



How coupled are Baja California (Mexico) and Pacific?

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Is Baja California part of the Pacific plate? Coupling GPS observations with numerical modeling we can answer this important question and evaluate the effect of a non-complete coupling on the kinematics of the Western hemisphere. Until 12 Ma the western coast of Baja California (BC) was the location of the subduction of the Pacific plate (PA) underneath the North American plate (NA). It is a common assumption that the eastward migration of the plate boundary was complete ~ 3.6 Ma and that since that time the Gulf of California has accommodated the full relative motion between North America and Pacific. One of the main consequences of this assumption is that the magnetic anomalies in the Gulf of California allow estimating the average relative motion between NA and PA. On the other hand, published geodetic measurement (e.g. Sella et al, 2000) indicate that NA is moving respect to PA at an higher rate then estimated by the spreading rate (DeMets et al 1994) and the few published GPS measurements in the Baja California Peninsula (Dixon and DeMets 1999, Dixon et al. 2001, Beaven et al. 2002, Gonzalez-Garcia et al. 2003) indicate that the velocity of the sites with respect to a rigid Pacific plate have significant residuals. These observations suggest that the Peninsula is not completely coupled with the Pacific plate and the Gulf of California spreading does not fully represent the NA/PA motion. Here we use the publicly available GPS data from Pacific and North America to compute a new reference frame in which to analyze the extensive network of campaign GPS of University of Miami/CICESE combined with the SCEC for the Mexico/US border region. This will allow quantifying the motion between Baja California and the Pacific plate and how it is accommodated. In particular, we will use the GPS and numerical models to verify if BC behaves as a rigid block as the absence of intra-peninsular faults seems to indicate (in this case the missing motion must be searched west of BC) and the effect of this motion on the rate of spreading of the Gulf of California.