

SEDIMENTOLOGY AND STRATIGRAPHIC EVOLUTION OF THE BARROW GROUP (NORTHERN CARNARVON BASIN, NWS, AUSTRALIA): IMPROVING GEOLOGICAL MODELS FOR MIXED-PROCESS SHALLOW-MARINE RESERVOIRS AND BASINWARD TURBIDITE DEPOSITS

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This project will aim to characterize the stratigraphic architecture and to improve the reservoir models of a mixed-processes delta-turbidite system (Barrow Group, Northern Carnarvon Basin, North West Shelf), which holds significant hydrocarbon reserves, by applying two novel approaches. (1) Semi-automated full-volume three-dimensional (3-D) seismic interpretation techniques will allow to interpret most of the open-file 3-D seismic data available in the study area to reconstruct the deltas reservoir geometries (and their evolution in time and space) at very high-resolution and over a large part of the basin. The 3-D seismic data will also be interpreted using seismic stratigraphic methods and seismic geomorphological principles to reconstruct the movement of ancient coastlines (and the associated hydrodynamic processes) that controlled the distribution of sandy sediments that ultimately formed the reservoirs. (2) A unified terminology (e.g. a process-based classification) will be applied to both 3-D seismic and core/log datasets within the reservoir intervals. Core logging and sedimentological analysis will be used to identify depositional environments, define key stratal surfaces and the stacking patterns in reservoir intervals. The seismic and core results will then be integrated to construct depositional/reservoir models and paleogeographical maps that summarize the lateral and vertical distribution as well as the connectivity of reservoir sands.

This project will ultimately lead to (1) understand the relationships (in time and space) between deltaic processes (wave, tides, fluvial) and basinward turbidite development; and (2) synthesize the impact of allogenic and autogenic controls on the observed architecture through time and evaluate their significance for reservoir development.