



Seismo and sequence stratigraphy of Cenozoic units of the Morondava Basin, offshore western Madagascar

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The N-S trending Morondava Basin extends in width from western onshore Madagascar over about 350 km westwards to the offshore Davie Ridge in the Mozambique Channel. Although basin formation was initiated during Karoo times, the main basin evolution took place during Jurassic rifting and subsequent drifting until middle Cretaceous as a result of Gondwana breakup (Geiger et al., 2004). Contemporaneous to the separation of India and Madagascar widespread flood basalts were emplaced during the late Cretaceous (Storey et al., 1995). Present knowledge of the Morondava Basin is mainly based on outcrop studies, seismic surveys and borehole information (e.g. Geiger et al., 2004), gathered in western onshore Madagascar, although the vast majority of the basin, including its depocenter is located offshore in the Mozambique Channel, now at up to 3,500 m water depth. Almost all of the recent offshore studies of the Morondava Basin rely on industrial data but up to date publications of exploration results are generally rare and mostly anonymized.

Our study aims to extend knowledge, particularly on the offshore seismic and sequence stratigraphy of the Morondava Basin. A key question is also to test the proposed tectonic stability of the Davie Ridge over the last 40 Ma. For this purpose 12 seismic profiles and bathymetric data, acquired in early 2014 by RV SONNE, are interpreted. Most of the profiles cover the distal deep marine areas of the northern Morondava Basin between the Davie Ridge and the shelf break of Madagascar.

Top Cretaceous, Top Eocene, Top Oligocene, the Middle Miocene Unconformity and the Base Pliocene, are mapped as major seismic marker horizons. Especially shelf and slope sedimentary units are important resources to reconstruct the tectonostratigraphic basin evolution. At the continental slope diffuse to chaotic seismic pattern of Miocene and younger age are identified which are subdivided by laterally continuous, high frequency reflectors with a higher impedance contrast. Bounded by the Base Tertiary and the Base Pliocene these units can be used to develop and verify a sequence stratigraphic approach for the Cenozoic in the Morondava Basin. Preliminary results indicate that the major sedimentation at the continental slope moved after Early Pliocene significantly landwards. In general the thickness of post-Pliocene units increases to the east.

Work in progress encompasses the application of seismo and sequence stratigraphic concept for Mesozoic sedimentary units and a correlation with other, potentially time-equivalent, basins in the area, such as the Mandava Basin in northern Mozambique.

References

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