Offshore Somalia: The last frontier for exploration in East Africa

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Introduction

With the announcement from the Turkish Petroleum Corporation (TPAO) that they have spud the Curad-1 well in April this year (2026) (figure 1) and additional prospects in nearby license blocks waiting to be drilled, Somalia is beginning a new chapter in exploration.

With only 2 offshore wells, the most recent being the Meregh-1 drilled over 40 years ago in 41m water depth and with the deepwater area yet to be tested, offshore Somalia is a frontier basin with significant potential.

As with all frontier and emerging basins, understanding petroleum system elements and predicting play fairways is an important part of the exploration workflow. These elements remain untested in the deepwater area offshore Somalia. However, despite the lack of offshore well data, an extensive 2D seismic database and onshore wells provide valuable insights into reservoir, source intervals and traps.

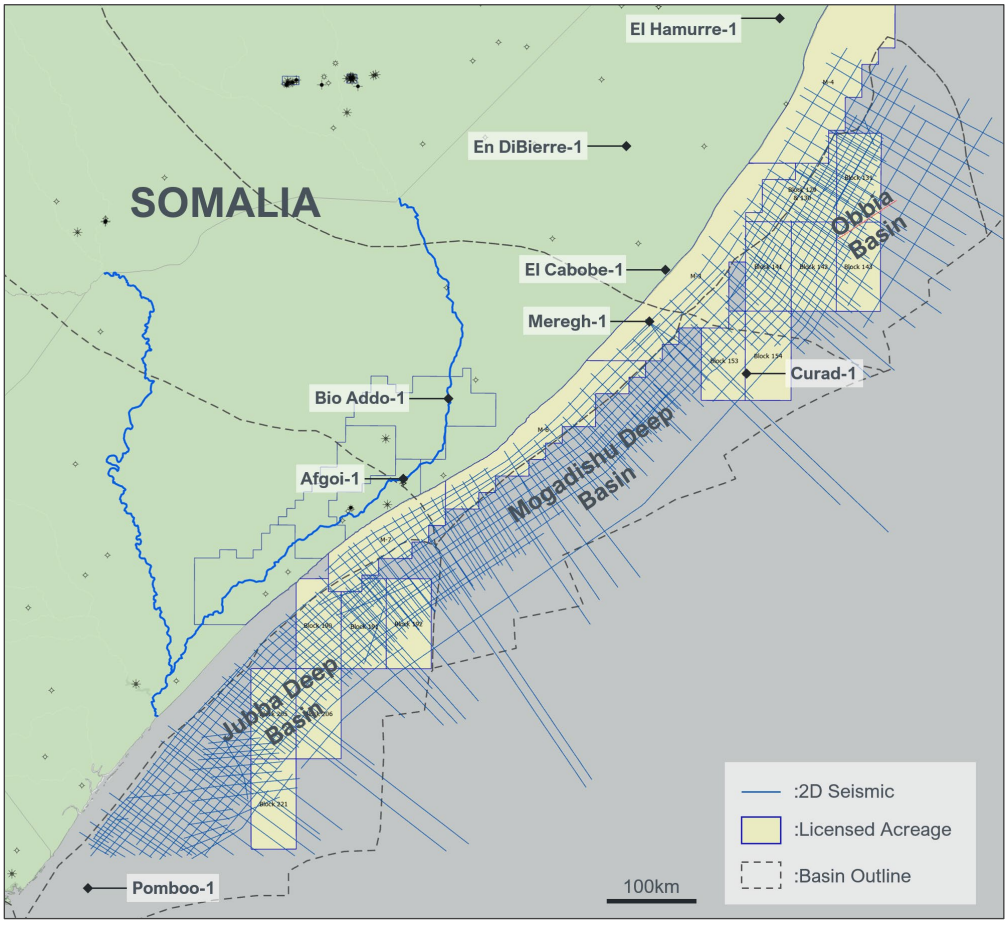


Figure 1: Basin extent and licensed acreage offshore Somalia with the spudded Curad-1 well highlighted along with other key wells in the area.

Offshore Exploration Potential

The oblique rifting of Madagascar from Somalia in the Early Jurassic generated a series of basins characterised by transpressional structures.

The Obbia Basin to the north is characterised by Jurassic tilted fault blocks topped by carbonate reefs and shoals, evident on seismic data (figure 2). The Cretaceous interval is thinner here compared to the Mogadishu and Jubba Deep Basins. This is due to inversion in the Mid-Cretaceous which formed the Mid-Somalia High, separating Obbia from the Mogadishu and Jubba Basins to the south. The uplift and inversion have made the Jurassic carbonates the main target for exploration in this basin, believed to be sourced by the Early-Mid Jurassic syn-rift sediments which extend the length of the conjugate margin.

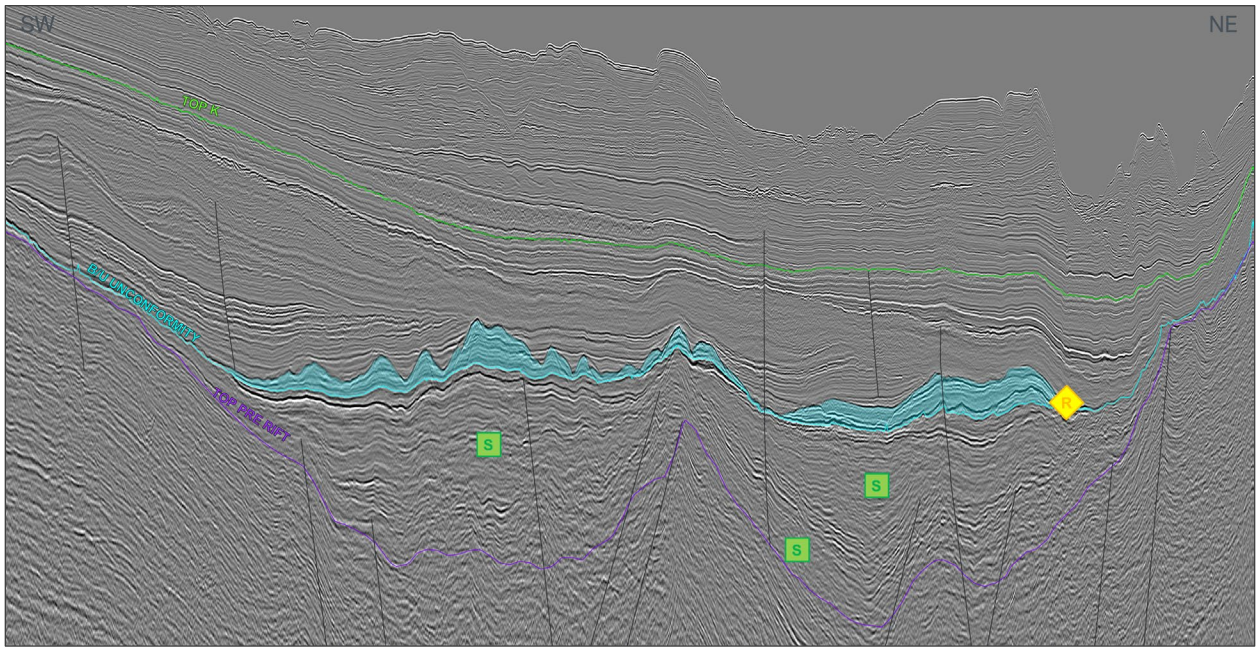


Figure 2: Obbia Basin Jurassic carbonate reservoir intervals (interpreted in blue) with underlying Jurassic marine shale source units.

The Mogadishu Deep Basin has thick Mesozoic and Tertiary clastic sequences having undergone significantly less inversion than the Obbia Basin. Structural and stratigraphic traps form from clastic drapes over structural highs and flower structures as well as turbidite fans that pinchout against the basin slope. Extensive sediment waves and contourites are seen on the seismic.

Jubba Deep Basin has a thick Late Cretaceous–Early Tertiary deltaic section deformed by major gravitational collapses in the Paleocene-age Kismaayo Thrust Belt (KTB) and the Pliocene-age Baraawe Thrust Belt (BTB). The KTB deltaic and pro-delta sands are trapped in thrust anticlines, formed by compressional toe-thrust faults that detach on the Cretaceous shale interval (figure 3).

The Cretaceous sands are also a potential reservoir target within the Jubba Deep Basin, which were encountered by the Pomboo-1 well, less than 10km south across the border offshore Kenya and recorded reservoir quality sands.

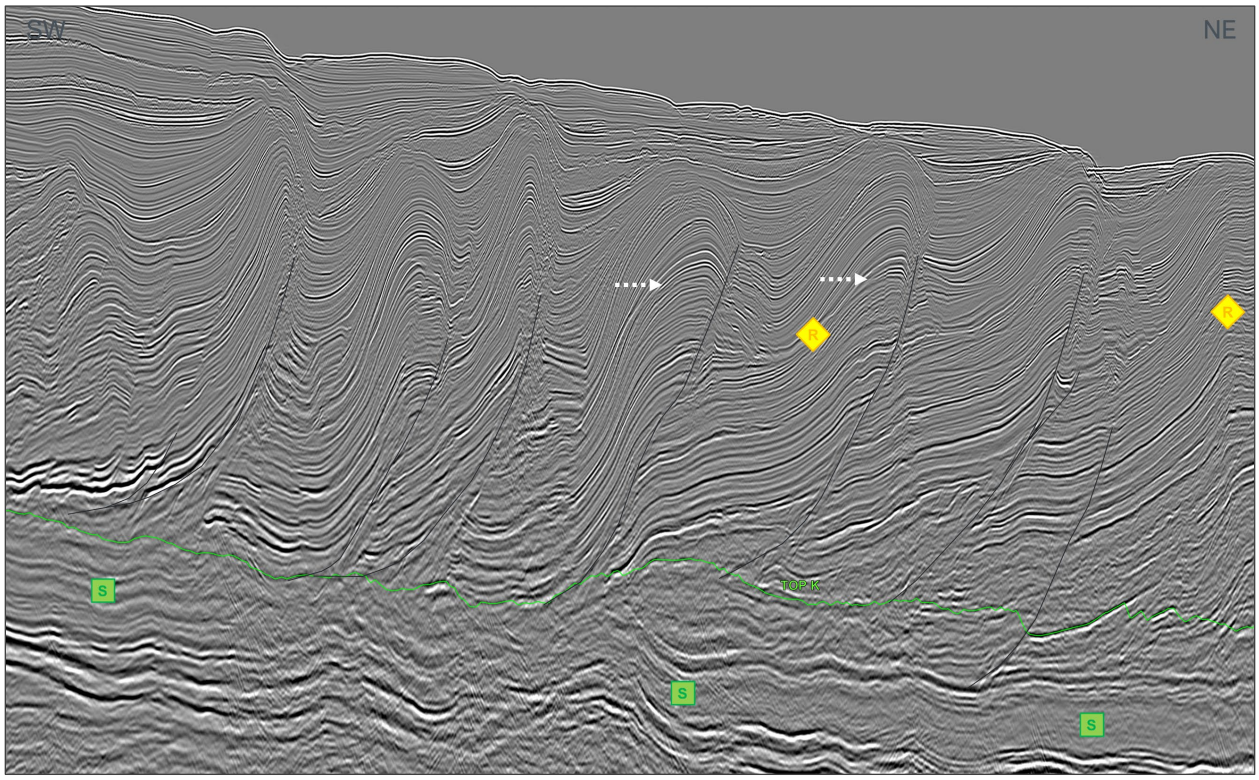


Figure 3: Kismaayo Thrust Belt in the Jubba Deep Basin, detaching on Cretaceous shale (green horizon) forming anticlinal traps with flat spots within the anticlinal structures.

The deltas in the Jubba Deep Basin generate a thick sedimentary sequence, potentially providing sufficient overburden to put the Cretaceous shale within the hydrocarbon generation window.

Key source intervals for the offshore are believed to exist in the Early Jurassic, Early Cretaceous and Late Cretaceous. The lack of offshore wells means source intervals and effectiveness are an unknown, however onshore wells provide valuable insight into the offshore potential (figure 1).

The Jurassic Lower Meregh and Adigrat Fm, encountered in the El Cabobe-1 onshore well, have good hydrocarbon potential. Gas has likely been produced from liquid hydrocarbons, evidenced by the occurrence of pyrobitumen in the Lower Hamanlei and Adigrat formations. Total organic carbon (TOC) values in these two formations show values up to 13%. (Harms et al, 1989). Depending on the overburden and burial history, gas or liquid hydrocarbons could be expected in the offshore area.

The best occurrences of the Cretaceous - Paleocene Jesomma source rocks are seen within the En DiBirre-1, El Hamurre and Afgoi-3 onshore wells, where TOC reaches 4% and almost 300 HI. This is likely to be mature in the Jubba Deep Basin, where the sedimentary column is thickest due to Cretaceous and Tertiary delta systems infilling the basin.

While these figures are encouraging indications, and the onshore wells confirm the presence of source intervals, higher HI and TOCs can be expected further offshore in deeper water settings. Here the anoxic environment would support deposition of richer source rocks due to restricted marine conditions during rifting of Madagascar from Somalia.

Conclusions

Offshore Somalia presents one of the last frontier exploration areas in East Africa. Whilst the unknowns surrounding petroleum systems elements present some exploration risk, the potential is great. This is demonstrated through the diverse range of structures and stratigraphic features that have evolved across the margin, with each basin containing plays that differ from its neighbour, providing an abundance of diverse exploration targets.

While only one element of a broader exploration effort, the TPAO well is expected to provide valuable insights into the deepwater petroleum system and support the continued assessment of multiple exploration plays across the basin.

References

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