

# **Evidence of syndepositional tectonics during the Early Permian in the Orobic Basin (central Southern Alps, N Italy)**

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Proofs of synsedimentary tectonics during the Early Permian in the central Southern Alps (cSA, N Italy) are recorded in the volcanic and terrigenous successions of the Laghi Gemelli Group, which are characterized by the occurrence of abrupt facies variations often associated with coarse-grained deposits. These features are generally attributed to syn-sedimentary tectonic activity demonstrated by the local occurrence of sediments deformation such as liquefaction or slumping due to seismic shaking. Detailed fieldwork allowed us to recognize dewatering structures and sedimentary dikes, ball and pillars and small slumps, occurring along hundreds of mesoscopic faults showing meter-scale displacement in correspondence of high-angle conjugate systems as well as domino-style faults, often accompanied by growth structures. These structures are mainly concentrated in the fine-grained sediments of the Pizzo del Diavolo Formation, which were deposited on top of the volcanoclastic succession of the Ca' Bianca Volcanite and crossed by seismogenic synsedimentary faults.

The Permian synsedimentary structures of cSA are mostly associated with high-angle Andersonian normal faults which are combined with low-angle normal faults (LANFs) that developed along the interface between the Permian sedimentary cover and the Variscan basement. This LANFs system is relevant for the Permian hydrothermal circulation, resulting in widespread tourmalinites deposition along fault zones, and locally in U mineralization. According to our structural analysis the Permian tectonic setting is characterized by pure extension, dominated by ENE-WSW striking normal faults inverted during the Alpine shortening as high-angle reverse faults.