



Bends in Hotspot Tracks: Kinematic observations and geodynamic models

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Bends in volcanic hotspot lineaments, best represented by the large 60 degree turn in the Hawaiian-Emperor chain, were once thought to record solely changes in plate motion. Several lines of geophysical inquiry, including paleomagnetism and plate-circuit analyses, now suggest that a change in the locus of upwelling in the mantle induced by mantle dynamics causes bends in hotspot tracks. Deep flow near the core-mantle boundary may have played a role in the Hawaiian-Emperor bend. However, we suggest that capture of a plume by a ridge, followed by changes in sub-Pacific mantle flow can better explain the observations. Ridge capture of plumes may be enhanced in the Pacific Ocean basin because of its history of rapidly spreading ridges, distant from the complicating effects of continents. We explore how ridge capture may resolve apparent discrepancies between the Hawaiian-Emperor chain and other hotspots of the Pacific Ocean basin.