# Structural Restoration of the Rovuma Basin to Analyse the Tectonic History and the Implications for the Petroleum Systems

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## Abstract

The Rovuma Basin in north Mozambique is proven to be one of the most exciting global exploration successes of the last decade. Numerous large gas fields have been discovered and the combined total estimated potential is believed to exceed 180 tcf of natural gas. The remaining question is how the hydrocarbon prospectivity extends to the south and to the east into the ultra-deep water. This study will extend the existing understanding using structural restoration.

The Rovuma Basin has a complex tectonic history. The sedimentary basins along the East African margin formed by the break-up of Gondwana during the Triassic (Salman et al., 1995). Prior to this time there was east-west stretching between west and east Gondwana (Reeves et al., 2000), that might have formed shallow water basins in which good quality source rock sediments were potentially deposited. During the Gondwana break-up the Davie Fracture Zone (DFZ) developed in the Rovuma Basin as a result of the dextral strike-slip along which Madagascar moved south to reach its present day position during the Aptian (Rabinowitz et al., 2006). From the Mid Cretaceous onwards the Rovuma Basin is affected by numerous periods of tectonic reactivation, causing fault inversion and extensive volcanic activity. As a result the Davie Ridge formed, which is a series of intermittent sea mounts that rise as much as 2200 m above regional seafloor depths. Around Middle Miocene the Kerimbas Graben formed in the Rovuma Basin, cutting into Tertiary sediments in a north-south orientation. This graben is believed to form the southern extension of the eastern branch of the East Africa Rift system. In the near shore Rovuma Basin the Mocimboa and Palma fold-and-thrust belts formed as a result of sediment loading and regional tilting during the Cenozoic.

Broadband seismic data acquired in 2013 is available in the Rovuma Basin. Six megasequences and the major faults are interpreted on this data and other available reprocessed and legacy seismic data. This interpretation, combined with our current understanding of the paleotectonic setting, is used to make a structural restoration of transects through the Rovuma Basin. The results of this structural restoration are correlated with the understanding of the petroleum systems in the Rovuma Basin. This enables us to better understand the relative timing of the petroleum system elements and to draw conclusions on the continuation of the Rovuma hydrocarbon prospectivity away from the current discoveries.