

## 2. Barremian (“Kudu”) Play (Unproven)

### Overview:

The Barremian outer synrift graben stratigraphic play is located within the eastern depocenter of the northern Orange Basin (Fig 1). This play is interpreted to be similar to the Kudu gas field in Namibia. The Kudu gas field occurs in two reservoir horizons separated by a basalt. The lower horizon consists of anhydritic sandstone of eolian origin while the upper horizon comprises conglomeritic sandstone from shoreline facies. This system is likely to extend southwards into the South African portion of the Orange Basin.

The eastern depocenter in the Northern Orange Basin, effectively constitutes the outer synrift wedge and has not been intersected by any wells. Deep seated source rocks of Hauterivian age or older are postulated to be present within the deeper sections of this outer synrift wedge (Fig 3) as well as below the Aptian unconformity. Based on Kudu, reservoirs are postulated to be sealed up dip by faults and overlying shales. Trapping should be efficient on the flanks of the regional highs towards the east and west of the graben

Offshore South Africa, several high amplitude, continuous events are seen on seismic data, within the eastern depocenter which are excellent candidates for possible source rocks at various stratigraphic levels.

### Petroleum System Detail (Based on Kudu)

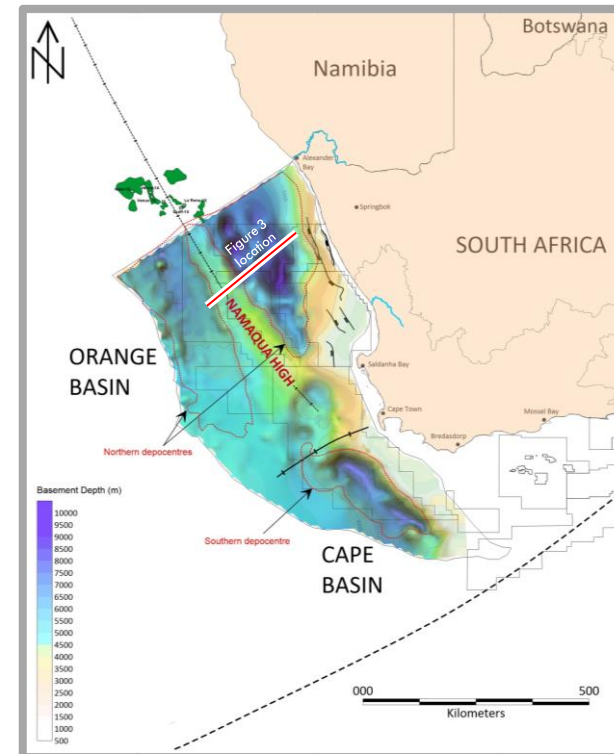
Of the two identified source intervals in the Kudu wells, the lowermost (Barremian) source interval is considered the primary contributor to the hydrocarbons in the Kudu reservoirs, which are also Barremian in age. Although the existence of an older downdip source cannot be entirely ruled out, the migration of hydrocarbons into the Barremian sandstone reservoirs of Kudu is evident. Notably, there is no evidence of pyro-bitumen residues in the reservoirs, indicating that the oil was not cracked in situ.

In this petroleum system, the source rocks exhibit wet gas to oil-prone characteristics. Oil generation likely commenced during the Campanian, transitioning to gas generation by the Oligocene. Expulsion and migration occurred after the sealing of structural-stratigraphic traps, a process concurrent with reservoir deposition in the Early Cretaceous. The oil and gas produced by the Aptian shales at Kudu are postulated to have migrated northwards, potentially being trapped in the Lüderitz Sub-basin. However, limited information is available about this system to provide a detailed description.

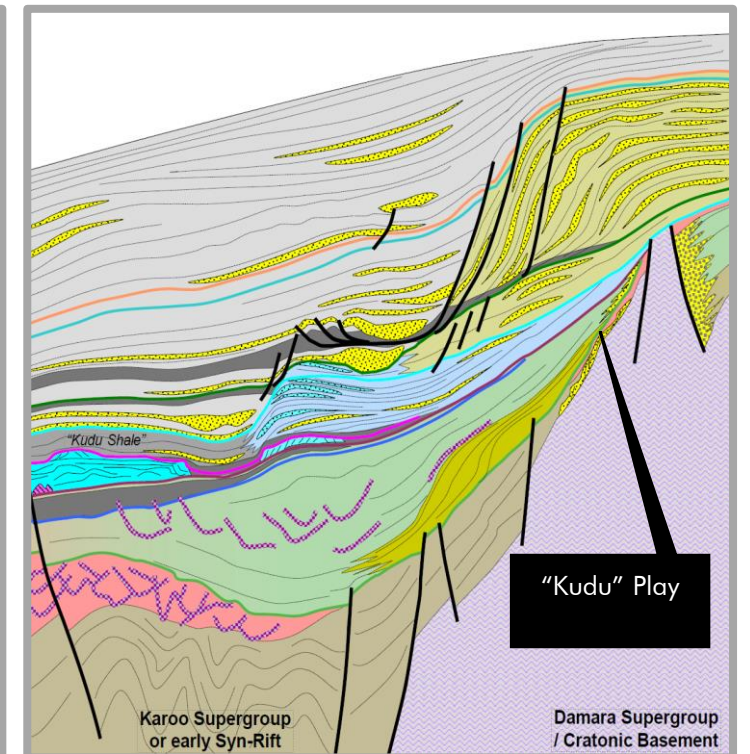
Traps in Kudu East are thought to have a combined stratigraphic and structural nature, featuring the pinching out of reservoir sands and a volcanic contact to the South. Furthermore, there are north-south faults present in the western part of the region.

### Exploration Opportunities

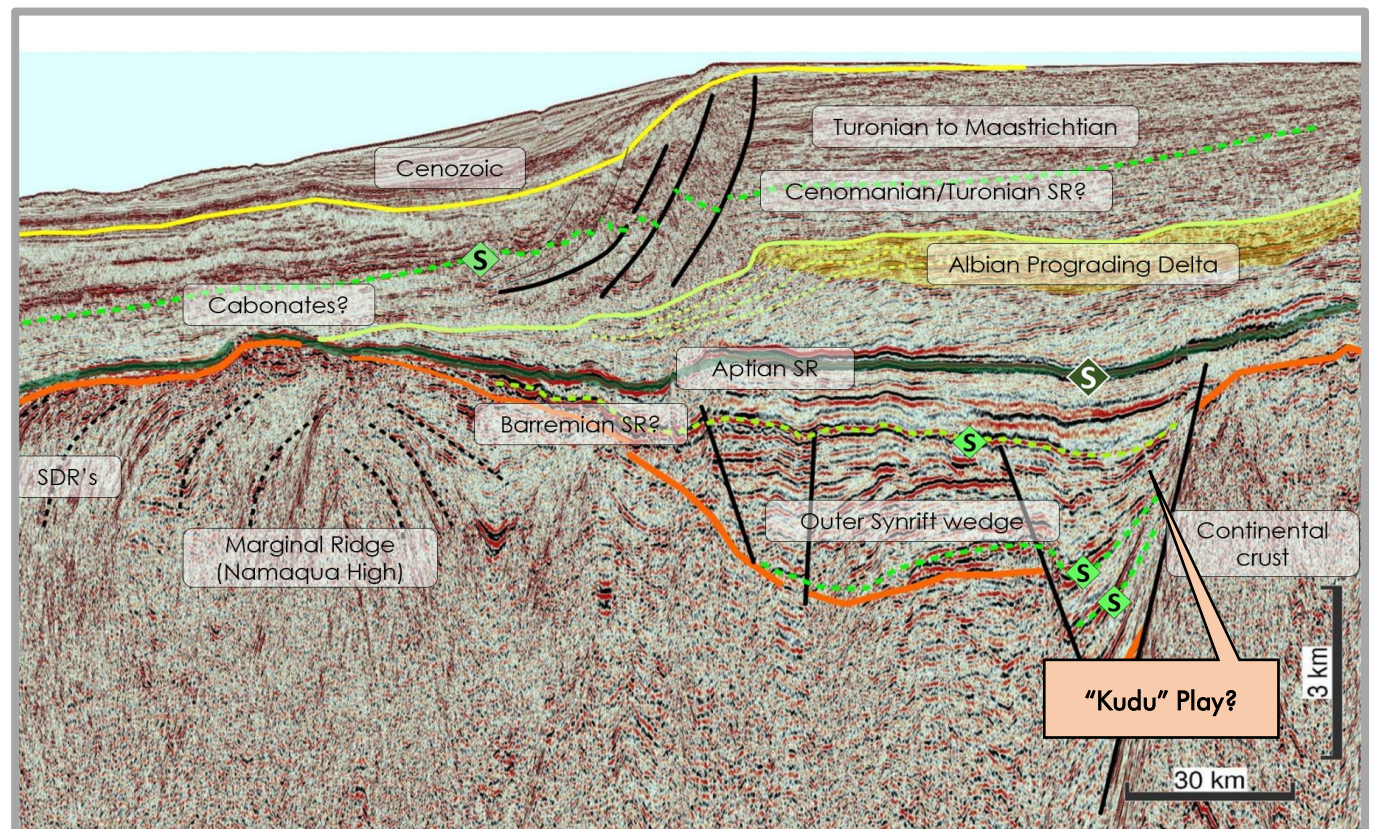
The outer synrift wedge play forms part of a 35 000 square kilometer eastern depocenter within relatively shallow water depths between 180m and 2100m below mean sea level. Seismic data indicate several high amplitude events as possible source intervals while reservoirs are postulated to be trapped up dip against faults and the flanking regional highs. This section in the Orange Basin remains undrilled but seems to be highly prospective from a seismic data perspective and based on what is seen in the Kudu wells to the north.



Orange Basin depth map, showing the location of the inner synrift grabens



Schematic cross section showing the Kudu play offshore Namibia



Orange Basin depth map, showing the location of the inner synrift grabens