

Prospect Definition in the Papuan Foreland Using Airborne Gravity

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The Papuan Foreland is relatively under-explored compared to the Foldbelt and yet to realise its full petroleum potential. Permit PPL239 (3484km²) in front of the Papuan Frontal Thrust lies in a 'desirable address' between the Juha, Hides and Elevala gas condensate fields. Airborne gravity (including magnetics) offered a safe, simple and cheaper approach to assessing structure in PPL239 and high grading areas for seismic.

Acquisition of airborne potential field data in PPL239 was completed in early 2005 over the Mogulu and Honinabi structures, features identified largely on surface topography with minor structure on 1970's-vintage seismic. 1km spaced gravity lines with 500m spaced magnetics were acquired over a rectangular area 43km x 60km.

The gravity indicates the presence of a basement ridge to the SW section of the permit with a thickened volcanoclastic section NE of this ridge, separated by the Wasu Fault. Both a NE trending transfer fault and a NW trending growth fault directions are evident from the gravity data. Where the survey crosses the frontal thrust, the Cecilia Anticline appears as a gravity high, indicating the presence of an elongate, upthrust Darai Limestone block, consistent with outcrop. Profile modelling and 3-D inversion of the potential field data was used to confirm interpretations.

Both Mogulu and Honinabi are interpreted to be related to basement highs, which may also show some re-activation. Honinabi in particular shows a large gravity closure (>10km wide). Mogulu consists of several highs and is an expression of the Porgera Transfer Zone. Both structures have significant potential. Seismic is planned to be acquired across the features during 2006 to improve confidence in the mapping and the structure suggested by gravity.