



Geomorphosites and the history of geomorphology

Christian Giusti

University of Paris-Sorbonne, Institute of Geography, Paris, France (Christian.Giusti@paris-sorbonne.fr)

Geomorphosites are geosites of geomorphological significance, with a now well admitted distinction between central or scientific values on the one hand, and additional values such as ecological, economical or aesthetical values on the other hand.

Among the scientific values, some are directly linked to the climatic forcings through geomorphological processes in the case of active geomorphosites, for example the meaning of a waterfall in a post-glacial trough valley. In the case of passive geomorphosites, the central values rather lie in structural features, ancient landforms, inherited regoliths such as the clay-with-flints of the Chalklands of Southern England and Northern France.

Sometimes, the scientific value is not fully determined by the type of geomorphosite, active or passive, but rather by the fact this geosite has a special importance concerning the history of the Earth sciences, especially in geomorphology.

This is well exemplified with the famous case of the Nant d'Arpenaz waterfall S-folds in the lower Arve valley between Geneva and Chamonix, first described by Horace Benedict de Saussure in 1774 and invoked to explain the formation of the Alps by folding. This structural geosite (history of tectonics) is also a geomorphosite. Concerning geomorphology, the current Nant d'Arpenaz waterfall is quite similar to the Pissevache waterfall in the Rhone valley: they are both examples of postglacial geomorphosites due to hanging valleys. When erosion is more advanced narrow gorges appear, for example Diosaz gorge (Haute-Savoie, France) or Dailley, Trient and Triège gorges (Valais, Switzerland).

All these geomorphosites (main trough valleys, tributary valleys, waterfalls and postglacial gorges) were studied by pioneers of fluvial and glacial geomorphology such as Jean Bruhnes and Emmanuel de Martonne before World War I. The former has played an important role at the University of Fribourg (Switzerland) and has devoted many studies about the potholes and eddies of rivers, particularly in the Alps (e.g. Maigrauge dam and Sarine valley, Fribourg). The latter has left many sketchbooks preserved in a restricted repository at the Geographic Institute library in Paris, which are the illustrated part (e.g., The Châtelard Valley from Finhaut, Valais, Switzerland) of a huge archive of his theory of glacial erosion in alpine mountains. Both were scientific editors (with E. Chaix) of the first Atlas Photographique des Formes du Relief, published by Boissonas in Geneva, 1914.

The presentation will focus on the scientific importance of some geomorphosites for the knowledge on the history of geomorphology and Earth sciences in general.