



Monitoring Surface Deformation in Istanbul and Western Termination of the 1999 Izmit Earthquake Rupture (Turkey) Using PSInSAR and GPS Measurements

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Abstract

The 1999 disastrous Izmit earthquake ($M_w=7.4$) was not a surprise because westward migrating earthquakes that broke ~ 1000 km-long section of North Anatolian Fault (NAF) in a manner of falling dominos had already arrived nearby Izmit. Another large and destructive earthquake is now expected to occur further west along the North Anatolian fault under the Sea of Marmara, 20 km south of Istanbul, where is one of the most populous and rapidly growing cities of Europe. Our efforts focus on the monitoring of the tectonic strain accumulation across the metropolitan area and western section of the 1999 Izmit rupture by combining InSAR time series and GPS data. We aim to determine the 4D postseismic deformation of Izmit earthquake in order to understand more about the earthquake cycle processes with other relevant data sets and to provide constraints to seismic hazard models. In addition, PsInSAR-GPS derived deformation maps as function of space and time may contribute to determining land slides and other mechanisms such as slope instability, shallow groundwater level, lithology and liquefaction. In this work, we will demonstrate our ongoing activates from the local deformations, which give the attributes of the local sources, to regional deformations, which contribute the earthquake hazard studies in the region.

Keywords: PSInSAR, GPS, Surface deformation, Istanbul, North Anatolian Fault