

Geology of System 4

Dolomiti Friulane and d'Oltre Piave

Rugged peaks and valleys in Dolomite stone and limestone on the eastern edge of the Dolomites

The predominant rocks in this system tell the story of the Norian and Rhaetian eras of the late Triassic and of the Jurassic period, thus making up the concluding chapters in the Great Dolomite Saga. Moreover, a very distinctive lithification process shaped the building blocks of these mountains in the south-eastern region of the Dolomites. The rock sequence is complicated by the thrusts creating steeply inclined faults, cutting through it and resulting in repetitions of the sequence. Main Dolomite rock, deposited towards the end of the Triassic period on an extensive flood plain, is the most common showing an early tendency to trap poorly oxygenated basins between the rock platforms, known as Forni Dolomite. Many dinosaur footprints from the late Triassic period have been found in this system.

The rocks of Val di Suola tell the story of the sinking of the Jurassic era. In the westernmost section, the system consists of Jurassic and Cretaceous rocks, closely related to the processes that produced the Friuli platform.

The Jurassic deposits from the sea that is generally very deep (the Soverzene, Igne, Vajont, Fonzaso and Rosso Ammonitico formations) are mainly calcareous rock and make up the Dof-Najarda area, the area to the west of Cimolais, the Cellina summit and the upper part of the Raut massif. There are rocks from the more recent Cretaceous and Palaeocene-Eocene periods found only on the valley floor in the Cellina area.

Finally, this system is of great interest for reconstructing the Quaternary evolution of the Dolomites since it contains deposits from glacial lakes, outwash plains, known as sandurs and other well preserved deposits from the late glacial age, for example in Val Zemola.

Geomorphology

The geomorphological set-up of this large system depends largely on the complexity of the folds and faults and how these develop, in addition to the variation in rock types. This is because the system lies close to the southern

edge of the chain where deformation due to movements of the crust was and still is more pronounced and widespread. The inclination of the layers and the planes of the numerous thrust faults are reflected in the NE-SW orientation of the principal mountain ridges, Cridola, Busca, Duranno, Preti, Pramaggiore, Cornagiet, their asymmetrical geometry displaying northern flanks that are less steep than the southern ones, and in the formation of the principal valleys, Valle del Vajont, Val Cimoliana, Val Settimana.

The landscape is adorned with towers and spires where the stratification or the planes of low-angle thrust faults intersect with vertical tectonic fractures, as in mounts Cridola, Monfalconi and Spalti di Toro. A truly unique feature is the monumental Campanile di Val Montanaia, set apart by erosion along the lines of weakness created by these shear forces, it rises in splendid isolation in the valley of the same name.

Given that most of the outcrops are Dolomite or other carbonate rock arranged in imposing, resilient banks, the rocky landscape appears rugged and untamed.

The Libri di San Daniele (literally St Daniel's books) on the crest of Monte Borgà, are massive slabs of rock whose geometry makes them resemble the heaped up pages of a book. The slabs were separated from one another by the selective erosion of the clay that once joined them together.

The lateral hanging valleys in this system, among them Val Zemola and Val Montanaia, contain some interesting concentrations of glacial deposits. The current landscape is marked by periglacial features and mountain streams. The constant freezing and thawing processes that afflict the walls already fractured by tectonic movements further break them down, leading to the formation of extensive detrital cones and debris fields that, when they are collected by mountain streams, lead to frequent accretion of the valley floors. In other places the mountain streams cut into the substrate creating deep gorges. Landslides are very common in this area, for example the Monte Salta landslide that is threatening the village of Casso, the Pineda landslide and the tragic Vajont landslide.

Text by Dolomiti Project Srl