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East Africa And Western India: Passive Margins from The Evolution of a Complex Ocean

Interpretations of onshore regional aeromagnetic data and the topography of the ocean floor have been used to build a refined global tectonic model for the complex evolution of the western Indian Ocean, summarized in animation on website <http://kartoweb.itc.nl/gondwana>. Several lines of evidence have been used to support a 'tight' initial configuration of the Precambrian fragments of Africa, Madagascar, India, Sri Lanka and Antarctica that was stable during the Lower Paleozoic. Long-lived rifting in Karoo times played little further part (south of Kenya) once ocean creation started in the middle Jurassic with dextral transtension between East and West Gondwana. Clockwise 'unwinding' of continental fragments from around the Congo craton of equatorial Africa - at the core of a growing African Plate - characterize all subsequent movements, with the exception of India's U-turn and rapid northward movement from ~89 Ma. The Seychelles and the Mascarene fragments were trapped between two opposing spreading axes as this northward movement started. Ridge reorganization left the Mascarene Basin as a failed ocean at K-T boundary times and signaled the first of several ridge reorganizations in the ocean between the Seychelles and India. Collision of India with Asia, westward ridge propagation between Africa and Arabia and the initiation of the East African Rift subsequently ensured that the East African margin has not remained truly passive. Some of the above regime changes may be linked via the West and Central African rift system with events in the South Atlantic and all of them have left their mark in the sedimentary columns around the African coast and in its rifted interior.