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Inheritance in Fold and Thrust Belts: A Case Study from The Italian Western Southern Alps

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A deeply investigated issue in Earth sciences is the role of inherited structures in controlling later tectonic, sedimentary and magmatic processes and their mutual temporal and spatial superposition in continental fold and thrust belts. This is particularly true for long-lived structures, that acted actively or passively during diverse tectonic phases and whose progressive movements can be hardly restored, lacking adequate syn-growth stratigraphy. Moreover, if superposition of the latest and more pervasive tectonic event masks the geometries related with of the previous evolution, only a partial restoration of separate structural blocks is feasible.
We present the first results obtained from a new geological mapping, structural and stratigraphic analysis and the building of a 3D geological model, performed in a sector of the Italian western Southern Alps, between Lake Maggiore and Lake Como (i.e. the Mesozoic Arbostora High – Generoso basin Auct.).
Here, Carboniferous to Cretaceous coverages, thrust by Oligocene-Miocene southalpine shallow-marine deposits, were deformed in a complex fold and thrust belt by alpine orogeny. Previous events include volcanism, shallow intrusions and transtension during early Permian, followed by the mainly Jurassic rifting.
Such a complex evolution is fully or partially recorded along two main regional structures along the studied area: i) the Marzio fault, a deeply rooted high angle structure, active since Carboniferous and re-activated by thrusting as a transpressive fault and ii) the Lugano fault, a Jurassic basin-bounding normal fault later inverted into a high-angle lateral ramp. Both the structures exerted a direct strong control on the architecture of the margin and lithological distribution and to the following structural evolution during the alpine collision.
We present a new 1:25.000 scale geological map of the area, a preliminary structural interpretation and a series of 2D balanced cross-sections.
We obtained a different geometry for the Marzio fault compared with previous published works and we consider it was its riactivated as a thrust ramp during the cretaceous contraction onset. In addition, we are testing alternative geometries for the Lugano fault, commonly assumed as listric normal fault bounding the Generoso basin to the west.