

## Lithostratigraphy and facies architecture of a Lower Permian continental succession in Central Southern Alps (Orobic Basin, Italy)

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The Lower Permian Pizzo del Diavolo Fm. of the Orobic Alps (Laghi Gemelli Gr., upper Collio Fm. *Auct.*) records, along an E-W area more than 50 km long, events that occurred in a complex continental depositional system, during semi-arid climatic conditions and in a transtensional tectonic setting. This formation postdates intense volcanic activity and overlays parts of a large caldera and its vast surrounding areas, covered by dominating pyroclastic deposits interbedded with rare braid-plain and lacustrine sediments (Cabianca Volcanite). Post-volcanic sediment distribution reflects the existence of connected half-grabens, characterised by transverse sedimentary input (coarse-grained alluvial fans) evolving into fine-grained heterolithic deposits in the depocentre, hosting ephemeral playa-lakes.

Field mapping of two marginal sectors of the Orobic Basin (Pizzo dei Tre Signori massif and Lake Barbellino area), coupled with facies analysis of the Pizzo del Diavolo Fm., led to the identification of significantly different sedimentary evolutions. At the eastern and western ends of the basin, the Pizzo del Diavolo Fm. consists of alluvial fan and floodplain facies associations that differ from the previously studied stratigraphic architecture described in the central part of the basin. The southern borders of the studied areas are characterised by coarse-grained, fining-upward alluvial fan deposits (Val Sanguigno Conglomerate) at their base. The petrographic composition of the conglomerates from the northern border of the basin (Ponteranica Conglomerate) indicates differences in the exposed and eroded rocks from the northern and southern highs, with changes along the basin borders, where conglomeratic units with dominating basement clasts (Mt. Aga Conglomerate) occur. Floodplain facies are similar all along the basin, even if with thickness changes (up to 700 metres in the western part).

The stratigraphic architecture observed in the eastern and western sectors markedly differs from that described in the central part of the basin (where a well-organised succession of two fining-upward cycles is described), preventing a detailed correlation of the events across the basin. Also the relative abundance of facies in these three sectors of the basin is different: fine-grained sediments dominate in the central part, whereas coarser deposits occur to the west (Pizzo dei Tre Signori massif) and to the east (Lake Barbellino). The complex architecture of the basin, the difficulty in recognising events or trends that can be traced all across the basin and the different petrographic composition of conglomerates along the northern and southern margins of the basin suggest not only that tectonics controlled facies distribution and depositional environments but also the existence of sub-basins characterised by different evolutions within the greater Orobic Basin, further supporting the envisaged role of strike-slip tectonics.