Geology of System 1

Pelmo, Croda da Lago

The Triassic archipelago before, during and after the Ladinian volcanoes

In this system some 100 million of history are written with surprising continuity.

On Monte Cernera traces still exist of the beginnings of the Triassic archipelago and its evolution during the Ladinian period. The chapters telling the story of the first Triassic archipelago recount in great detail the oscillations of the sea bed responsible for the temporary emergence of sections of land that were then eroded.

The subsequent evolution of the archipelago is fossilised in the Dolomitic limestone towards the summit of Cernera, where a late Anisian reef developed, built from the organisms, preserving the interaction between the sediments in the shallows and coastline and those in the deep sea, the geometry inherited from the subsequent covering with volcanic material and its original three-dimensional nature.

Like a never-ending story, the history of the archipelago marches on with the Lastoni de Formin and Le Rocchette. These huge slabs of carbonate rock tell the story of the islands built of organisms at the end of the mid-Triassic period of volcanic activity and the subsequent filling up of the stretches of the sea between the islands, leading to the disappearance of the Carnian archipelago. Footprints of sauropods and primordial dinosaurs have been found in these rocks. Fossil amber containing the world's oldest known insects and mites can be found in the rocks of the same period on Monte Penna. Slightly younger rocks nestle at the base of Monte Pelmo and here too, on Pelmetto, there are a great many dinosaur footprints.

The medium altitude part of this famous mountain is made of the Main Dolomite rock that created the tidal plain established at the end of the Triassic period, as can be seen in the Croda da Lago chain. The part at the summit consists of rocks that bear witness to the subsidence that began in the late Triassic period. Some dinosaur footprints have recently been found here which are now on record as those found at the highest altitude ever. The system is also notable for the Mesolithic remains of Mondeval Man found on the Mondeval plateau. This is a wondrous place modelled by

tectonic and glacial events that wreaked havoc with the fragile material of volcanic origin in the basins. Some glacial erratics delivered by the glaciers on the Mondeval plateau were used as tombs by the nomadic communities of hunters.

Geomorphology

The Pelmo-Croda da Lago system is considered a geomorphological jewel in the crown, on a planetary scale, for the extreme diversity of its morphology, encapsulating all the morphostructural and morphoclimatic elements. Because this is so easy to read, a great many academics descend on this area for their research into paleoclimatology and applied geomorphology.

Skeletal forms (structural morphology)

The complex stratigraphic architecture is faithfully reflected in the continuous progression of slabs and walls of calcareous and Dolomite rock (Monte Cernera, Lastoni di Formin, Piz di Mezdì, Croda da Lago, Rocchette, Monte Pelmo, Monte Penna) that give way to undulating saddles and gentle slopes carved out of argillaceous and volcanic rock (Passo and Forcella Giau, Passo Staulanza, Forcella di Roan and della Puina, Mondeval and Campi di Ru Torto).

The plateaux at the summit of the Lastoni di Formin and Monte Penna, the stepped structure of the Formin-Croda da Lago chain and the numerous ledges that cut sharply across the steep slopes of Monte Pelmo and Monte Cernera, on the southern side, are magnificent examples of the morphoselective action of erosion on rock formations of varying hardness.

The contours of the main walls, the deep flexure that separates Monte Pelmo from Monte Pelmetto, and the fractures that break up Mount Becco di Mezzodì and the crest of Croda da Lago into numerous towers and spires, trace the tectonic features that cut through the rocky mass.

The forms created by the evolving climate (climatic geomorphology)

The glacial processes are currently limited to the small glacier of Val d'Arcia, buried under debris. The Mondeval de Sora and de Sotto zone displays numerous late glacial banks of moraine, dating back some 15,000-12,000 years, glacial erratics and forms produced by freezing and thawing, such as rock glaciers and pronival ramparts.

The wholesale modelling of the landscape is evidenced by the geometric detrital cones and the extensive layers that drape the foot of the sheerest walls, together with the frequent rock falls that set the material in motion once again. This is now perpetuated by gravity, assisted by freezing and thawing.

Both large and small rock falls detach themselves ever more frequently from the sheerest, most fractured walls, potentially creating considerable danger, as happened with the tragic landslide on the north face of Monte Pelmo in 2011. In prehistoric times two enormous landslides on Monte Pelmo landed on the valley floor, known as the Mareson and Palafavera rock avalanches.

The Lastoni di Formin is a much-studied iconic example of lateral spreading. In this complex form of landslide huge volumes of compact Dolomite rock in the vicinity of widespread tectonics faults, migrate very slowly on the more plastic underlying clayey layers, gradually becoming looser until they become a landslide. The karst and glaciokarst formations of Monte Pelmo are of great interest and have been the subject of recent studies and speleological exploration.

This landscape is a unique example of the harmonious integration of outstanding geology, geomorphology and archaeology and, as such, it must be preserved and valued.

Text by Dolomiti Project Srl