

## **Mountain geomorphosites in Odle Group (Dolomites, Italy)**

Paola Coratza, Alessandro Ghinoi, Mauro Marchetti, and Mauro Soldati

University of Modena and Reggio Emilia, Department of Chemical and Geological Sciences, Italy (paola.coratza@unimore.it)

The area, considered in the present study, is located in the north-eastern sector of the Gardena valley, in the Odle Group, a popular destination of summer and winter tourism (more than 3000 m a.s.l.). The area has a strong hiking-tourism vocation thanks to its spectacular high-mountain landscape and a dense network of hiking tracks. The well-developed network of hiking paths and slopes for many different climbing skills offers a lot of possibilities for high-mountain excursions. Permanent dwelling-places are absent with the exceptions of a few tourist structures nearby opened during certain periods of the year.

This area, as all Dolomites, which became UNESCO World Heritage Site in 2009, represent landscape mosaics, which express the summation of landscape histories and processes offering an almost complete educational open-air laboratory due to the variety and complexity of phenomena and processes taking place during present climate conditions and during recent geological periods. These mountains, due to the aggregation of relict, recent and active landforms constitute an outstanding geoheritage, suitable for educational and tourist purposes. Landforms typical of past morphoclimatic conditions (inherited geomorphosites) share the stage with forms and processes active in the current morphoclimatic conditions (active geomorphosites); their spatial and geometrical relationships may be sufficient to trace a relative time-line of the geomorphological history of the area. Several glacial landforms testify for the presence and the activity of a glacial tongue hosted in the valley during the Lateglacial, mainly located in the northern sector of the area, where altitudes range from about 2000 m to about 2300 m a.s.l. Among these, worth of note are the well-preserved glacial cirques of Val dla Roa and those located at the southern margin of the Odle Group. Quite well preserved moraine ridges are present at a mean altitude of some 2000 m at the Alpe di Cisles as well as scattered glacial deposits, marking the stadial advance of the glacial tongue. The well preserved morphology of a frontal moraine arc is quite unusual for this sector of the Dolomites where gravity-induced slope processes, active since the retreat of the last glaciers, have partly hid the till and the glacial landforms. Peculiar example of rock glaciers and protalus ramparts can be found in the upper part of Val dla Roa. Moreover, gravity-induced features such as scree slopes, talus cones and landslides of various type and size affect every sector of the area.

This area has appeared to be suitable to develop new ways and strategies to educate hikers to the dynamicity of mountains environments and to natural geomorphological risks, favouring an easy understanding and comprehension of the landscape and of its hazards and a responsible and safe fruition of high-mountain tourist areas.