



Evidence for True Polar Wander since mid-Cenozoic time: A Paleomagnetic Investigation of the Skewness of Magnetic Anomaly 12r (32 Ma) Between the Galapagos and Clarion Fracture Zones on the Pacific Plate

B. Horner-Johnson and **R. G. Gordon**

Rice University, Earth Science, MS 126, Houston, Texas USA 77005

In recent years, some researchers have asserted that there has been no motion of the Pacific hotspots relative to the spin axis since the age (ca. 47 Ma) of the elbow in the Hawaiian-Emperor chain (e.g., Tarduno et al. 2003). In contrast, the apparent polar wander of the Indo-Atlantic hotspots shows distinct motion of the hotspots relative to the spin axis over the same time interval (e.g., Morgan 1981; Besse and Courtillot 2002). If this latter shift is due to true polar wander, one would expect to see a similar shift of Pacific hotspots relative to the spin axis. Here we present critical new data and analyses to test these distinctly different hypotheses.

Specifically, we present results of an investigation of the skewness of magnetic anomaly crossings of anomaly 12r between the Galapagos and Clipperton and between the Clipperton and fracture zones on the Pacific plate. We chose to focus on this region for three reasons. First, numerical experiments showed that these crossings, of all those available from the Pacific plate, should contain the most information about the location of the 32 Ma paleomagnetic pole for the Pacific plate. Second, many of the available crossings are from vector aeromagnetic profiles, which have superior signal to noise ratios (Horner-Johnson and Gordon, 2003). Third, the rate of seafloor spreading recorded in these crossings exceeds the threshold (half rate of 50 mm/yr) above which no anomalous skewness occurs. Moreover, for the first time, we combine uncertainties in plate-hotspot rotations (Andrews et al. 2005) with paleomagnetic uncertainties to obtain the total uncertainties of our new paleomagnetic pole recon-

structed into the Pacific hotspot frame of reference.

The results show significant and unambiguous motion of Pacific hotspots relative to the spin axis since 32 Ma. Moreover, when the 32 Ma Pacific plate paleomagnetic pole is reconstructed into the Pacific hotspot reference frame, it is consistent with the paleomagnetic pole of the Indo-Atlantic hotspots. We conclude that the global set of hotspots have moved in unison relative to the spin axis since 32 Ma, which is most simply interpreted as true polar wander.