PARANÁ-TRISTÃO DA CUNHA SYSTEM: PLUME MOBILITY AND PETROGENETIC IMPLICATIONS

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The high- and low-Ti flood tholeiites of the Paraná Magmatic Province (PMP) are generally related to the Tristan da Cunha plume (TC), which gave rise to the volcanic chains of the Rio Grande Rise (RGR) and Walvis Ridge (WR). Paleogeographic reconstructions of the Paraná-TC system presented so far, assume the TC hotspot as a fixed point in the mantle. Based on this hypothesis paleomagnetic data demonstrate that TC would be located well south (~1000km) of PMP. Therefore, plume mobility is required in order to maintain the PMP-TC relationship. Assuming that TC was located at the northern portion of PMP (~20 degrees from the present TC position), the plume migrated southward from 133 (main volcanic phase) to 80 Ma at a rate of about 40 mm/yr. From 80 Ma to Present the plume remained virtually fixed leaving a track compatible with the African plate movement. WR and RGR are characterized by high- and low-Ti tholeiites as those from PMP. In general geochemical and Sr-Nd-Pb isotope data do not support that the tholeiites from WR, RGR and PMP can result from mixing dominated by TC plume and MORB components. The similarity among the high-Ti basalts from RGR, part of WR (525A) and the Paraná suggests that delaminated subcontinental lithospheric mantle has to be considered in the genesis of WR and RGR tholeiites.