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A model for Mexican neotectonics based on nationwide GPS measurements, 1993-2001
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Abstract

We combine velocities for 14 continuously operating GPS stations spanning Mexico, GPS sites on Socorro and Clarion islands on the Pacific plate west of Mexico, and 178 GPS sites on the North American and Pacific plates to derive plate-based reference frames suitable for GPS-based studies of North American plate neotectonics. The motions of sites in Mexico north of and including Oaxaca are consistent with North American plate motion, implying negligible slip across the Mexican Volcanic Belt.Sites in the Yucatán peninsula move 3±1 mm/yr eastward relative to the North American plate. Velocities for new GPS sites on Clarión and Socorro islands are consistent within their uncertainties with Pacific plate motion, and provide useful new constraints on Pacific plate motion. Pacific-North America motion in the southern Gulf of California is 50.8±0.5 mm/yr toward S55°E±0.5° degrees. This is consistent with 50-52 mm/yr geologic estimates, but slower than recently published 52-53 mm/yr geodetic estimates. Southeastward motion of La Paz near the tip of Baja California relative to the Pacific plate agrees with previous results suggesting that Baja California is detached from the Pacific plate. The new plate angular velocity vectors amount to a well-constrained, geologically stable reference frame.

Keywords

GPS, stable reference frames, tectonic plates.