

THE ROLE OF STRATIGRAPHICALLY-CONTROLLED DETACHMENT SURFACES IN THE TECTONIC SETTING OF THE SOUTHERN ALPS OF LOMBARDY

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The stratigraphic succession developed on the Southern Alps passive margin in Lombardy is preserved within a thrust and fold belt, produced by the Alpine north-south compression. The older rocks outcrop toward the north (immediately south of the Insubric Line) and the younger toward the south, where they are covered by the deposits of the Po Plain. The Alpine tectonics is responsible for the development of different tectonic units, controlled by two main detachment horizons: the lower Triassic dolostones and pelites of the Carniola di Bovegno and the Carnian sabkha facies of the San Giovanni Bianco Formation. These detachment surfaces acted as important structural boundaries, separating three huge portions of the stratigraphic succession with different age, lithology and rheology: 1) a lower portion, represented by basement rocks capped by Permian volcanites and siliciclastics; 2) a middle portion represented by Anisian subtidal limestones and Ladinian carbonate platforms capped by shallow water mixed sediments; 3) an upper portion, represented by a thick Norian dolomitized carbonate platform covered by deeper sediments. Tectonic units belonging to each of these portions are never overthrust by units belonging to the underlying portions, with the only exception of the Bruco Klippe (western Val Brembana), where Anisian and Ladinian rocks overthrust Norian dolostones.

The lower detachment surface (controlled by the rheological characteristics of the Early Triassic pelites, sabkha dolostones and evaporites of the Carniola di Bovegno) is represented by the fault system known as Valtorta-Valcanale Fault (VVF). Previous works interpreted the VVF as a

system of minor faults acting in different ways or as a system of steep transcurrent faults dividing rigid blocks with different kinematic behavior. New detailed geological mapping of the Southern Alps of Lombardy (scale 1:10.000, Carg Project, Regione Lombardia) allowed to identify the VVF system as a major tectonic element, separating the basement and the Permian-Early Triassic succession from the younger sediments. Actually, the tectonic units below the VVF (Orobic Anticlines) are interpreted as antiformal stacks that developed below the Triassic cover, detached at the Carniola di Bovegno level. Similarly, the Middle Triassic overthrust units are interpreted as antiformal stacks between the VVF and the upper detachment surface at the top of the Carnian succession (Clusone-Antea Fault, CAF), previously interpreted as a wedging fault in its eastern portion or, locally, as a normal fault. The Middle Triassic rocks are covered, above the CAF, by tectonic units consisting exclusively of Norian and younger sediments.

The strong control of the two detachment surfaces on the tectonic setting has an important stratigraphic implication: the sedimentary succession of the Southern Alps of Lombardy is never preserved as a continuous succession.

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