Geophysical Research Abstracts, Vol. 8, 10004, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10004

Present-day crustal motions at the triple junction between the Dead Sea Fault, the East Anatolian Fault and the Cyprus Arc (SE Turkey)

S. Bertrand (1), M. Meghraoui (1), S. McClusky (2), E. Altunel (3), S. Ergintav (4), & R. Reilinger (2)

(1) Institut de Physique du Globe de Strasbourg, UMR 7516, France, [sophie.bertrand@eost.u-strasbg.fr] , (2) Massachusetts Institute of Technology, USA , (3) Eskisehir Osmangazi University, Turkey , (4) TUBITAK, Gebze, Turkey.

A network of 22 GPS sites was implemented in south-eastern Turkey (Hatay province) to measure crustal displacements at the junction between the East Anatolian Fault (EAF), the Dead Sea Fault (DSF) and the Cyprus Arc. These tectonic structures meet at a triple junction between the Arabian plate, the African plate and the Anatolian block in central-southern Turkey. Here, we analyse active tectonic observations and GPS data (for the period 1991-2004) at the junction using the GAMIT/GLOBK software in a three-step approach (Feigl et al., 1993; Dong et al., 1998). Relative to Eurasia, GPS sites at the northern edge of the Arabian Plate show 17 ś 2 mm/yr. at N28° ś 5°W of convergence, slower than the NUVEL-1A rate estimate (25 ś 1 mm/yr. at N21° ś 7°W, DeMets et al., 1990). Sites located north of the EAF in Anatolia show 18 ś 3 mm/yr. at N76° ś 9°W indicating a westward escape of the Anatolian block along the EAF. We also estimate 1.5 - 2.3 mm/yr. of left-lateral displacement and 0.8 - 2.0 mm/yr. for the normal component (with a northward increasing velocity) along the Amanos fault. Measurements west of DSF and south of the Amik basin show slip vectors consistent with the African plate motion and indicates that a branch of the Anatolia-Africa plate boundary (i.e. Cyprus arc) extends inland. West of the Karasu Valley, the deformation is distributed between the Cyprus Arc and the NE-SW trending Osmaniye-Karatas Fault zone (OKFZ), which reveals 4.0 - 4,5 mm/yr of left-lateral slip rate. The GPS Anatolia-Arabia Euler vector (31.0° ś 1.0°N, 41.1° ś 0.9°E, 0.70° ś 0.09°/Myr) provides an upper bound of 9.7 ś 1.5 mm/yr of left-lateral slip along the EAF. Finally, the processed velocities are interpreted using an elastic

locked-fault model (Savage and Burford, 1973) for an infinitely long fault as applied to the main tectonic elements at the junction. We apply the model for a range of reasonable depths (6 - 12 - 18 km) for strike-slip faults and estimate 9.0 mm/yr. slip rate along the EAF considering a 18 km locking depth.