QUATERNARY TECTONIC ACTIVITY IN THE NORTH-EASTERN CORNER OF THE FRIULI PLAIN (NE ITALY)

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Interpretation of seismic industrial lines matching with morphotectonic data and wells subsurface data allowed us to retrace the bottom of the Quaternary succession buried under the eastern Friuli plain, with the aim to detect the Quaternary activity of the main faults.

The study area is settled between eastern Friuli and western Slovenia, where the external fronts of late Cretaceous-Paleogene SW-verging External Dinarides meet the external fronts of S-verging Neogene Eastern Southalpine Chain. The complex structural setting of the area

reflects the articulated tectonic evolution that affected the eastern Friuli-western Slovenia region.

- Dinaric phase: during late Cretaceous-Paleogene a NE-SW compressional regime caused the propagation of NW-SE trending thrusts;
- Neoalpine phase: starting from Middle Miocene an about N-S compressional regime is responsible of the formation of S-SE verging, WSW-ENE low angle thrusts and the reactivation of favorably oriented old structures;
- starting from Pliocene, the activation of a NNW-SSE compressional regime caused the formation of new NW-SE strike-slip high angle structures that locally displace and/or renew the old structures.

According to focal mechanisms of seismic events, two different deformational systems can be distinguished: a western sector where reverse activity on low angle WSW-ENE oriented thrusts prevails, and an eastern sector characterized by strike slip tectonics on high angle NW-SE oriented faults. Both deformational systems are subjected to NNW-SSE compressional regime (Serpelloni et al, 2016) with velocities vectors of 2-3mm/yr (D'Agostino *et al*., 2008; Devoti *et al*., 2011; Caporali *et al*., 2013), responsible of their reverse or transcurrent/transpressive kinematics. Recent and historical earthquakes show that the study area is seismically active, in fact at least three events with M>6 struck the area: Mw 6.63, 1348; Mw 6.32, 1511; Mw 6.45, 1976 (Rovida *et al*., 2016). Nevertheless, the seismogenic role of the main tectonic structures is still not completely clear; in this context Quaternary activity has been assumed for the Susans Tricesimo thrust (Zanferrari *et al*., 2008; Poli and Zanferrari, 2018), while recent paleoseismological investigations revealed Quaternary dislocations on the Colle Villano thrust (Falcucci *et al*., 2018).

In this study, we present three crustal geological cross sections of the eastern Friuli plain, that allowed the reconstruction of the tectonic buried setting of the eastern Friuli sector. The geometry of the main stratigraphical horizons (Carnic Unconformity, top Cretaceous-Paleogenic carbonatic platform, bottom and top Cavanella Group, bottom Pliocene marine deposits and Quaternary base) and the main tectonic structures were reconstructed through ENI industrial seismic lines interpretation, together with well logs data.

Moreover, the implementation of well logs data allowed us to reconstruct the 3D bottom surface of alluvial Quaternary deposits, detecting the tectonic influence. By merging these new data with morphotectonic observations, the main buried active faults of the area were detected, and possible estimates of their activity rates were performed.

Three main fault systems were recognized:

- The Palmanova System, composed of many NW-SE and WSW-ENE thrust faults. It represents the most frontal structure of the External Dinarides, reactivated in recent times. In detail, the Pozzuolo-Medea Thrust, the Terenzano Thrust and the Trivignano thrust show evidences of Quaternary activity.
- The Trnovo System is composed of the active Udine-Buttrio thrust and the inherited structures of Trnovo and Premariacco thrusts that don't show evidences of recent activity.
- The Borgo Faris-Cividale Fault System composed of dextral strike-slip faults and reverse SW verging associated splay like Colle Villano and Cividale thrusts. Both transcurrent and reverse faults show clear evidences of Quaternary activity.

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