



Complex Stratigraphic Evolution of the Red Sea

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The Red Sea rift, separates the African and the Arabian continents, and is considered a type location of a juvenile rift-related small ocean. Geological studies and drilling programs date back to more than half a century yet very little is known about the stratigraphic evolution to the wider geological community. Following the arrival of the Afar plume at the late Oligocene (ca 30 Ma) the southern Red Sea underwent rapid extension culminating in extended continental crust or seafloor spreading, which stalled during the early Miocene at the central Red Sea due to either slowing of the convergence between Arabia and Eurasia or the onset of the Arabian plate passive margin collision with Eurasia. The mainland pan of the region was uplifted, resulting in the development of the Red Sea erosional escarpment. Shelf sedimentation (Middle-late Miocene to Pleistocene successions) then ensued and covered oceanic and continental crust. The present day spreading centre resumed in the southern Red Sea at 5 Ma and has been propagating northward until the present-day. However, detailed analysis of the basin shows a more complex pattern of basin development with late Oligocene succession restricted to the western Red Sea coast and the southern sectors. Well data suggest that up to 4 km of sediments exist in the southern Red Sea shallowing upward to the northern sector; 3 km or more of this section consists of Miocene evaporates, which contains intercalated anhydrite and shale horizons. These Miocene evaporates are overlain by Quaternary reefal limestone, and recent volcanic rocks restricted to the central axial trough zone of the Red Sea. In this study extensive well data that is well spread in the area was used to evaluate the stratigraphic architecture, build-ups, and local controls on deposition. Potential stratigraphic models have been developed. The distribution of stratigraphy in the Red Sea area yields complex correlation, with unique depositional characteristics in discrete zones within the Red Sea basin.