Geophysical Research Abstracts
Vol. 15, EGU2013-11135, 2013
EGU General Assembly 2013

Block model at the Hatay Triple junction in N-W Syria and S-E Turkey from GPS data inversion

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The active deformation at the Hatay Triple junction (HTJ) in northwest Syria and southeast Turkey is represented by finite number of rotating elastic spherical blocks limited by faults. GPS derived horizontal velocities are inverted for the fault parameters and block angular velocities. We are using GPS vectors from our dense regional GPS network reinforced by other GPS solutions in the region.We test different tectonic configurations trying to minimize the data misfit of our model using a reduced chi-square statistic:$\chi\_n2=(\sum r2/s2)$/DOF.Residuals were calculated for different models in order to define the best fit to the known kinematic configuration of the region.
A block model with the new Iskenderun and Amanous micro blocks and three major blocks of Arabia, Anatolia, and Sinai is essential to explain the GPS vectors. The estimated relative slip rates on faults are similar to other published estimations with some exceptions.The Karasu Fault shows a sinistral slip rate of 4.0 $\pm$ 1.0 mm/yr and a compressional behavior with a revers slip rate of 2.1-2.7 mm/yr, which contradicts with the extensional nature proposed by previous studies. The Dead Sea fault experiences a relative slip rate of $\sim$3.5 $\pm$ 0.3 mm/yr along all its segments. We also define a new Euler pole for the relative angular velocity of Anatolia-Arabia Euler pole at (27.61oN, 45.127oE, 0.391$\pm$ 0.056 o/Myr), and a Sinai-Arabia Euler pole at (31.012oN, 46.464oE, 0.202 $\pm$ 0.067 o/Myr).A 15 km of locking depth is estimated for the EAF, 4-5 km deeper than that of the Dead Sea Fault. The East Anatolian Fault is however partially locked down to the depths of 30 km with no significant extension or compression. In general, slip rates and kinematics of faults are consistent with the geological observations in the region.