Offshore East Africa Fan Chronostratigraphy from Wheeler-Transformed Seismic Data
ION GeoVentures East AfricaSPAN™

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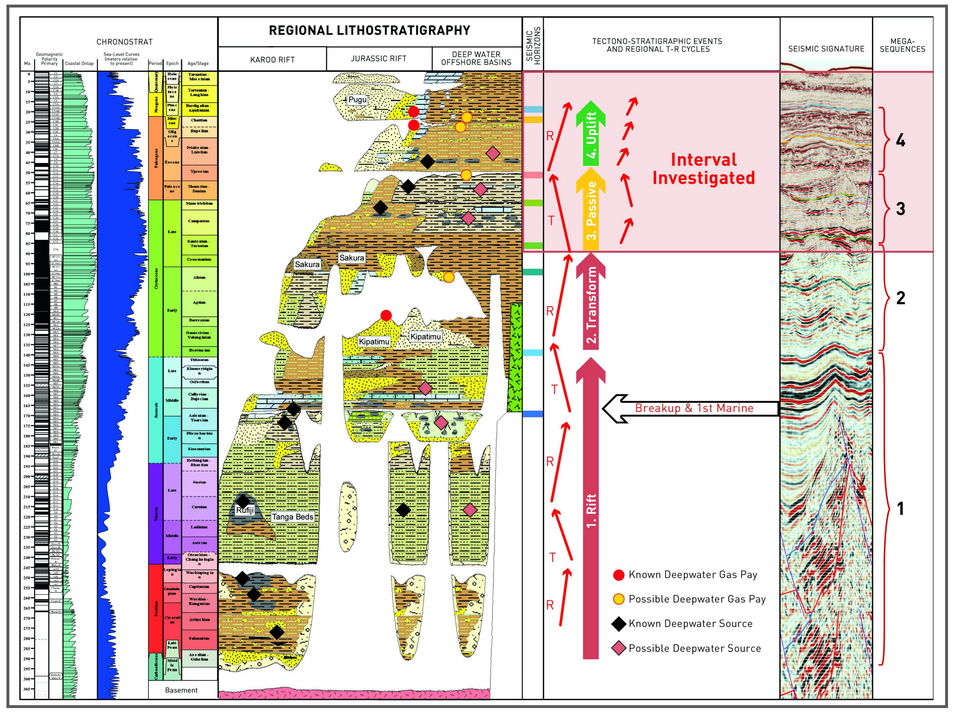
Abstract

Recent discoveries offshore Tanzania and Mozambique highlight East Africa as an emerging world-class petroleum province. Oil and gas estimates for this province total 12.5 BBO and 250 TCF of gas (Brownfield et al, 2012) as yet undiscovered. Play-opening reservoir systems have been verified in Paleocene, Eocene and at least two Oligocene deepwater submarine fan and intra-slope channel complexes (Law, 2011). Evidence continues to mount suggesting that the Late Cretaceous section contains deposits from similar depositional settings (TPDC, 2003). There are also indications that the petroleum system may contain oil as well as the established gas, and investigations are underway to determine if liquids are present in the deepwater areas.

Mapping the evolution of sedimentary systems through time is the key to understanding the distribution of these potentially extensive deep water reservoirs. We describe the initial phase of our work to delineate the stratigraphy at multiple scales, using a modified version of conventional deep water sequence stratigraphic interpretation concepts. Within the constraints of regionally interpreted mega-sequences, using dGB's OpendTect and SSIS software, we apply finely spaced horizon interpretation to ION GeoVentures' long-offset 2D BasinSPAN™ survey(s). We then extract Wheeler-transformed chronostratigraphy from the detailed horizon interpretation.

Results reveal a highly detailed regional and temporal distribution of deep water submarine fan complex deposits within mega-sequence scale regressive-transgressive successions. Further, application of this method suggests that mapping the internal seismic character of fan complexes reveals temporal and spatial variance in fan system character. Thus the mega-regional SPAN seismic surveys are sufficiently high-quality to effectively reconstruct detailed chronostratigraphy, map depositional systems tracts and refine play definition and prospectivity.

Tectono-stratigraphic Mega Sequences Reveal Long Term Basin Evolution:



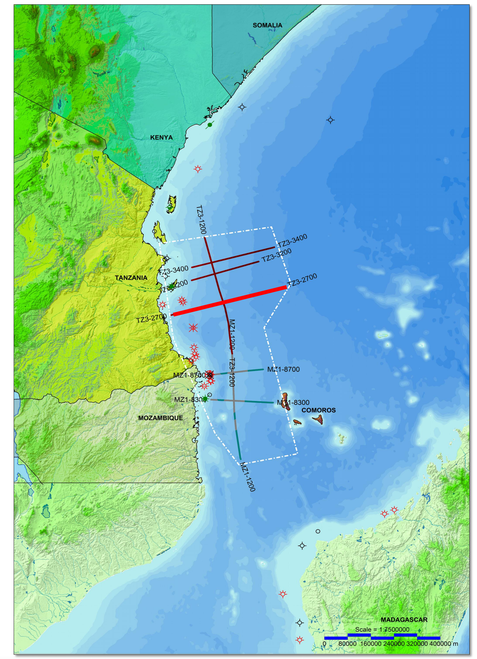
4. Uplift and Regression: Late Paleo/Eocene(?) to Recent – East Africa Uplift

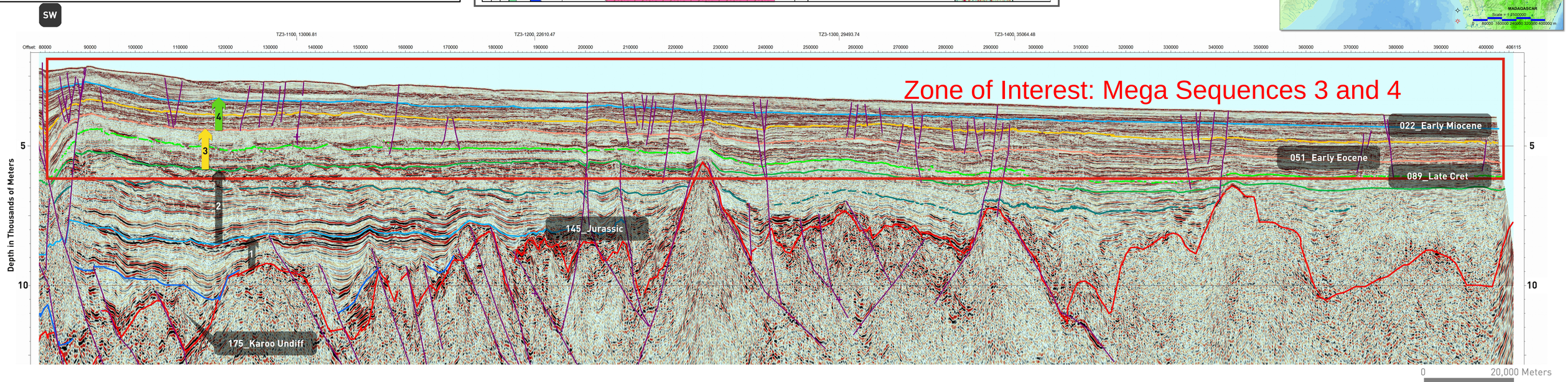
3. Passive Margin: Mid Cretaceous to Eocene (?) – T/R Cycles

2. Transform Margin: Mid / Late Jurassic to Mid Cretaceous – Seafloor Spreading

1. Syn-Rift: PermoTriassic to Early Jurassic Extension – Precursor to Breakup

Regional location map showing the 6 2D seismic surveys from ION's East AfricaSPAN™ used in this study. TZ3-2700 highlighted in red.





Regional PSDM seismic profile TZ-3 2700

Tanzania Deep Offshore Basin