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Crustal deformation field in Greece determined from 10 years of GPS measurements, with special emphasis on time-dependent behavior and the Lefkada 2003 earthquake

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The eastern Mediterranean forms the seismically most active region of the Alpine-Mediterranean plate boundary. In addition to the relatively slow counterclockwise rotation of the African plate, rapid motion of the Anatolian-Aegean region is encountered, directed towards west-southwest, relative to the Eurasian plate. In this paper, we present results of 10 year records of continuous GPS (CGPS) time series and campaign-type GPS measurements of crustal motion in Greece. In addition to the GPS networks in Greece, 54 IGS and EUREF stations were included in the processing to ensure a consistent reference frame. A detailed kinematic and strain rate field is being presented as a contribution to a better understanding of the ongoing deformation processes in the eastern Mediterranean. Striking tectonic features being discussed are the arc-parallel extension along the Hellenic arc and the existence of deformation zones on both sides of the North Aegean Trough. First indications of height changes are also being presented. Apart from overall rates of crustal motion, emphasis is being placed on the time-dependent behavior of crustal deformation, visualized by means of time series, trajectories and the evolution of cumulated strain. In particular, we present the GPS results associated with the Lefkada 2003 earthquake, where we observed coseismic displacements of several centimeters.