Geology of System 9

Dolomiti di Brenta

The far western edge; from flood plains to the depths of the last Dolomite Sea

The sequence of rocks in the Brenta Massif ranges from the early Triassic to the Cretaceous periods, about 185 million years ago, and these rocks are very different from elsewhere in the Dolomites. The main differences can be found in the rocks of the end of the Triassic period and of the Jurassic and Cretaceous periods. These relate the opening up of the Lombardy Basin and the development of the western edge of the Trento Platform. The rocks of the first Dolomite Sea and of the first archipelago, of the early and mid-Triassic period, are found principally in the western areas, along and near Val Rendena and the south western area. The Werfen formation which bears witness to the early stirrings of the Triassic Dolomite Sea, can be seen in Val d'Algone, while in Val Perse there are deposits from the rivers that eroded the Anisian landmasses.

The magnificent mountains in the central part of the Brenta Massif are supported by a core of mid-Triassic rocks that tell of the evolution of the archipelago of islands formed from organisms, as can be seen in Val Brenta Alta, near the Casinei Refuge and in Val Perse. There is a great deal of Principal Dolomite rock deposited when the Dolomite region was a huge mudflat, repeatedly flooded by the tide, during the late Triassic period. This rock makes up some of the most famous peaks in the system: Cima Brenta, Cima Tosa, Grostè and some marvellous valleys, such as Valle di Tovel, Val delle Seghe and Val Brenta Alta have been carved out of this same rock. At the end of the Triassic period the area began to sink, evidence of which can be seen today in the sequence of calcareous rocks originating from varying sea depths.

The tectonic instability caused by the general sinking that occurred during the Jurassic and Cretaceous periods is magnificently demonstrated by the large recesses caused by underwater landslides, fossilized in the Peller – Sasso Rosso area in Cima Vallina and by the large accumulations of material that collapsed into the surrounding basin, Castello di Stenico and the Castello dei Camosci area, which are just beyond the boundary of the system.

Geomorphology

The appearance of the Brenta Dolomites is that of an imposing, elongated ridge running mainly north-south, predominantly consisting of sedimentary carbonate rocks arranged in compact, erosion-resistant banks. The contours of such valleys as Val di Tovel, Valle delle Seghe, Val d'Agola and Val di Brenta and of the narrow gorges, rock walls and gullies generally reflect the various subvertical fault and fracture systems that have caused local weakness in the resistant rocky mass, facilitating the eroding action of water and ice. The erosion that occurred where fractures running in different directions came together led to the formation of some spectacular spires and isolated pinnacles, such as the monumental Campanil Basso di Brenta, Campanil Lungo and Torre di Vallasinella. There are plenty of planar morphostructures, such as ledges and balcony and step formations, arising from the moderate changes in composition and texture that can be observed in the predominant strata of Principal Dolomite rock. Systems of karst and glacio-karst morphologies are widespread, both on the surface, in the form of limestone pavements and sinkholes, and underground caves and potholes, due to the mainly carbonate nature of the rocks. These are particularly plentiful in Plateau di Groste, Bocca della Vallazza, Pian della Nana, Pozza Tramontana and Val Nardis.

From the morphoclimatic point of view, there is an abundance of such glacial forms and deposits as cirques, hanging valleys, smooth step formations, sheepbacks and banks of moraine, on both the eastern and western sides of the massif, in Val Gelada, Alta Val Brenta, Alta Vallesinella, etc. In the higher parts there is clear, well-preserved evidence of the Little Ice Age, its forms still relatively intact having only recently emerged from the ice. Current surveys in the Brenta Dolomites reveal 16 glacial cirques, largely buried under a thick cloak of debris, all located on the less exposed western side. The largest glacier, Vedretta d'Agola, extends over about 20 hectares and occupies a cirque between the mountain of the same name and Cima d'Ambiez.

The currently most active morphogenetic processes are periglacial and snow-related as evidenced by snow moraines and rock glaciers, for example in Pra Castron di Flavona, which gradually transport the debris fields and/or glacial deposits. Debris cones and fields can be found everywhere, particularly in the western part of the Groste-Val Brenta Pass and these are frequently reactivated by debris flows.

Text by Dolomiti Project Srl