Quaternary kinematics of the Adria plate along a transect from the Southern Apennines to the Albanides

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The Adria plate is deformed and consumed by subduction and collisional processes along the peri-Adriatic mountain belts (Apennines, Dinarides and Hellenides). The PRIN Project AdriaLab aims to unravel the geodynamic processes of the Adria plate by providing a natural laboratory where a geodynamic model of a (double) subduction zone can be tested using geological and geophysical data. In this context, we propose a multidisciplinary study that merges marine geological, seismological and geodetic data along a transect that extends from the southern Apennines-Calabrian Arc to the Dinarides-Hellenides transition (Albanides).

In particular, the crustal architecture and a new scheme for the Quaternary kinematics of the Adria plate will be reconstructed based on the interpretation of seismic reflection profiles (Crop Mare, commercial multi-channel seismic lines from the Videpi database with variable resolution/penetration) coupled with newly collected GNSS measurements and relocalized seismic events. The high-penetration seismic profiles reveal the presence of high-angle transcurrent faults, some of which offset the seafloor and form NNW-trending structural ridges extending southeastward from the Apulia platform. In the area west of Corfù Island, contractional structures deform Miocene units. Geodetic data reveal the ongoing deformation processes between the Adria plate boundaries. We used the velocity solution processed (code vel2020) by the RING network and reoccupied (years 2022 and 2024) 37 benchmarks belonging to the IGM95 network. IGM95 data have been reprocessed using GAMIT-GLOBK software. Velocity fields, referred to as ITRF2014 to the stable part of the Eurasian plate, highlight a convergence pattern between the Dinaric-Albanian and Southern Apennine fronts, oriented approximately NNE. The seismological analysis aims to characterize recent and historical seismicity to improve understanding of the regional seismotectonic framework. We analyze seismic events recorded by the INGV networks over the past 40 years, focusing on hypocentral location, spatiotemporal distribution, and kinematic characteristics. These seismological parameters are integrated with geological and geophysical datasets to assess potential correlations with known or inferred active structures. The multidisciplinary research strategy is expected to disclose unsolved geodynamic issues that apply to other convergence zones, such as the causes and mechanisms of lateral slab tearing and break-off and their effect on orogenic processes.