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Reservoir Potential using Seismic Attributes and Depositional Environment Analysis of the Eocene Succession Southern Rovuma Basin, Mozambique

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Summary

The study area is located in the southern Rovuma Basin, where there is only one well drilled, and the main problem seems to be whether there is reservoir potential. The drilled well encountered potential sands in two intervals, Eocene and Mid-Cretaceous (Late Albian). The focus of this study is the Eocene interval to reduce uncertainties and generate better understanding of reservoir distribution and geometry, using a combination of well data and seismic data analysis.

This study examined depositional environments and sand distribution in the Eocene of the southern Rovuma Basin using well data and seismic attributes. The succession was deposited in deep water by a major progradational event that occurred in the Tertiary because of a huge influx of sediments and shelf edge collapse that generated turbidity currents that transported shallow water sediments down slope.

Seismic amplitude data cannot fully delineate detailed stratigraphic or structural features, so it is important to consider a number of seismic attributes that can help to easily identify those features. Out of many available attributes, RMS, spectral decomposition, variance and coherence were selected because of their proven abilities to delineate stratigraphic, structural discontinuities and bed thickness. Seismic attributes were extracted from a conventional 3D Pre Stack Time-Migration seismic volume. Two main horizon slices were analyzed within the interval. Shallow slice Top Sand RMS and Variance better detect the sand distribution and the lateral continuity associated with the channels and depositional lobes, whereas the deeper slice Base Sand can be imaged more efficiently by using Spectral Decomposition, Coherence and Variance. Nevertheless, the channels are filled by mud. Channel widths vary from 800 m to 2.2 km. These channels are NW-SE oriented. Depositional environment analysis was carried out on the basis of seismic geomorphology supported by well log data. The study interval was divided into 4 units based on well logs and comprise proximal to distal fans.

Potential reservoir targets in this interval may be where there are high amplitudes, however, the presence of carbonate cement must be considered. Attributes effectively demonstrate lateral continuity and geomorphology of the channels.