Introduction to the thematic set: Tectonics and petroleum systems of East Africa – Part II

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This text provides a short overview of three further papers published on the theme ‘tectonics and petroleum systems of East Africa’, following the four previous papers published in the February 2018 issue of Petroleum Geoscience. Part I of this thematic set concentrated on the regional tectonics of the region, while Part II includes more basin and regional specific papers on offshore Somalia (Davidson et al.), offshore Tanzania (Sansom) and offshore Mozambique (Butt & Gould). Further papers on the region are still being processed and all will be eventually combined into an online thematic set.

The three papers published here span in turn the spectrum between a broad regional paper on an exploration frontier, learnings from recent exploration drilling and the expansion of our understanding of known petroleum systems (Fig. 1). Somalia is undoubtedly the least explored and understood country in East Africa. Davidson et al. presents some recent offshore seismic and details many new features, including a large collapsed delta system in offshore south Somalia and an attractive Jurassic carbonate play on the mid-Somalia High. All such features are yet to be drilled.

Fig. 1. Location of papers published in this second edition of East Africa papers concentrating on the offshore and some of the issues labelled. Orange hashed areas are the offshore basins discussed in Part II. Other basins are yellow = tertiary rifts, green = Cretaceous rifts, blue = Permian and Jurassic rifts. Dashed lines shows various interpretations of the Continent–Ocean Boundary of East Africa, derived from the papers in the February 2018 compilation. For further discussions, see the original introduction paper (Macgregor et al. 2018).
Sansom moves us to offshore Tanzania, in the first ever published paper covering aspects of a recent burst of exploration and gas discoveries in that region. She concentrates on the effects of contourite currents on both Cretaceous and Tertiary reservoirs, again a first in terms of a published paper in this region, though ENI have presented several talks on this subject on their giant fields in the Rovuma Basin. While Sansom concludes that the systems she describes are hybrids, with the contourite currents modifying the depositional geometries of turbidites, it is clear that many companies are now exploring for stratigraphic geometries created by the contourites themselves, particularly in central and southern Mozambique, where these currents appear to be stronger. Butt & Gould expand our knowledge further south of a petroleum system in central Mozambique. To the authors’ knowledge, despite the hundreds of Tcfs of gas now established in that country, no interval that could reasonably be described as a ‘source rock’ has ever been encountered, making the building of charge models for new plays difficult. Butt & Gould take a deductive approach through 3D modelling to the charge systems in the Zambezi and Pande-Temane areas, testing for the products generated from a number of postulated source rocks and conclude that the model of highest probability is generation from an Aptian source rock. Their work has important ramifications for the risking of plays in the largely undrilled Zambezi depocentre.

As we said in our introduction to the first set of papers, there are still many tantalising aspects of East African petroleum geology yet to document, of which the influence of contourites is a specific example. These papers represent another small step in this process of documenting this new major petroleum province and we look forward to further contributions on the region, both in Petroleum Geoscience and elsewhere.

References