

Resolving Climatic and Tectonic Controls on Grant Group Deposition, Evidence from Sedimentological and Seismic Analysis

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The hydrocarbon-bearing Grant Group of the Canning Basin has been subject to several studies examining its depositional evolution. The aims of this study is to constrain existing models by adopting an integrated approach involving sedimentological and lithofacies analysis of Grant Group outcrops and subsurface cores, and 2-D seismic interpretation of surveys from the Barbwire Terrace, Fitzroy Trough and Lennard Shelf areas.

Facies analysis of cores from the Canning Basin reveal a glacially-influenced succession interpreted to record the retreat of an ice sheet, consistent with evidence for glaciation from outcrop that includes striated pavement. A common brecciated contact with Devonian dolomites is overlain by diamictite containing faceted, occasionally striated clasts, interbedded with turbiditic and glacial outwash sandstone and siltstone that suggests reworking in a sub-aqueous environment. This lower glacially influenced sequence is transgressed by a fossiliferous marine claystone and heterolithic facies interpreted to record sea-level rise during deglaciation.

This in turn is succeeded by regressive shallow marine facies, possibly recording isostatic uplift and subsequent rejuvenation of hinterland clastic source areas. A dominantly tectonic control on sedimentation is not consistent with observations from seismic data that indicate although syn-sedimentary faults are present, they are limited in extent and cannot be solely reconciled with Grant Group facies associations. This study forms part of a broader scale project investigating the regional evolution of the glaciogenic Grant Group, with important implications for future hydrocarbon exploration in the Canning Basin.