



Kinematics of the Eastern Part of the North Anatolian Fault Zone

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The North Anatolian Fault Zone (NAFZ), which marks the boundary between Anatolia and the Eurasian plate, is one of the world's most seismically active structures. Although the eastern part of NAFZ has high seismic hazard, there is a lack of geodetic information about the present tectonics of this region. Even though many scientists would like to study this area, geographical and logistical problems make performing scientific research difficult. In order to investigate contemporary neotectonic deformation on the eastern NAFZ and in its neighborhood, a relatively dense Global Positioning System (GPS) monitoring network was established in 2003. Geodetic observations were performed in three GPS campaigns in an area of 350×200 km square with 12-month intervals. In addition, 14 new GPS stations were measured far from the deforming area. Since this region includes the intersection of the NAFZ and the East Anatolian Fault Zone (EAFZ), deformation is complex and estimating seismic hazard is difficult. One important segment is the Yedisu segment and it has not broken since the 1784 earthquake. After the 1992 Erzincan and 2003 Pulumur earthquakes, the Coulomb stress loading on the Yedisu segment of the NAFZ has increased significantly, emphasizing the need to monitor this region. We computed the horizontal velocity field with respect to Eurasia and strain rates field as well. GPS-derived velocities relative to Eurasia are in the range of 16–24 mm/yr, which are consistent with the regional tectonics. The principal strains rates were derived from the velocity field. Results show that strain is accumulating between the NAFZ and EAFZ along small secondary fault branches such as the Ovacik Fault (OF).