



New Evidence that the Emperor Seamount Chain Records Motion of the Pacific Plate Relative to the Deep Mantle

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A key question for Pacific and circum-Pacific tectonics with implications for mantle convection is whether the Emperor seamount chain records the northward motion of the Pacific plate relative to the deep mantle. To investigate this question, we determine a new Pacific plate paleomagnetic pole for ≈ 60 Ma BP from the analysis of the skewness of marine magnetic anomaly 26r recording Pacific-Farallon motion in low paleolatitudes. We further update a previously published Pacific plate pole for ≈ 65 Ma from the analysis of anomalies 27r to 31 by incorporating a larger correction for anomalous skewness. These two poles, along with prior poles for 58 Ma and 72 Ma allow us to test how much, if any, the Hawaiian hotspot moved relative to the spin axis for ≈ 14 Ma of the ≈ 30 Ma during which the Emperor chain was formed. We find that the Hawaiian hotspot moved insignificantly southward (4 ± 17 mm/a (95% confidence limits)) from 72 Ma to 58 Ma while the Pacific plate moved significantly northward (42 ± 17 mm/a (95% confidence limits)). We further compare the apparent polar wander of the Pacific hotspots with that of the Indo-Atlantic hotspots over the past 65 Ma. The two paths indicate a jump of $\approx 8^\circ$ in the position of the spin axis relative to global hotspots between ≈ 60 Ma and ≈ 45 Ma presumably due to true polar wander.