures, informative sheets or short monographies clearly edited and, as far as can be ascertained, also correct from a scientific point of view (Parco Naturale delle Dolomiti Friulane, 1997) (Fig. 7).

Most of the works collected are monographies with various aims, articles from naturalistic periodicals at a regional/local level, booklets or illustrative brochures published by local Tourist Authorities which, in order to increase the offer in their tourist packages, publicise also aspects of the local nature. Many of these only hint at geological or geomorphological features, often not referring to an area as a geosite. Despite this, even if they are not exhaustive from the viewpoint of scientific information, they give useful indications and represent a starting point for possible assessment and sustainable management (Parco Adamello Brenta, 2001) (Fig. 8). Very often this minor or "grey" bibliography, rather particular, curious and exclusive is known only locally and can be difficult to procure.

Numerous indications can be found also in popular scientific reviews issued by local administration boards such as museums, Chambers of Commerce, alpine associations etc. They always start from well founded and documented scientific bases and have the merit of informing about natural landscape phenomena

<sup>1</sup>The research of the material in question was limited to the regions of Trentino and Lombardy.



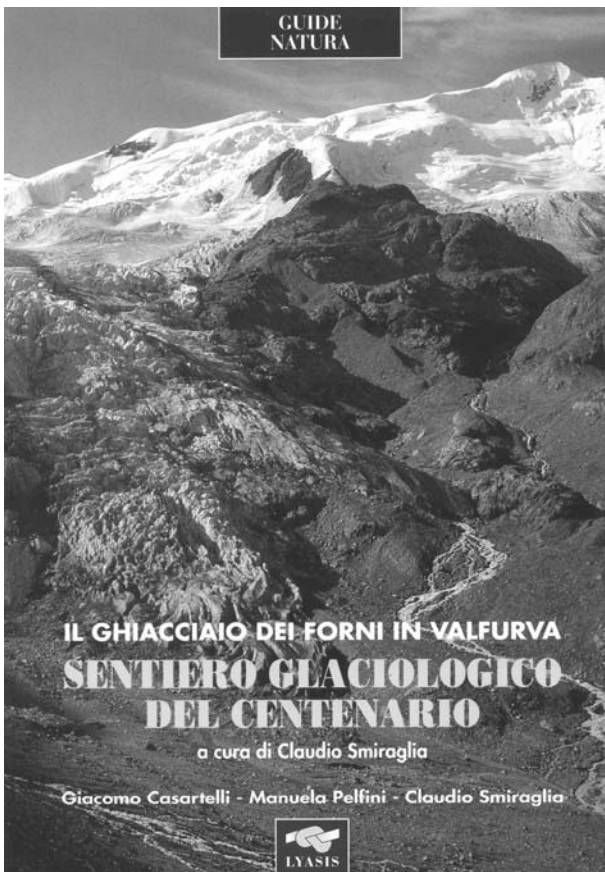


Fig. 5 - Cover of the guide of *Sentiero Glaciologico del Centenario* (Centenary Glaciological Footpath) (Smiraglia, 1995). In 1995 on the occasion of the centenary celebrations of the Italian Glaciological Committee, an 8-kilometre long footpath (4-5 hours) was instituted. The itinerary illustrates, in an excursion, traces of the past, recent and present life of the glacier. The text offers ideal support for the visitor, but is also essential for whoever wishes to use the glacier as a teaching aid. In the text, accompanied by numerous photographs and a route map, subdivided into 10 stages, there is also a more strictly scientific part which regards the latest research carried out and recent variations in the volume of the glacier.

*Copertina della guida del Sentiero Glaciologico del Centenario (Smiraglia, 1995). Nel 1995 in occasione delle celebrazioni del centenario del Comitato Glaciologico Italiano, fu realizzato un sentiero della lunghezza di circa otto chilometri, percorribile in 4-5 ore. L'itinerario illustra, in una escursione, le tracce della vita passata, recente e presente del ghiacciaio. Il testo rappresenta un ideale supporto per l'escursionista, ma anche una indispensabile guida per chi desidera sul ghiacciaio fare didattica. Nel testo, corredato da numerosissime fotografie e da una mappa del tracciato, suddiviso in 10 tappe, è contenuta anche una parte più strettamente scientifica che riguarda le ultime ricerche svolte e le recenti variazioni volumetriche del Ghiacciaio.*

simply and clearly, but with scientific rigour and accurate information.

Another source of identification of geosites is the wealth of magazines in the tourism sector. Captivating images of geographical landscapes are systematically shown in brochures (Società Incremento Turistico Canazei S.r.l., 2001) (Fig. 9). These spectacular scenic features attract the attention of publishers and readers alike. However, specific reference to geographical or

geoconservational concepts is almost totally absent in the aims of the publishers because, faced with spectacular images that show geomorphosites that are exceptional examples or true naturalistic rarities, their cultural significance tends to be neglected.



Fig. 6 - Detail of the guide to the geological footpath of Dos Capel, Val di Fiemme, Trentino (Dell'Antonio & Roghi, 2001). The guide proposes an itinerary that crosses most of the rock successions outcropping in the Dolomites organised in 32 stops, indicated along the route by numerous tables. On each page of the guide together with a brief description of the stop, there is a stratigraphic column indicating in what period of the Earth's history we are. Numerous colour photographs illustrate panoramic points and outcrop details (sedimentary structures, fossils), and allow the excursionist to compare the present situation with paleogeographical reconstructions reproduced with clear colour drawings. The bilingual organisation (Italian and German), often parallel texted, also makes it available to a wider public.

*Particolare della guida al Sentiero Geologico del Dos Capel, Val di Fiemme, Trentino (Dell'Antonio & Roghi, 2001). La guida propone un itinerario che attraversa gran parte della successione delle rocce che affiorano nell'area dolomitica e si snoda attraverso 32 stops, evidenziati lungo il percorso da numerose tabelle. In ogni pagina della guida a fianco di una sintetica descrizione dello stop, viene riportata una colonna stratigrafica che permette di capire di volta in volta in quale momento della storia della Terra ci si trova. Numerose foto a colori illustrano panoramiche e particolari di affioramenti (strutture sedimentarie, fossili), e permettono di confrontare la situazione reale con ricostruzioni paleogeografiche realizzate con chiari disegni a colori. L'esposizione bilingue (italiano e tedesco) che spesso occupa due pagine a fronte, permette di fruire di un ampio corredo iconografico.*

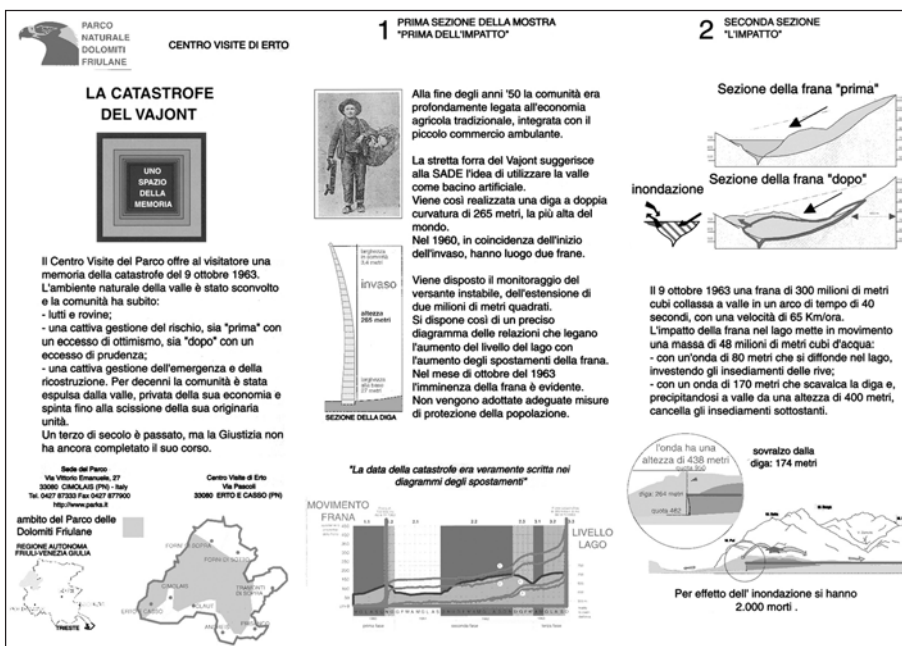


Fig. 7 - The Vajont disaster. This six page leaflet illustrates the catastrophe of 9 October 1963. A brief comment and simple colour schemes narrate the stages of the disaster: the situation before impact, the impact itself, the ongoing emergency, the reconstruction and various legal aspects. A summary map shows the general scenario of the area.

*La catastrofe del Vajont. Il depliant in sei facciate illustra la catastrofe del 9 ottobre 1963. Un breve commento e semplici schemi a colori raccontano la situazione prima dell'impatto, l'impatto vero e proprio, l'emergenza, la ricostruzione, la giustizia. Una carta di sintesi raffigura infine lo scenario territoriale.*

### 3. PROPOSAL OF RE-EVALUATION

Following the collection of a vast range of works and documents, the idea was born to produce a georeferenced database at a regional and/or national level, consultable on the Internet, and with constant updating both for works already collected and newly produced documents.

The aim of this type of bibliographical collection is to supply information to anyone interested in widening their knowledge of a determined area, a specifically focussed bibliography, even if popular in nature, which accompanies the user during the visit. This will be particularly useful for visitors to less frequently visited areas off the beaten track.

The bibliography chosen, fully computerised, will also be useful for operators in the tourism sector (Provincial Tourist Boards, graduates in Ecotourism, tourist guides, etc.) for the production of leaflets, brochures or for those interested in taking their teaching out of the classic boundaries of the classroom.

It can also be a cue to propose and organise naturalistic itineraries and/or guides also beyond the single regional areas. From these bibliographic sources it will also be simpler to trace back to the specific scientific bibliography.

Creating a database of this sort might at first seem in competition with the geomorphosite database which is being produced and which had as a starting point the same research project<sup>2</sup>. In reality this is not the case because the sites indicated in the past will not necessarily become geosites or geomorphosites of a higher level. At the same time situations of little national

interest, mentioned in past bibliographies, can become extremely important at a local level and therefore should not be lost and/or forgotten.

From an operative point of view a file-card was produced for each bibliographic item (Fig. 10), using an electronic database, on which the traditional references are indicated (author/s, title, review etc). Associated with these are indications on the type and quality of illustrative content, the existence or otherwise of thematic maps and how to obtain the original article. A specific information field includes comments on the scientific content of each work (from the viewpoint of geoconservation and exploitation) and any relevant logistic information. Two image fields will be dedicated respectively to illustrating the work or particular details of it and the exact geographical area object of the description.

The database produced enables each user to research the bibliography not only by means of key words, but also geographical areas. The boundaries of the zones described in single works have been georeferenced, so that they can be "superimposed", by means of a GIS, on any computerised regional topographical base. In this way, by mouse clicking on any point of the territory, it is possible to know if there is any relevant bibliographical information. If this is the case then the successive video displays further details on the specific bibliography, on the subject dealt with and on the exact area taken into consideration. This is by means of a map index linked to each card.

The use of the GIS in this type of "regional" bibliographical consultation, besides giving cartographical elaboration, will favour research, traditionally associated either with key words<sup>3</sup> or knowledge of the author

<sup>2</sup>Currently the National Geological Service within the project "Conservation of the Italian Geological Heritage" is carrying out a census of the sites of national interest.

<sup>3</sup>Often key words, if not carefully and correctly indicated, hinder rather than help the search process.



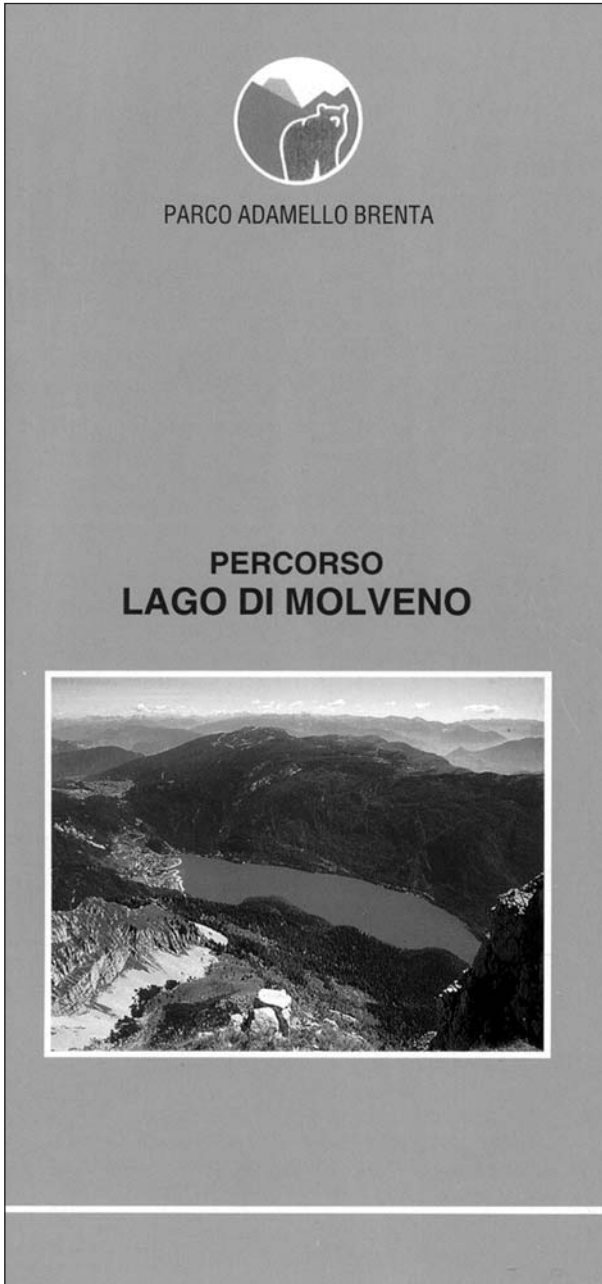


Fig. 8 - Brief guide and brochure published by the Adamello Brenta Park (Trentino). There are ten or so *do-it-yourself* route guides, fifteen pages each, organised in stops. Each observation point regards a specific geological, geomorphological, botanic or faunal subject. The guides contain clear topographic maps, height profiles and tables with walking times. A thinner series of leaflets include the main characteristics of all the valleys of the Adamello Presanella mountain range and illustrate, even if rather simply, all the naturalistic features, including geomorphological aspects.

*Guida breve e depliant editi dal Parco Adamello Brenta (Trentino). Del primo tipo sono stati pubblicati una decina di percorsi autoguidati, di circa una quindicina di pagine, organizzati in stops. Ciascuna stazione di osservazione riguarda di volta in volta un tema ben specifico di carattere geomorfologico o geologico o botanico o faunistico. Le guide sono corredate da chiare carte topografiche, da profili altimetrici e da tabelle con i tempi di percorrenza. Una serie più speditiva di depliant illustra le principali caratteristiche di tutte le valli del gruppo Adamello Presanella mettendo in evidenza, sia pure con semplici cenni, tutte le evidenze naturalistiche comprese quelle geomorfologiche.*

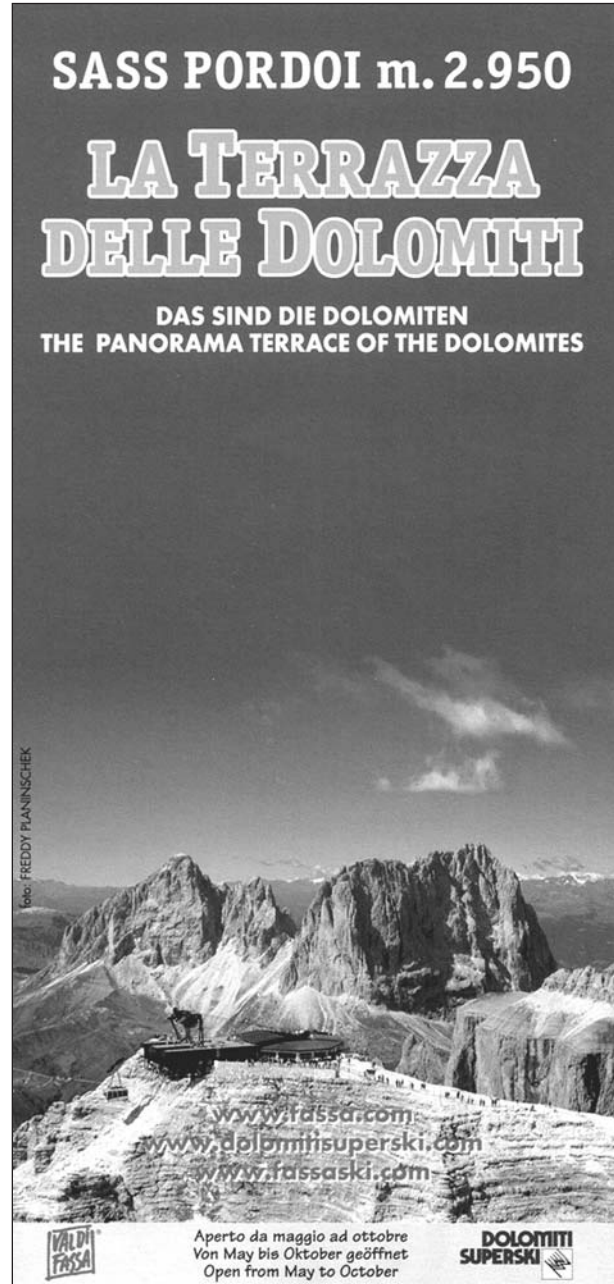


Fig. 9 - The image shows how in popular magazines and tourist publications (Società Incremento Turistico Canazei S.r.l., 2001) impressive geomorphosites frequently appear without being identified as such. It is a great pity that there is so little emphasis given these portions of the geosphere of particular geological, geomorphological and geocological significance, which represent important evidence of the history of the Earth and evolution of the landscape. Greater attention in this respect would perhaps enable us, in a moment of relaxation in which the human mind is perhaps more inclined to acquire these concepts, to realise how many of the landforms we distractedly see every day are not renewable and therefore worth safeguarding for what they represent.

*L'immagine mostra come nelle riviste e nel materiale turistico divulgativo (Società Incremento Turistico Canazei S.r.l., 2001) facciamo bella mostra geomorfositi che non vengono certo proposti sotto questa chiave di lettura. E' un vero peccato che non si sottolinei come porzioni della geosfera di particolare significato geologico, geomorfologico o geocologico rappresentino importanti testimonianze della storia della Terra e consentano di comprenderne l'evoluzione del paesaggio. Questo permetterebbe di capire, in un momento di svago in cui la mente umana è forse più propensa ad acquisire questo concetto, come molte delle forme del paesaggio che distrattamente osserviamo ogni giorno, siano beni non più rinnovabili e quindi da salvaguardare, per ciò che rappresentano.*

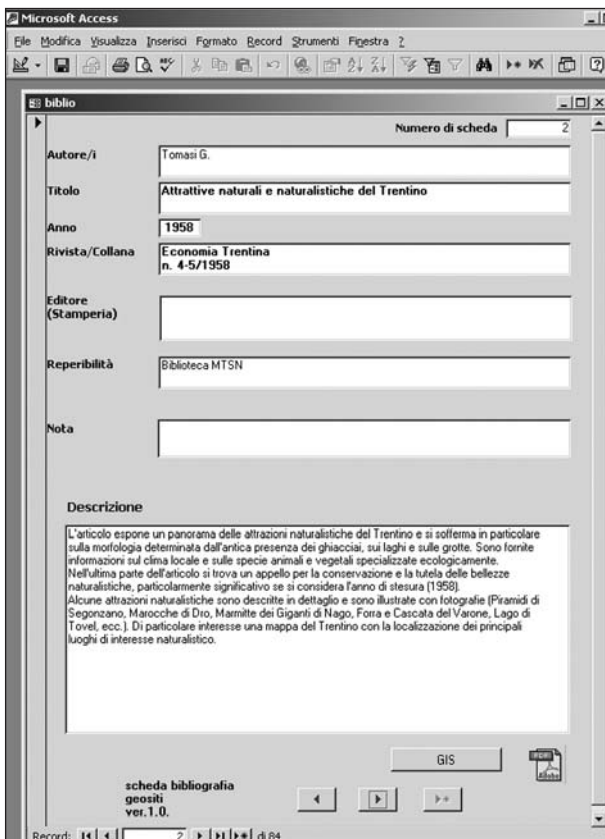


Fig. 10 - The file-card that was used for the creation of the bibliographical database on geosites. The two buttons identified as "GIS" and "PDF" are visible. Each of these enables the user to connect respectively with maps of the territory in which research is to be done and to access a pdf file of the filed text.

La scheda che è stata utilizzata per la realizzazione del data base della bibliografia sui geositi. Sono evidenti i due pulsanti identificati come "GIS" e "PDF". Ciascuno di essi permette di collegarsi rispettivamente con la cartografia del territorio regionale sulla quale effettuare la ricerca per aree geografiche e di accedere al testo in formato pdf dell'opera schedata.

and/or title, and facilitate the user in planning their excursion in the area depending on the offer (existence or otherwise of bibliographical indications).

With this system it will also be possible to obtain a copy of the original text of the work. This is particularly useful in the case of documents difficult to find due to their being old editions, or having been published in very locally produced journals, or because they are part of leaflets, brochures or similar documents only available locally. In fact, the bibliographical card has a button that allows the user to access the complete text, saved as a file. Once the main product has been put on the Internet, in order to access this service it will not be necessary to acquire the whole bibliography in electronic form at the start, but each work will be made available on the web depending on user demand. It will therefore be a product that will have an ongoing development with a limited need for management personnel. With the same mechanism whoever wishes to publicise a new initiative regarding their specific area can send the Webmaster their work (guide, leaflet, brochure, etc), which will be added to the census and published in the

bibliographical cards. At the same time the origin of the work will be indicated and it will be made available on the Internet as a file.

A computerised system organised in this way can be included and managed in the websites of institutions such as a Museum of Natural History, the Regional Geological Service, the regional office of the Tourist Board or of environmental associations. It is evident that its use in a scientific institution like a Museum of Natural History, with constantly revised records of local naturalistic publications, enables a qualified and rapid updating of the site. Furthermore, institutions of this sort often have a valuable well stocked library, including less well known and/or not easily found articles.

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