



Areas 2 and 5 Mozambique; a tectonically active deep-water margin with scant adjacent shelf

Simon Ayers

United Kingdom (s.ayers@fugro.com)

Statoil ASA and partners are in the process of exploring these East African deep-water concessions which are located in the northern portion of the Mozambique margin. Fugro GeoConsulting have conducted a geohazard assessment of these areas using a dataset primarily consisting of 3D short-offset seismic data volumes, 2D seismic lines and limited core data.

The seafloor exhibits dramatic morphology and some unusual combinations of factors, such as deep water close to shore: the absence of an adjacent flat-lying shelf. Data within Area 2 extends to within 2 km of the coast at which point water depths are in the order of 350 m. Observations associated with the juxtaposition of deep water close to shore are:

- A great level of sediment bypass/erosion to water depths in excess of 1000 m;
- Avalanche type deposits in deep water;
- Strongly developed seafloor drainage patterns of some diversity which are interpreted to be active as they are not isolated from the coastline by flooded shelves (as is the case over much of the West African margin);
- Relatively high proportions of coarse sediment in deep water.

Areas 2 (close to shore) and 5 (offshore) are separated by a 30 km wide zone of pronounced subsidence. The most recent sediments within this area of subsidence have no resolvable stratigraphic equivalent anywhere else within the dataset and the zone still shows negative seafloor expression. Considering that this low-lying area seems to be accepting a great mass of sediments which have bypassed the slope to the west it seems feasible that this small basin is actively subsiding.

Beyond its significance as a recent depo-centre this zone of subsidence has totally overprinted the seafloor expression of a very major canyon. This canyon runs into the basin from the coast to the west (Area 2), is morphologically absent over the zone of subsidence then becomes a major seabed feature farther east within Area 5. This is an unusual situation where a conventional erosive canyon appears to be totally disconnected from a coastline or shelf break. At the present day the dislocated offshore expression of this canyon appears to be a simple elongated extension of the subsiding basin.

The region's patterns of mass-movement are somewhat atypical. Top-down failures of canyon flanks are commonplace but retrogressive slides are rare. This is probably due to a combination of low sedimentation rates on the slope, a high proportion of coarse sediments and the pronounced influence of tectonics. Faulting has segmented the shallow stratigraphy and introduced contrary dips and rough textures which compromise the facility for sediment transport across bedding planes; sedimentation on dipping surfaces cannot outstrip tectonic displacements to allow smooth continuous potential failure planes to develop.

2D exploration lines which extend west of the morphological complexity of Area 5 into a gently seaward dipping sequence show clear evidence of large scale retrogressive sliding.

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