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# Active buried faults in Southern Alps: insights from seismic reflection data

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The eastern Southern Alps are located at the northern edge of the Adriatic microplate. They are delimited to the north by the Periadriatic Fault (Pustertal and Gailtal lines) and to the west by the Giudicarie Fault. To the east they taper between Eastern Alps and Dinarides up to the Pannonian Basin. This part of Alps is mainly composed by SW-S-verging thrust and folds developed since the end of Early Cretaceous. In its southern border, the contractional structures are partially or totally buried by Plio-Quaternary sediments (Veneto-Friuli basin). Geodetic data, instrumental seismicity and historical earthquakes suggest that some of these structures are still active. All these data indicate a today ∼N-W shortening. In this study we use seismic reflection profiles derived from oil and gas exploration to reconstruct the geometry of the buried faults and to define their recent activity and, finally, to speculate about their seismogenic potential.

We focused our attention on two areas. The first one is located on the south-western range front, in the area of the Montello Hill: a well-defined active, alpine and south-verging anticline. The second area is located in the Friuli Plain, close to the town of Udine, where alpine structures partially reactivate a Dinaric structure.

In both cases we interpret several cross- and along-strike seismic profiles. We depth-converted the buried structures using different velocity models. We balanced our subsurface interpretation and we restore that to obtain insights to the recent activities of the structures. As previously described, we found that the Montello Hill represent the surficial expression of an active thrust fault. However, we described also the activities of a minor and external structure located in the Montello thrust footwall area that allow to recalculated the slip rate of this system. For the structures located in the Udine area, we reconstruct three active thrust ramps that partially reuse a Dinaric thrust system. The shallower and northern structure is rooted in the Upper Cretaceous-Paleogenic flysch. The Other two structures are rooted in the Mesozoic carbonates, one of the most diffuse seismogenic rocks in Italy. Although the calculated slip rate for these structures are smaller than those suggested for the structures bordering the mountain range, the seismic risk is high as they are located very close to Udine, the largest town in this part of Italy. In summary, our study may improve seismic hazard calculation for this area.