

EA02

Tectonic History and Structural Evolution of the East Africa Margin

S.T. Sutton (ExxonMobil International Ltd), P.H Figueredo* (ExxonMobil Upstream Research Company), M.A Sullivan (ExxonMobil International Ltd), C. Johnson (ExxonMobil International LTD), G. Karner (ExxonMobil International)

Summary

Understanding petroleum systems within a complex region such as East Africa requires an approach that focuses on identifying controls on distribution of hydrocarbon systems, reservoir and seal, and trap history. We have defined several genetic tectono-stratigraphic domains across the East Africa offshore margin that share key hydrocarbon system characteristics whilst at the same time reflecting important spatial and temporal margin trends.

East Africa's margin history records rifting, continental break-up and long-lived structural reactivation and rejuvenation due to far-field tectonic stresses. Continental rifted margins in the north (Somalia to Northern Mozambique) are characterized by hyper-extension and/or mantle exhumation. In contrast, magma-rich margins developed in the south between Southern Mozambique and Zululand, were influenced by the long-lived Karoo hot spot track.

The varied tectonic history observed along the margin will be discussed utilizing a series of geo-seismic transects from northern South Africa to Somalia. These will illustrate the influence that genetic margin character has on the potential for source rock deposition, reservoir and seal development, trapping styles and hydrocarbon retention.

Figure 1 East African crustal types and tectonic domains. Topography data provided courtesy of Getech.

Callovian (165 Ma.)

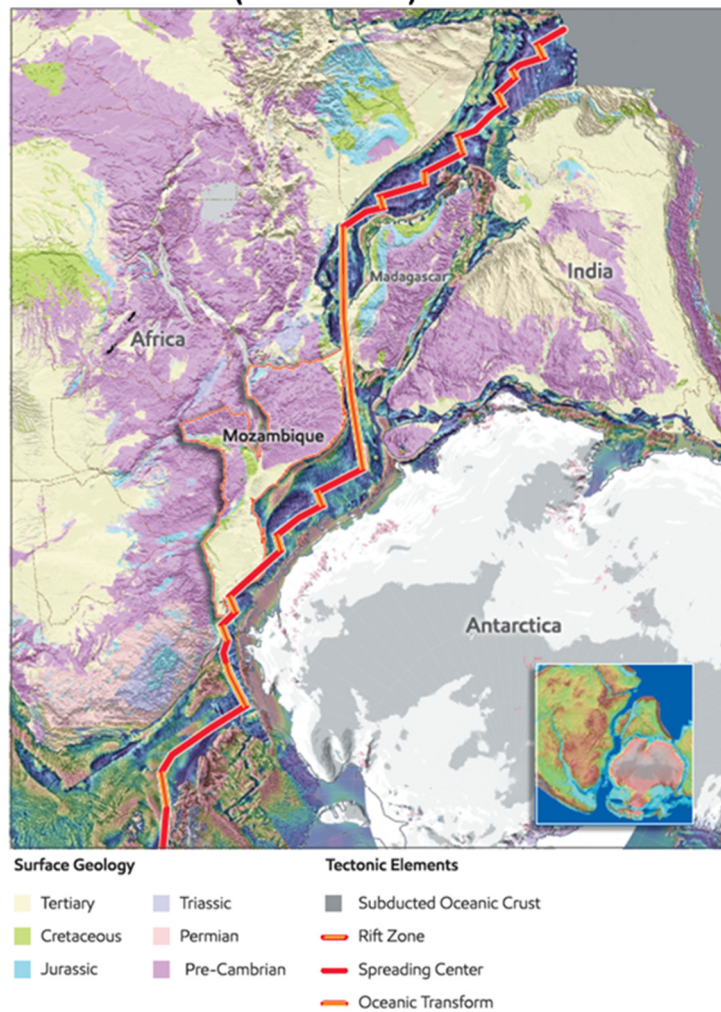


Plate Reconstruction Model from ExxonMobil URC/Global Tectonics.
 Gravity Data from Sandwell et al. Towards 1mGal Global Marine Gravity from Cryosat-2, Envisat & Jason-1, The Leading Edge 2013.
 Digital Surface Geology from Geologic Data Systems, 2003-2005; Digital Representation of the Geologic Map of Africa.
 Inset Map: Topography / bathymetry taken from Getech's global Digital Elevation Model.

Figure 2 Callovian plate tectonic reconstruction of East Gondwana. Surface geology data licensed by Geologic Data Systems.