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Basin subsidence and Miocene/Pliocene sedimentary change in the Browse Basin, NW Australia

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The upper Miocene to Pliocene interval of the Browse Basin on the Australian North West Shelf (NWS) records a significant paleo-environmental change in its sedimentary record concerning the decay of middle to late Miocene tropical reefs. Seismic observations towards the Pliocene show a clear landward migration of carbonate build-ups in the eastern part of the basin, and very high subsidence rates seem to have outpaced most reef growth in distal shelf-edge positions. Nevertheless, the Scott Reef and the Seringapatam Reef were able to withstand shelf-edge drowning, which indicates a significant contribution of inversion-related uplift for reef survival. The contribution of basin subsidence as a driving factor for this reef decay and survival is still discussed and has not been studied in detail. This study provides an estimate for the laterally and through time changing late Miocene/Pliocene subsidence pattern. A 3D paleo-environmental reconstruction was generated by 3D quantitative backstripping, integrating 3D paleo-waterdepth information derived from seismic-based depositional system interpretation. The base of this analysis is a giant 2D and 3D seismic-reflection data set (>130.000 km²) integrated with borehole data (logs, cores, cuttings), new Sr-isotope dating, X-ray diffractometry (XRD) and microfacies analyses, supporting paleo-bathymetric correction and ties to global sea-level data. The seismic-reflection data is covering a study area extending over 130.000 km² and is supported by industry borehole data (logs, cores, and cuttings), SR-Isotope dating, X-Ray diffractometry (XRD) and microfacies analysis.