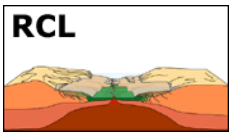
Baja California Kinematics from Geodetic Data Analysis



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We present a GPS plate motion study of the North America - Pacific plate boundary region, focusing on the Baja California microplate (BAJA). We considered possible elastic strain accumulation from the faults at the edge of the microplate. We find that the microplate is rigid with an average residual motion of ~1.7±0.8 mm/yr in the northern, and ~1.3±0.8 mm/yr in the southern network, corresponding to a convergent strain of -1*10-16 sec-1 (Plattner et al., 2007). Using this new rotation pole, we calculated the rigid plate relative motion of BAJA to its neighboring plates along the plate boundaries (the Western Baja California Shear Zone and the Gulf of California). With respect to stable North America (Sella et al., 2006)*, BAJA moves in the same direction as the stable PAC plate (Plattner et al., 2007), but with a rate that is about 10% slower than the PAC plate. These results are in accordance with geological studies and suggest partial coupling of the micro-plate to the Pacific plate. Our analysis suggests that on average since 3 Ma the plate motion rates were constant. More detailed information on the relative plate motion partitioning and strain accumulation from the lateral plate boundaries of BAJA is expected from future GPS velocity data of the central BAJA network. This network will be observed and expanded in 2008/2009. Preliminary velocities show already the presence of strain accumulation from the Gulf of California.

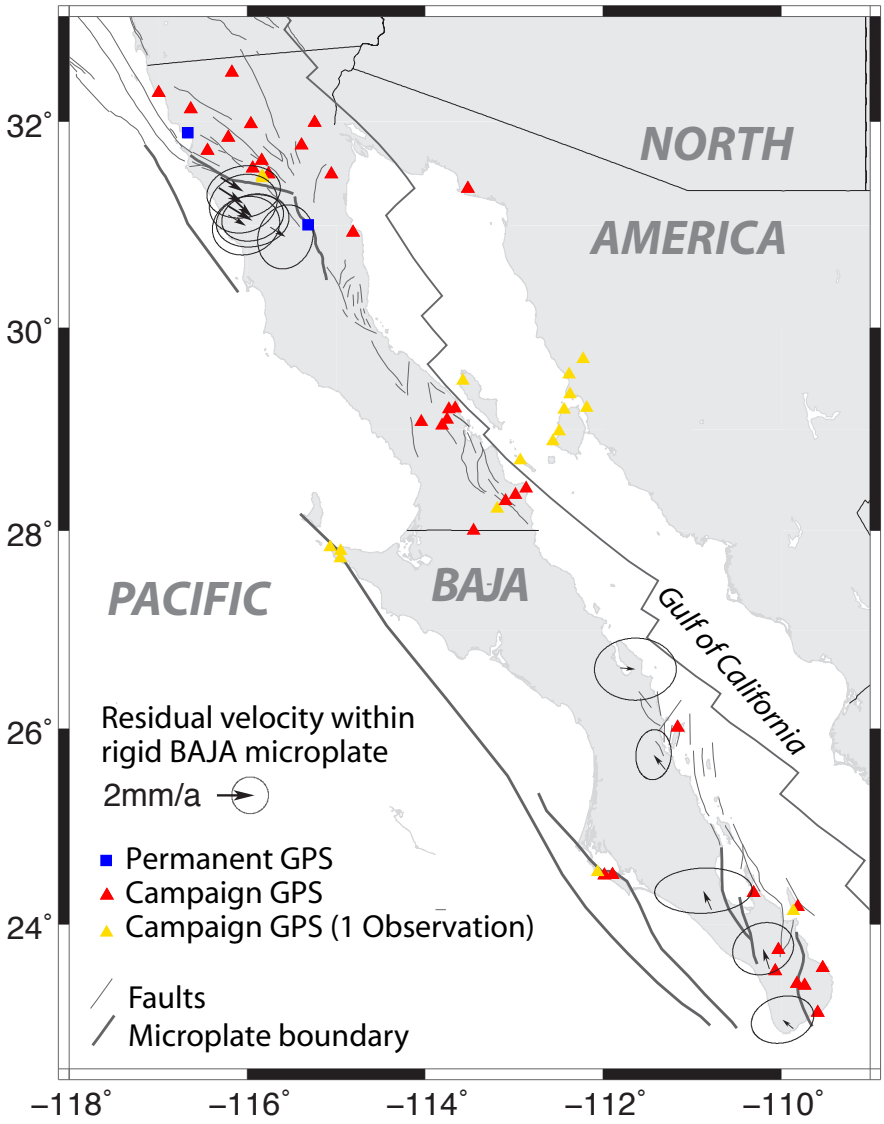

Figure: GPS network and velocities with respect to rigid BAJA shown for stations used for the BAJA Euler vector calculation. The main faults outlining the rigid microplates are shown by thicker lines with respect to the regional fault network (data from INEGI and fault mapping data from Northern Arizona University).

Plattner, C., R. Malservisi, T.H. Dixon, G.F. Sella, P. Lafemina, J. Fletcher, and F. Suarez-Vidal (2007), New constraints on relative motion between the Pacific plate and Baja California microplate (Mexico) from GPS measurements., Geophys. J. Int., doi:10.1111/j.1365-246X.2007.03494.x.

*References listed in appendix A.