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NeoTethys Rifting on the Rocks! The Late Carboniferous Syn-Rift Phase blurred by Gondwanic Glaciation

During the Permo-Carboniferous, glaciations affected much of high-latitude Gondwana as highlighted by the widespread glaciogenic sediments that tend to form prolific petroleum systems from South America to the Arabian Peninsula and to Australia. On the Eastern Gondwana, the glaciation reached its maximum between the latest Carboniferous and the Early Permian coeval with the extensional phase culminating in the drifting of the Cimmerian terranes and the opening of the NeoTethys Ocean later during the Permian.

The Western Australian margin was affected by the early stage of this rifting, that propagated from east to west, and currently represents one of the few remaining sections of the Gondwanan margin with preserved structures linked to the NeoTethys rifting. In the Dampier Sub-basin (Northern Carnarvon Basin, NW Shelf of Australia), infraglacial deposits and subglacial moraine have been undoubtedly identified as the first syn-rift sediments. Due to the subglacial nature of the rifting, these deposits do not display classic syn-tectonic patterns and common criterions associated with the early stage of passive margin development. For this reason a precise timing for the initiation of the NeoTethys spreading has been a long-lasting controversial issue.

The interpretation of regional 2D seismic lines and seismic volumes integrated with subsidence analysis performed on the NW Shelf, allow to constrain plate tectonic reconstructions for the Late Paleozoic and Early Mesozoic and clearly indicate a Late Carboniferous initiation of the NeoTethys rifting affected by glacial conditions in the Eastern Gondwanan region.