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New Petroleum Exploration Concepts Related to the Davie Fracture Zone, Offshore East Africa

The Davie Fracture Zone extends from the Kenyan shelf southward to the Madagascar Plateau, a distance of more than 2500km. This prominent feature has had a multifold impact on sedimentation and structural development of the region and, in particular, the Rovuma, Morondava and Zambezi Delta basins, from Bajocian (onset of drift) to Tertiary. The Davie Fracture Zone represented the transform plate margin during the Bajocian to Aptian separation of the Madagascar-India-Antarctica plate from Africa. The pulses of right-lateral movement were associated with various degrees of transpression, transtension, uplift and erosion. This activity continued in stages until the Paleogene, probably related to the India-Seychelles plate drift phase. As result, several significant petroleum concepts concentrated along the Davie Fracture Zone stand out: Major traps formed proximal to basin centers. Barriers to circulation developed, which enhanced basinal oil-prone source rock creation. Erosional episodes provided local reservoir quality deposits, accessible to down-dip source rock.