

Reservoir Characterisation of Petroleum Reservoirs in Block 11B/12B Deepwater Southern Outeniqua Basin, South Africa

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Each geological characterisation needs a framework for comparison of the subsurface data set with the outcrop-based data set (Fugelli and Olsen, 2005) and because deep-water reservoirs tend to be highly variable in geometry, size and internal character, geometries derived from seismic mapping and attribute analysis alone commonly fail to give an adequate basis for a correct risk analysis of the reservoir. It is therefore critical that we understand key stratigraphic intervals and surfaces that bound deepwater systems and related elements. These intervals are better defined by integrating observations from 2D/3D seismic data; wireline logs biostratigraphic data, reservoir pressure data and outcrops. The Southern Outeniqua Basin, a deepwater extension of offshore half-grabens off the south coast of South Africa is a classic frontier basin. Latest interpretation of seismic data indicates the possibility of a gigantic basin floor fan complex (named “paddavissie”) with an upside potential of billions of barrels of oil (PASA, 2008)

A modus operandi is hereby proposed for the effective geological (reservoir) characterisation of the Southern Outeniqua Basin which not only entails seismic analyses and interpretation but also the integration of log analyses, palaeodata analyses, core analyses and outcrop study to strengthen the understanding and distribution of reservoirs in this frontier basin. Sequence stratigraphy gives a more holistic approach for effective characterisation of a frontier basin.

Composite log data, palaeodata, sediment provenance, as well as core of the nearby shallower Pletmos sub basin are analysed and results integrated for reservoir characterisation and determination of depositional environment of the depositional strata.

Outcrop study of analogue onshore extension of these offshore Mesozoic deposits is done to reveal more insight of the paleoenvironment, sediment provenance and the offshore reservoirs that extend deepwater. The Pletmos Basin is the offshore extension of these series of small basins onshore.

The integration of the analyzed data will go a long way in establishing sediment provenance and analysis of biostratigraphy of offshore wells, predict how much of the post rift reservoir sands have been deposited away from the basin margin into the deep marine (basin floor) as well as predicting their location, stratal geometries and distribution.