Source Rocks of Somalia – An Attempt at De-Risking a Critical Play Element

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ABSTRACT

In total, some 60 wells have been drilled onshore and less than 10 offshore Somalia. Several prospective basins remain undrilled, essentially in the offshore and specifically in the undrilled deep water, but also onshore. In view of the gas discoveries offshore Mozambique and Tanzania, and also of encouraging results offshore Kenya (sub-commercial oil discovery at Sunbird-1) and in Madagascar, the Somalian offshore and onshore basins were re-evaluated. We establish an inventory of proven and possible source rock occurrences in Somalia by integrating publicly available data on slicks and seeps, geological and gravity maps, literature data, well data and geological information from adjoining basins as well as, where accessible, seismic information. The extension of the Yemeni Jurassic and Cretaceous rifts into Somalia highlights the possible prospectivity in Somalia. Seeps abound (Odewayne and Nogal basins) and a number of wells encountered good shows. Late Jurassic and Upper Cretaceous marine shales are source rock candidates for these onshore seeps. Gas in the area of Mogadishu may be associated with the Early Triassic Karroo source rock. Seeps in western Somalia are rare, and may result either from long-distance migration out of the Calub Graben in Ethiopia or from locally mature Lower (or Upper?) Jurassic sources. Our data indicates that in the Somali part of the Gulf of Aden, high heat-flow may critically affect the Late Jurassic source rock. However, Late Cretaceous or even Eocene sources may be locally oil-mature. The presence of source rocks on the Somali Indian Ocean margin remains presently speculative. Abundance of slicks in the area south of Mogadishu are unlikely to relate to hydrocarbons. Of more interest are reported isolated slicks further to the north, in deeper waters of the Mogadishu and Mid-Somalia High Basins. These slicks may be related to Lower/Mid-Jurassic or Late Jurassic, or more likely to as yet unproven Late Cretaceous or Eocene sources. Analysis of onshore seeps in northern Somalia (Nogal, Daroor, Odewayne basins), integrated with seismic data, will allow to determine the origin of these oils and an assessment of the size of prospective kitchen areas. In the offshore, 3D-Basin-modelling will be required to determine which areas are prospective for gas or for oil.