

The application of new geophysical data to the study of the Capel-Faust basins – Lord Howe Rise

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Geoscience Australia is currently investigating the geology and petroleum prospectivity of the Remote Eastern Frontier region, offshore eastern Australia using funding provided to the organisation under the Australian Government's Offshore Energy Security Initiative. Given the frontier nature of the region and a lack of exploration wells, the acquisition of new datasets has been essential for a better understanding of the region. Two surveys (GA302 and GA2436) in the Capel and Faust basins (Lord Howe Rise) by Geoscience Australia in 2006-07 have acquired 2D seismic, gravity, magnetics and multibeam bathymetry data. Geoscience Australia's Remote Eastern Frontiers Project is currently interpreting and integrating these datasets to both better understand the petroleum prospectivity and improve the marine resource management of the region.

The Capel-Faust region has been interpreted in the past based on sparse regional seismic data as a lower-plate margin containing

two main rift basins. Survey GA302 seismic data has revealed the existence of numerous depocentres, some up to 120 km long and 40 km wide with a possible total sediment thickness of up to 5 km. The architecture of the depocentres varies between the two originally defined basins and this may represent a change in basement terrane, with changes also seen in seismic and potential field character.

The line spacing of Survey GA302 varies between 20–50 km, making structural and stratigraphic interpretation across and between depocentres challenging using seismic data alone. Integration of potential field data (acquired at a line spacing up to 3 km) has shown generally good correlation between the gravity data (gravity highs and lows) and the distribution of the major Cretaceous depocentres. Also, the high-resolution multibeam bathymetry (GA2436) shows correlation in places between the deep underlying basin structure and sea floor morphology. Both types of data enable further refined mapping of depocentre boundaries. Initial results and examples of these datasets are on display.

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