

Hydrocarbon Potential of the Gulf of Papua

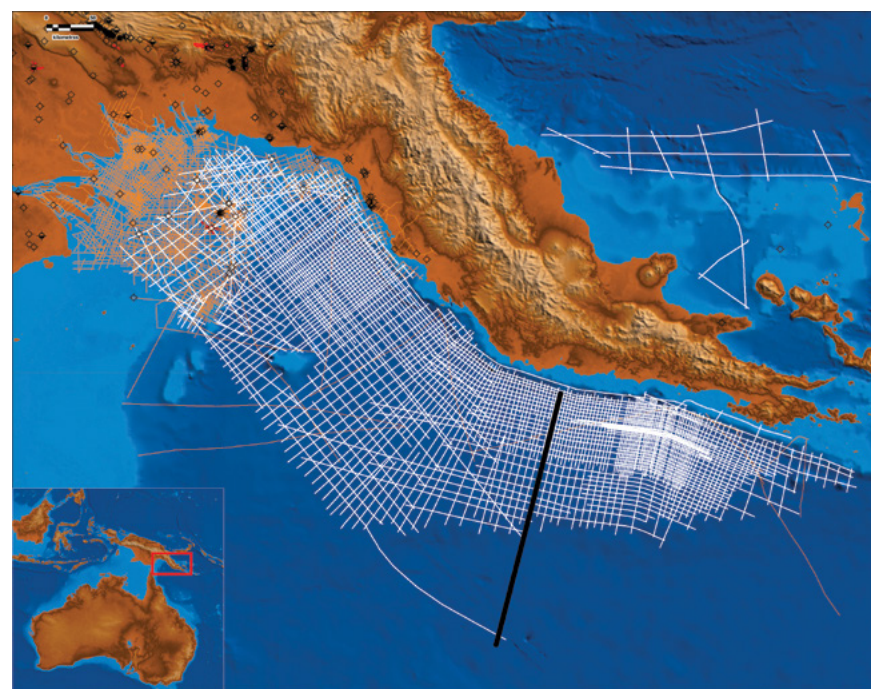
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PAPUA New Guinea has become one of the world's most exciting exploration regions with significant petroleum potential in the Gulf of Papua. Searcher Seismic, in cooperation with the Department of Petroleum and Energy (DPE) and BGP, have acquired over 32,000 line kilometres of long offset, PSDM processed 2D seismic in the Gulf of Papua. This dataset has revealed exciting new potential and has highlighted the prospectivity in the Gulf of Papua.

The Gulf of Papua (GOP) has been acknowledged as a potential premier hydrocarbon region. Discoveries in Pasca, Pandora and nearshore Uramu have demonstrated the prolific charge presence analogous to other areas in south-east Asia [Jablonski et al., 2018]. However, exploration efforts in the deep water GOP has been hampered by paucity of seismic data and some early models that suggested limited and geologically young sedimentation on top of the unknown age basement, most likely of oceanic origin [Struckmeyer, 1994].

Between 2015 and 2017 32,000 km of 2D long offset, high resolution, broadband seismic was acquired by Searcher Seismic, demonstrating yet the clearest picture of several depositional packages that are often separated by tectonically significant unconformities. This is also supported by PSDM reprocessing of 12,972 km of the historical 2D data.

Several stratigraphic subdivisions have been proposed in the GOP. Whilst a Tertiary to Jurassic sequence is generally accepted, the older section is still poorly understood, limited by a paucity of well information and poor legacy seismic imaging. Acquisition of new seismic data and reprocessing of historical data has led to the identification of several angular unconformities each suggesting distinctive



tectonic packages that have not been previously recognised.

- 1 Recent to Pliocene basins defined between the present-day sea floor and the 5.2S Woodlark Basin break-up unconformity;
- 2 Miocene to Paleocene basins bounded by the 5.2S at the top and Coral Sea Break-up unconformities at the base, which corresponds to the C21 magnetic anomaly and 60S composite sequence boundary (5.2Ma to 60Ma);
- 3 Upper Cretaceous basins defined between the Coral Sea break-up and Tasman Sea break-up unconformities (60Ma or 79Ma);
- 4 Lower Cretaceous to Upper Permian basins defined between 79SS and the 271S composite sequence boundaries. Middle Triassic and

Permo-Carboniferous successions are interpreted to be analogous to the Bowen and Galilee basins located onshore Queensland in Australia.

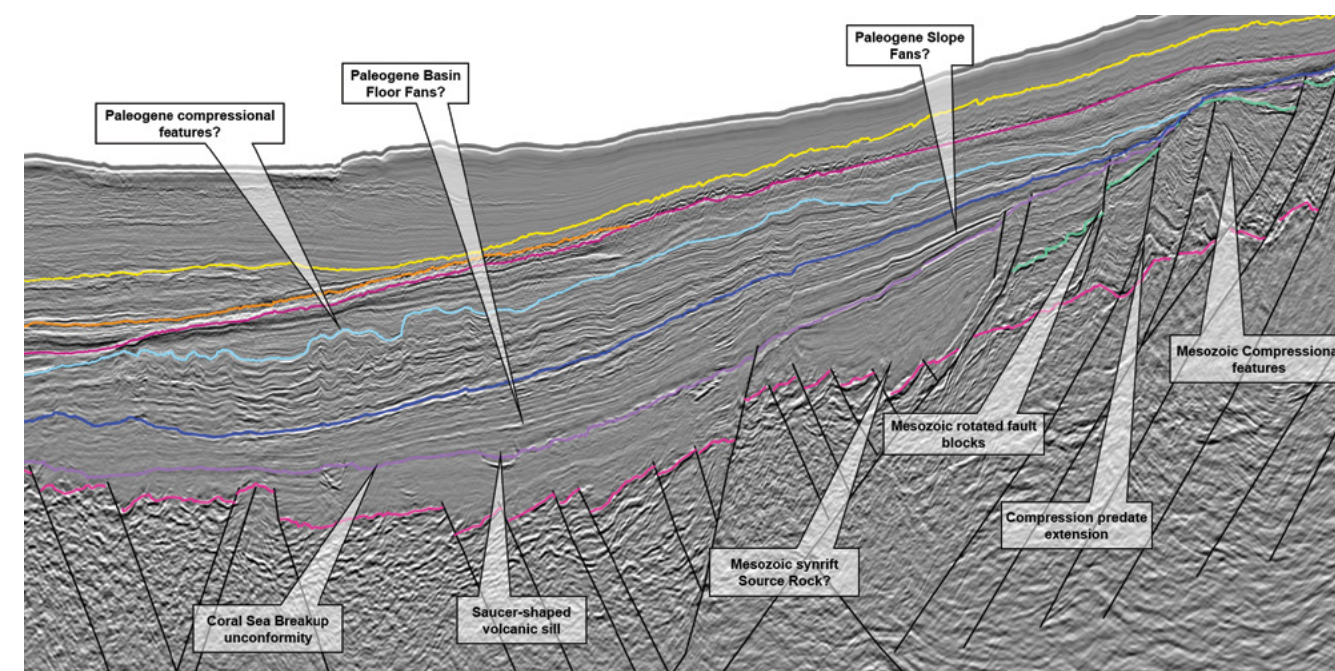
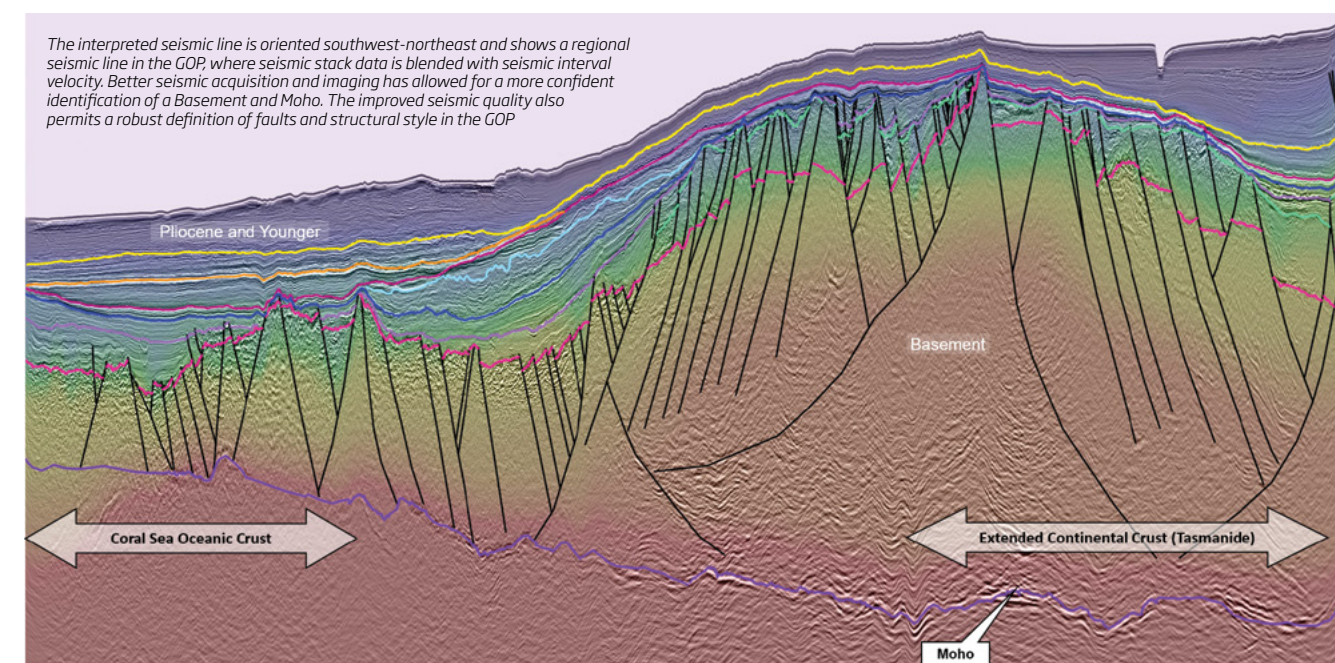
- 5 Lower Permian to Upper Carboniferous basins defined between 271S and 330S composite sequence boundary or most likely economic basement. And
- 6 Basement to Moho package allowing differentiation between the continental, transitional and oceanic crust and consequently refinement of existing plate tectonic models.

With a more confident identification of a basement and Moho marker, the interpretation of the shipborne gravity and magnetic data has allowed for a better understanding of the depth to basement and composition of the crust that is interpreted to be most likely of continental

origin (non-oceanic; Lowe, 2016). These observations have been incorporated into a regional picture that connects geographically distant regions like onshore eastern Australia, PNG and New Zealand. Synchronisation of high quality seismic data and regional synthesis works allow a more comprehensive plays identification in the GOP. Several, often vertically stacked, plays have been identified in the GOP [Jablonski et al., 2018]. These are summarised as:

- 1 Middle Triassic to Upper Carboniferous reservoir/seal pairs analogous to the Bowen and Galilee basins in Queensland.
- 2 Lower Cretaceous to Upper Triassic reservoir/seal pairs have been primary targets in onshore and offshore PNG exploration.
- 3 Break-up structures of various ages.
- 4 Miocene Pinnacle structures analogous to Pasca and Pandora gas discoveries.
- 5 Pliocene detached basin floor fans.
- 6 Compressional fold belt, some 500 km long, not tested in deep water. ▶

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Zoom in of the regional line as shown in the foldout, with illustration of the main geological features and structural elements.