



Fault kinematics along the orogenic front of the Eastern Southern Alps

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We aim to link fault kinematics along the orogenic front of the Eastern Southern Alps with deformation of the Adriatic indenter since Miocene time. The main structure in this area, the Schio-Vicenza Fault, is a steep fault system that trends NW-SE, perpendicular to the strike of frontal thrusts of the Eastern Southern Alps and oblique to NNE-SSW striking Giudicarie fold-and-thrust belt. This belt was active in Miocene time and offsets the main edifice of the Alps, including the Periadriatic Fault.

The steep fault surfaces of the Schio-Vicenza Fault carry two generations of striations: (1) older subhorizontal striations with sinistral slip indicators; and (2) younger SW-dipping striations indicating oblique downthrow of the SW block. Faults with the Schio-Vicenza Fault trend can be traced NW to the end of the ENE-WSW-trending Valsugana Thrust. However, the Schio-Vicenza Fault does not merge with or truncate the Giudicarie Belt as shown on previous maps of the area.

East of the Schio-Vicenza Fault, the orogenic front of the Eastern Southern Alps comprises the Bassano thrust system. This system is associated with an ENE-WSW trending ramp anticline that folds and tilts Mio-Pliocene strata. Southwest of the Schio-Vicenza Fault, the front comprises the Marana Thrust, which emplaces the Upper Triassic Dolomia Principale to the SSE onto Lower Cretaceous strata ('Maiolica'). Fault-slip analysis of this thrust and NE-SW trending fold axes indicate NNW-SSE shortening. At the SW end of the Marana Thrust, m-scale chevron folds in the footwall strata ('Maiolica') trend NW-SE, at a high angle with this shortening direction.

Sinistral motion along the Schio-Vicenza Fault indicates that it acted as a clutch to accommodate differential Neogene-to-recent shortening associated with Adriatic indentation in the Eastern Southern Alps. NW-SE-directed shortening was greater NE of the Schio-Vicenza Fault along the Bassano Thrust than SW along the Marana Thrust. The observation that the Schio-Vicenza Fault terminates in the NW, near the end of the Valsugana Thrust, rather than merging with the Giudicarie Belt, indicates that the latter was kinematically decoupled from post-Oligocene shortening along the orogenic front. Together with the anomalously low seismicity just north of the Valsugana Thrust, this suggests that ongoing shortening is taken up between this thrust and the active orogenic front.

The NW-SE trending folds in the footwall of the Marana Thrust do not fit with the typical Neogene Alpine ENE-WSW strike of folds and thrusts in this area and the timing of the thrusting is not well constrained. Work is underway to determine whether these folds represent a different deformational phase or formed due to interference with a local Oligocene normal fault. In addition, the oblique normal motion to the SW along the Schio-Vicenza Fault is inconsistent with Neogene Alpine shortening and could reflect flexural extension in the foreland bulge of the Apennines.