Geomorphosites and geodiversity: a new domain of research

Emmanuel Reynard, Lausanne, Paola Coratza, Modena

Geoheritage, which draws attention to the geological and geomorphological elements of nature worthy of conservation, has for years been considered less vulnerable than biological and cultural heritage. As a consequence, it has not received the same amount of attention by the conservationist movement as has cultural and ecological heritage. Nevertheless, during the last decade, several initiatives have been developed both at the international level, for example with the Declaration of the Earth's Rights by scientists in Digne-les-Bains in 1994 (Martini 1994), the establishment of the European Geoparks Network in 2000 (Zouros 2004), and the Initiative on Geoparks adopted by the UNESCO in 2003 – and at the national level. In Switzerland, for example, a Working Group on Geotopes was founded by the Swiss Academy of Sciences in 1994 (Heitzmann et al. 2006), a Strategic Report on Geotopes was published in 1995 (Strasser et al. 1995), to be followed by a similar report on geoparks (Reynard et al. 2007), and the first list of geosites of national significance was published in 1998 (Working Group for the Protection of Geotopes in Switzerland 1999). As a result, «geodiversity» (Gray 2004) is now currently used parallel to the term «biodiversity» to indicate the natural diversity of the abiotical part of nature and its influence on both biodiversity and cultural diversity.

This new interest in geoheritage induced the International Association of Geomorphologists (IAG) at the 5th International Conference on Geomorphology held in Tokyo in September 2001, to found a specific working group to deal with issues related to the assessment, the protection and promotion of geomorphological sites (or geomorphosites; see Panizza 2001). These sites were defined as landforms of interest that appeared specifically valuable in terms of natural heritage. The working group is expected to remain active until the 7th International Conference on Geomorphology in Melbourne in 2009. The working group in particular aims to enhance understanding of the definition through scientific research, as well as improve the assessment, the cartography, the protection and the conservation of geomorphosites. The group currently has more than 130 members from 29 countries and is chaired by Emmanuel Reynard (University of Lausanne, Switzerland) and Paola Coratza (University of Modena and Reggio Emilia, Italy).

Some of the results of research carried out by the members of the working group have already been published in two special issues of international journals: Il Quaternario 18, 1, 2005 (Piacente & Coratza 2005), and Géomorphologie. Relief, processus, environnement 3, 2005 (Reynard & Panizza 2005); a third issue is currently in press (Geografia Fisica e Dinamica Quaternaria, 2007). In this special issue of Geographica Helvetica, recent research results on the assessment of geomorphosites and geodiversity carried out in different countries are presented. The articles explore the concept of geodiversity, present experience with various assessment methods in different contexts, and discuss management issues of a geomorphosite at the local scale.

The article by E. Serrano & P. Ruiz-Flaño (University of Valladolid) deals with the concept of geodiversity. The authors review the changes in the definition of the concept over time and argue that geodiversity may be defined as the constituent elements within the physical environment that participate in the richness of biotopes, ecosystems or landscapes. They show, as is also the case for biodiversity, that scale is an important issue in the definition process. The assessment of geodiversity may therefore be seen as a geographical issue concerning both physical geography (analysis of the components of geodiversity) and regional planning (insertion of the geodiversity concept in land planning strategies).

Three of the articles focus on the assessment of geomorphosites. E. Reynard and his co-authors G. Fontana, L. Kozlik and C. Scapozza (University of Lausanne) present a method that allows the evaluation of not only the scientific value of sites, that is their value for the knowledge of the Earth and climate history, but also the so-called additional values (Reynard 2005). It is these latter values that allow the study of geomorphological heritage to be integrated with other fields of research, such as cultural and ecological heritage. The results of implementation of the method within two contexts in Switzerland are presented: the assessment of the geocultural heritage of the Trient valley (Western Switzerland) and the evaluation of the geomorphological importance of the National Park project in the Blenio-Lucomagno area (Southern Switzerland).

The methodology proposed by P. Pereira, D. Pereira and M.I. Caetano Alves (University of Minho, Portugal) has been applied to the evaluation of the geomorphological heritage of the Montesinho Natural

Park in Portugal. The authors present the various steps involved in compilation of the inventory and selection and assessment of sites of geomorphological interest for promotion by the Natural Park Board, especially with regards to their educational value. The method proposed by the Portuguese geomorphologists is particularly interesting from a geographical point of view because it not only considers the sites for their specific scientific interest, as most of the existing methods do, but it also takes into account places from where the observation of sites or geomorphological landscapes of special interest may be observed.

The third article dealing with the assessment of geomorphological heritage is put forward by N. Zouros (University of the Aegean, Greece). The article presents the evaluation of geoheritage at two different scales: landscape (large sites included in natural parks) and landform (sites included in the Lesvos Island Geopark). In contrast to the two other articles herein, this study is specific because the assessment is clearly oriented toward the promotion and the development of geotourism, and not to the protection of the selected objects in general.

Finally, the paper proposed by V. Panizza & M. Mennella (University of Sassari, Italy) deals with issues concerning the promotion of geoheritage. In this case, the assessment does not aim at the selection of sites potentially usable for the development of a specific geotourist or geocultural offer – as are the case in the examples proposed by E. Reynard and N. Zouros – but at the resolution of problems due to the tourist or sportive utilisation of sites of geomorphological interest. The article emphasises both issues related to the impact of human use of a site, and the possible risks involved.

The selection of papers presented herein gives an overview of the progress that has been made during the last years at the international level in the domain of geomorphological heritage and geodiversity research. Further, it draws attention to the potential that research in these areas has to offer with regards promotion of geotourism and geoparks.

References

Gray, M. (2004): Geodiversity. Valuing and conserving abiotic nature. – Chichester: Wiley.

Heitzmann, P., Reynard, E. & B. Stürm (2006): Geotopschutz in der Schweiz – quo vadis? – In: Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften 44: 48-54.

Martini, G. (1994) (ed.): Actes du premier symposium international sur la protection du patrimoine géologique. – Mémoires de la Société géologique de France 165.

Panizza, M. (2001): Geomorphosites: concepts, methods and examples of geomorphological survey. – In: Chinese science bulletin 46, Suppl. vol.: 4-6.

Piacente, S. & P. Coratza (2005) (eds): Geomorphological sites and geodiversity. – Il Quaternario 18, 1 (Volume speciale).

Reynard, E. (2005): Géomorphosites et paysages. – In: Géomorphologie. Relief, processus, environnement 3: 181-188.

Reynard, E. & M. Panizza (2005): Geomorphosites: definition, assessment and mapping. An introduction. – In: Géomorphologie. Relief, processus, environnement 3: 177-180.

Reynard, E., Baillifard, F., Berger, J.-P., Felber, M., Heitzmann, P., Hipp, R., Jeannin, P.-Y., Vavrecka-Sidler, D. & K. von Salis (2007): Les géoparcs en Suisse: un rapport stratégique. – Berne: Académie suisse des sciences naturelles.

Strasser, A., Heitzmann, P., Jordan, P., Stapfer, A., Stürm, B., Vogel, A. & M. Weidmann (1995): Géotopes et la protection des objets géologiques en Suisse: un rapport stratégique. – Fribourg: Groupe suisse pour la protection des géotopes.

Working Group for the Protection of Geotopes in Switzerland (1999): Inventory of geotopes of national significance. – In: Geologia Insubrica 4, 1: 31-48.

Zouros, N. (2004): The European Geoparks Network. Geological heritage protection and local development. – In: Episodes 27, 3: 165-171.

Prof. Dr. **Emmanuel Reynard**, Institute of Geography, University of Lausanne, Quartier Dorigny, Bâtiment Anthropole, CH-1015 Lausanne, Switzerland.
e-mail: Emmanuel.Reynard@unil.ch

Dr. **Paola Coratza**, Department of Earth Sciences, University of Modena and Reggio Emilia, Largo S. Eufemia 19, I-41100 Modena, Italy.
e-mail: coratza.paola@unimore.it