

Developing carbonate depositional models in the eastern Papuan Basin and the impact on prospectivity

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Recent seismic and airborne gravity and magnetic data have been acquired by InterOil in its licences PPL237 and PPL238 over an extensive onshore area in the Eastern Papuan Basin in Papua New Guinea. The Elk Prospect was initially identified on the basis of surface geology. A 2D seismic line was acquired in 2004 which proved the presence of an independent thrust anticline. However, projecting the structure along strike proved difficult and was complicated by extremely ductile deformation in the outcropping Orubadi Formation.

After the acquisition of the airborne gravity and magnetics, a distinct gravity anomaly was identified as the extension of the Elk structure and allowed targeting of a 71 km 2D seismic programme comprising three dip lines and a strike line. Seismic mapping identified two distinct structural elements: the Elk block to the north and Antelope to the south and east.

In 2006, InterOil drilled the Elk-1 discovery well in PPL237/238. As a result of the discovery a follow up well, Elk-2 was drilled and an additional 130 km 2D seismic acquisition programme was completed. InterOil in conjunction with CGGV, the seismic acquisition contractor, attempted to improve the quality of the seismic by optimising acquisition parameters. This process was successful, with a significant improvement in

data quality. The data quality has improved to such an extent that imaging of internal depositional architecture within the limestones indicates the development of possible reefal mounds, progrades and possible erosional surfaces in the Elk/Antelope structure. These suggest a shallower water depositional environment for the carbonates on the southern end of the Elk/Antelope structure than previously considered. In addition, the seismic mapping defines a broad flat palaeo-platform on which localised reefs developed and across which carbonate sediments prograded in a general northwesterly direction.

The InterOil platform/reef model proposes that the Elk/Antelope structure is analogous to the Uramu/Mira/Ini/Iviri Platform, which lies 90 km to the southwest partially onshore in PPL237 and partially offshore in PRL10. The Uramu gas field lies in the southwest corner of this platform. In addition, many of the features are similar to platforms developed on the northeast Australian margin and elsewhere in the Gulf of Papua.

In this model, extensional fault blocks of variably attenuated basement material form the basis of these carbonate platforms and are separated by narrow rifted troughs. The Marion Plateau (shallow water) and Queensland Plateau (deeper water) may also provide good analogues with which to understand the controls on the distribution of the shallow water 'Kereru' facies (Elk-1, Ori-1, Ini-1, Ivir-1 and Uramu-1) and the deeper water 'Puri' facies (Wana-1, Puri-1, Kuru-1, Bwata-1 and Triceratops-1).

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