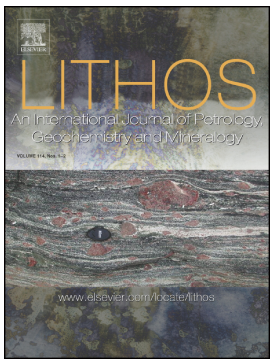

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Coexistence of alkaline-carbonatite complexes and high-MgO CFB in the Paranà-Etendeka province: Insights on plume-lithosphere interactions in the Gondwana realm

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Abstract

A careful review of petrological and geochemical data on the Paranà-Etendeka igneous province is reported, with particular attention being devoted to the relationships between high-MgO CFB (tholeiitic basalts-picrites) and nearly coeval alkaline-carbonatite complexes linked to the same extensional tectonics on a regional scale. At 135-130 Ma, the tectonomagmatic activity was focused in Etendeka, the centre of the restored province, and characterised by an exclusive occurrence of the hottest and deepest high-MgO CFB (potential temperature T_p up to 1590°C and pressure up to 5 GPa) possessing the same Sr-Nd-Pb isotopic composition of the "Gough" geochemical component, a marker of the initial Tristan plume activity. Etendeka high-MgO CFB thus represent the most genuine proxies of sublithospheric melts generated at the plume axis and are relatively unaffected by lithospheric contamination. Nearly coeval (133-128 Ma) alkaline-carbonatite complexes cluster around the extensional structures of the Ponta Grossa Arch (e.g., Jacupiranga and Juquia in Brazil) and the Damara Belt (e.g., Erongo, Okurusu, Okenyenya and Paresis in Namibia), both of which intersect the early track of the south Atlantic opening. Compared to high-MgO CFB, alkaline magmas display distinctive isotopic signatures and an incompatible element distribution consistent