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Kevin Burke¹ (1) University of Houston, Houston, TX

From Earth's Core to the Industrial Ecosystem in Africa

No chilling subducted slabs have penetrated the mantle under Africa for the past 200 My. Heat has been extracted from the hot deep mantle in plumes which have generated large igneous provinces (LIPs): e.g. Karroo, Parana, CAMP and Afar. New plate boundaries formed around Africa after LIPs erupted. The Karroo and Afar plumes temporarily arrested plate motion leading to the establishment of shallow-mantle convection that generated basins, swells, rifts and intra-plate magmatism. Erosion of sediments from the swells into rifts and rifted-margins led to deposition of source and reservoir rocks. Source rocks related to the Karroo plate-pinning episode (183-133 Ma) and its aftermath (133-30 Ma) are now producing oil and gas (e.g. in Angola and the Niger delta) because of burial under thick sediments eroded from swells formed in the, more recent, Afar plate-pinning episode (30-0 Ma). Climatic variations in the past 34 Ma, dominated by polar ice-sheets and their volume changes, have led to the high regions of S. and E. Africa becoming drier. In S. and E. Africa less erosion from dry areas has led to less offshore deposition, less source rock burial and (?) less oil. In Africa links from the core, mantle, lithosphere, atmosphere, hydrosphere, biosphere to the industrial ecosystem are thus discernable.