

## Implications of New Pacific-Antarctic Reconstructions for Hotspot Motion

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New Late Cretaceous - Early Tertiary Pacific-Antarctic reconstructions, derived from an expanded data base, document a fragmented ridge system separating the Antarctic plate(s) from the continental masses presumed to be attached to the Pacific plate (Campbell Plateau and **Chatham Rise**). Poles and angles of **reconstruction** for the southern half of the basin, separating Marie Byrd Land from the Campbell Plateau, are **significantly** different at the **95%** confidence level from reconstructions for the northern half of the basin prior to **chron 28/29** (65 Ma). Our Antarctic data set is sparse for ages older than **chron 30/31** (69 Ma) but Pacific side data indicate that the fragmented ridge system was inherited from breakup. We speculate that a major plate reorganization at **chron 27** (62 Ma) linked the ridges north and south into a continuous Pacific-Antarctic ridge system.

It is not clear, therefore, whether either the northern or southern part of the basin represented Pacific-Antarctic motion prior to 62 Ma. We examine the implications of these new results for hotspot motion by inserting the new poles (both north and south) into the circuit connecting the Atlantic hotspots to the Pacific hotspots. We employ several alternative published models of the motion of the hotspots relative to Africa, and revised Pacific-Antarctic reconstructions for ages younger than 62 Ma. For some **Africa-hotspot** models, the post-62 Ma reconstructions provide a better fit to the Hawaiian hotspot track than did previous studies, **While** all the reconstructed **positions** of the Hawaiian hotspot lie on the Hawaiian **hotspot** track, a significant age discrepancy remains, even for younger times, **The** reconstructed positions all fall on younger **crust**, although the amount of misfit is less than in previous **reconstructions**. At times older than 62 Ma, the reconstructed positions derived **from** either the northern or the southern **parts** of the Pacific-Antarctic basin lie off the Emperor chain, far to the west of their expected positions. Hence the global plate circuit test of **fixity** of the Atlantic and Pacific hotspot fails prior to 62 Ma. It may also fail for younger times unless the age discrepancy can be reconciled.

Before these results can be unequivocally interpreted as evidence for hotspot drift, one must discount the following alternative explanations for the observed hotspot misfit: 1) these spreading centers did not **represent** Pacific-Antarctic motion until 62 Ma; 2) there was motion between East and West Antarctica before or after 62 Ma; 3) there **are** errors in the reconstructions of the Atlantic hotspots to Africa; 4) there was motion between the North and South Pacific prior to 62 Ma. We examine and attempt to eliminate some of these possibilities by testing the Indian **hotspot** circuit and including constraints on possible E-W Antarctica motion from the known Pacific-Australia-Antarctica **plate** circuit.