

## Sequence Stratigraphy of the Darai Limestone Megasequence in the Gulf of Papua

Technical presentation by Glenn Morgan (Geoscience Australia/CO2CRC)

The PESA ACT Branch hosted a technical presentation by Glenn Morgan (Geoscience Australia/CO2CRC) summarising work from his recently submitted PhD thesis; 'Sequence Stratigraphy and Structure of the Tertiary Limestones in the Gulf of Papua, Papua New Guinea.'

Glenn's presentation was watched with interest by all, with attendees discussing the potential prospects of petroleum exploration in offshore PNG over wine and cheese following the presentation.

The abstract from Glenn Morgan's presentation is below:

A sequence stratigraphic study was conducted on the Darai Limestone Megasequence in the foreland area of the Papuan Basin in Papua New Guinea. It enhanced the understanding

of the structure, depositional architecture, basin morphology, and petroleum potential of the limestone. The study integrated seismic, wireline log, well core and cuttings, strontium isotope age and biostratigraphic data.

Ten third-order sequences were delineated within the Darai Limestone Megasequence. Seven depositional facies were interpreted across these sequences, namely: shelf; backreef; reef; shoal; forereef; basinal; and submarine fan, facies. Each facies was differentiated according to seismic character and geometry, well core and cutting descriptions, and its position in the depositional framework of the sequence.

Deposition of the Darai Limestone Megasequence commenced during the Upper Oligocene in response to oblique rifting of the Omati Trough in a back-arc setting. Sedimentation was initially restricted to the

Omati Trough and comprised deep water shelfal limestones. Regional subsidence associated with the back-arc extension led to development of an extensive carbonate platform across the Gulf of Papua.

Carbonate reef growth commenced along palaeo-highs during the Lower Miocene and led to the establishment of a rimmed carbonate platform margin. The carbonate platform and reef margin kept pace with relative sea-level fluctuations until the Upper Miocene, when carbonate sedimentation was terminated by prograding clastic sediments from the uplifted northern parts of the Papuan Basin. New play fairways were identified within the Darai Limestone Megasequence. These are associated with slope and basin floor fan development, and stratigraphic traps in the Omati Trough.