



Crustal deformation and microplate motion of Adria, new constraints on present day tectonics from GPS geodetic measurements

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We have analyzed GPS data from the Adriatic region from 1994 to present, including all available permanent stations in the region and select data from campaigns in northern Italy, Croatia, and Slovenia. The data provide new constraints on the present day tectonics of the Adria microplates and their interactions with the surrounding Eurasia plate. Motions of sites GRUZ and MATE, on the Island of Palagruza, Croatia, outermost Dalmatian Island, and Matera, Italy, Puglia platform, respectively, differ by less than $0.2\text{--}0.3$ mm/yr in magnitude and $0\text{--}3$ degrees azimuth. These small differences imply that Palagruza and Puglia lie on a common southern Adria microplate. Moreover, the northeast orientation of these sites' velocities is significantly different from the NW direction of Nubia-Eurasia relative motion in the central Mediterranean region, suggesting that the southern Adria microplate is distinct from the Nubia plate. However, the boundary between Nubia and southern Adria is not defined by the present data set. Sites in Istria move at comparable rates to sites located along the spine of the northern Apennines chain ($2\text{--}3$ mm/yr) but in a more northerly direction. Extension is observed across the internal northern Apennines and shortening is observed across the Dalmatian Islands, Dinarides, and the eastern Alps, such that there is no net motion across a northeast transect from the Corsica-Sardegna region to the Pannonian Basin region, both of which show no motion relative to the Eurasia plate. A change in velocity azimuth of ~ 20 degrees across the Gargano-Dubrovnik fault may be indicative of distinct northern and southern Adria microplates.