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The Application of Sequence Stratigraphic Techniques in the Zambezi Delta Area, South Mozambique: Providing New Insights into Prospectivity and Basin Evolution

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Summary

A stratigraphic study of the Zambezi Delta area has been carried out, using sequence stratigraphy as a predictive tool, in order to re-evaluate the depositional and uplift history of the Mozambique Basin. The detailed stratigraphic framework which has been developed has aided the understanding of the chronostratigraphic evolution, reservoir distribution and palaeoshelf edge movement which in turn has improved the understanding of the petroleum system. The study has also supported recent work completed by ERCL on the origins of the Beira High

The Zambezi Delta is located in the Mozambique Basin and remains an attractive, underexplored target in the offshore areas. Future success within the Mozambique basins relies on the advanced understanding of uplift histories and basin evolution.

A re-evaluation of the Zambezi Delta's depositional history was conducted using sequence stratigraphy as a predictive tool to better understand the implications for the petroleum system and establish uplift histories.

Using the sequence stratigraphic techniques proposed by Miall et al. (2010) and Catuneanu et al. (2011), the main aims of this study are:

- Use reflector geometries, terminations and stacking patterns (aggradation-progradation and retrogradation) to identify key regional surfaces (SB, TS, MFS) and mega-sequence packages.
- To build a sequence stratigraphy model, using mega-sequence packages as a framework, to highlight the Zambezi Delta's depositional history; with focus on Cretaceous to Cenozoic delta development and sediment influx
- To use seismic sequence stratigraphy to aid the understanding of the Beira High's evolution.

A number of regional 2D composite profiles which extend onshore to offshore were interpreted. Integration of palaeontological, sedimentological and petrophysical data from released wells provided controls on age, lithology and depositional environments of mapped sequences.

- A total of 14 mega-sequences, separated by major erosional events have been identified. Systems tract and shoreline trajectory analysis has shown that the Cenozoic Zambezi Delta has an overall progradational trend, with some areas of aggradation linked to sediment fluxes and sea level rise. Shelf edge positioning was compared to palaeodrainage maps from Getech Group plc (2014) to further understand delta development, sediment supply and provenance.
- The depositional model has highlighted potential plays within the Zambezi Delta area. They are located in Cretaceous and Cenozoic aged sediments where high sedimentation rates have been predicted based on the sequence stratigraphy model.
- Research into the origin of the Beira High using sequence stratigraphic techniques has indicated that it has been potentially subjected to two periods of uplift. This has been used as input for basin modelling studies and the development of a new Crustal Model.

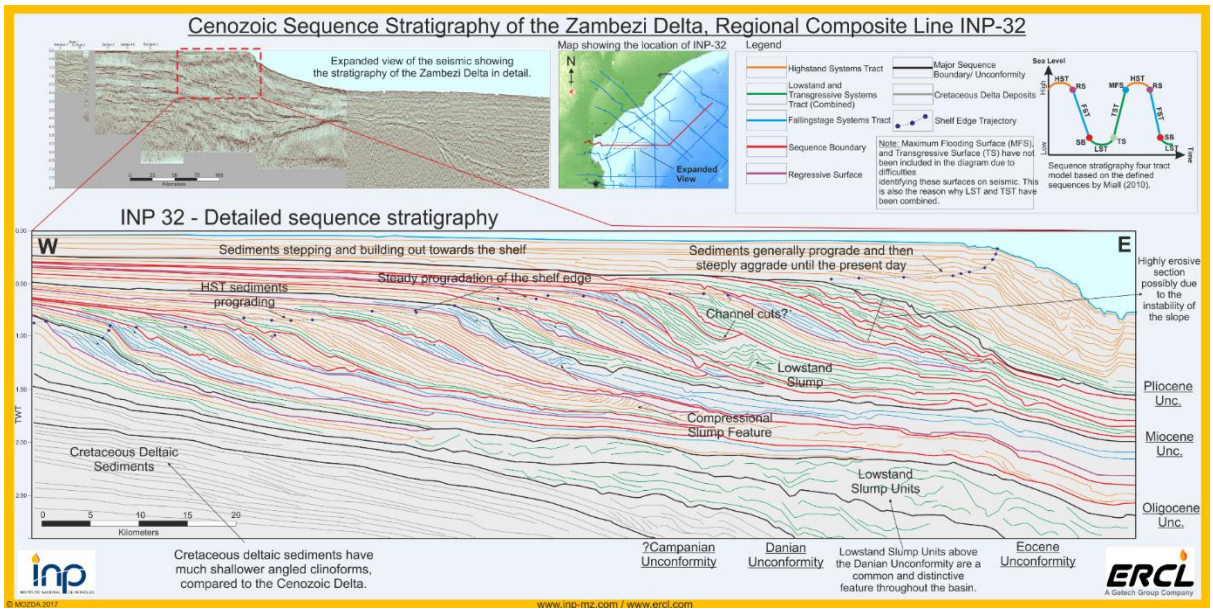

Figure 1 *Detailed sequence stratigraphy of the Cenozoic Zambezi Delta.*

Catuneanu, O., Galloway, W. E., Kendall, C., Miall, A. D., Posamentier, H. W., Strasser, A., Tucker, M. E. (2011) Sequence Stratigraphy: Methodology and Nomenclature. *Newsletters on Stratigraphy*, vol. 44/3, pp. 173-245.

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