

Geology of System 8

Bletterbach

The ancient tale of a land gradually invaded by the first Dolomite Sea

This is the smallest of the nine systems, but it could be called the Grand Canyon of the Dolomites. It consists of an incision up to 400 metres deep, carved by the Bletterbach mountain stream, that makes it possible to observe the sequence of basal Dolomite rocks laid down between the late Permian and Anisian periods. The incision also cuts through the layers containing traces of the largest mass extinction ever to have happened on Earth, the Permian-Triassic extinction.

The outcrops of rock bear witness to the sequence of different paleo-environments, from volcanic rocks to the marine rocks of the first Dolomite Sea. The latter preserve a perfect record of the changing nature of this sea, as it went through its various stages of advance and retreat. One particularly powerful advance resulted in deposits of fossiliferous calcareous rocks, full of cephalopods, that formed a terrace over which a marvellous waterfall now flows.

Travelling up the gorge is like moving through time, making it possible to observe the advance of the sea in the late Permian period and the deposits of the Bellerophon formation, with the precipitation of evaporates followed by beach deposits, carbonates and the terrigenous ramps seen in the Werfen formation, on which the conglomerates created by erosion were deposited and finally, the carbonate banks of the Corno Bianco (Contrin formation). The Bletterbach is famous the world over for its wealth of fossil footprints left by many species of Permian reptiles and for the abundance of fossil plant remains of the same period.

Geomorphology

The deep gorge carved by the Bletterbach runs for about 8 kilometres and it has a maximum depth of 1,100m. It mainly runs E-W, its path sometimes interrupted by some entrenched meanders, the result of a network of tectonic fractures. This system of the Dolomites UNESCO World Heritage Site is notable as the ideal laboratory for the study of forms of stream erosion and the way in which these are affected by the stratigraphic architecture of the underlying bedrock.

The width of the gorge reflects the rock formation's degree of erosion resistance, being as narrow as some tens of metres when the water is carving through such hard volcanic rocks as porphyry, growing increasingly wider, up 200-300m, when this is in less resistant rocks such as the sandstones, evaporates and marls of the Permian-Scythian sedimentation period. A number of waterfalls, some ten of metres high are found along the gorge where there are local variations in hardness of the layers. The final part of the gorge widens out into a basin 600-700m in diameter, displaying the spectacular sequence of multi-coloured rocks, the Bellerophon and Werfen formations, that bear witness to the arrival of the Dolomite sea. These contrast with the pale Dolomite rock of the Corno Bianco, the first stage in the formation of the Triassic archipelago.

Around the gorge can be found glacial deposits that can be linked to the Last Glacial Maximum and which are full of clay and pebbles, and striated and rounded boulders. Closer to the Corno Bianco these deposits give way to ancient deposits of debris with sizeable blocks only partly eroded by glacial transport. Along the steepest banks of the gorge and on the sites of the principal waterfalls there a large number of small landslides providing evidence of the dynamism marking the evolution of this area.

Text by Dolomiti Project Srl