



POSTER PRESENTATION

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## An Active Petroleum System in the New Ireland Basin: Papua New Guinea's New Frontier Carbonate Play

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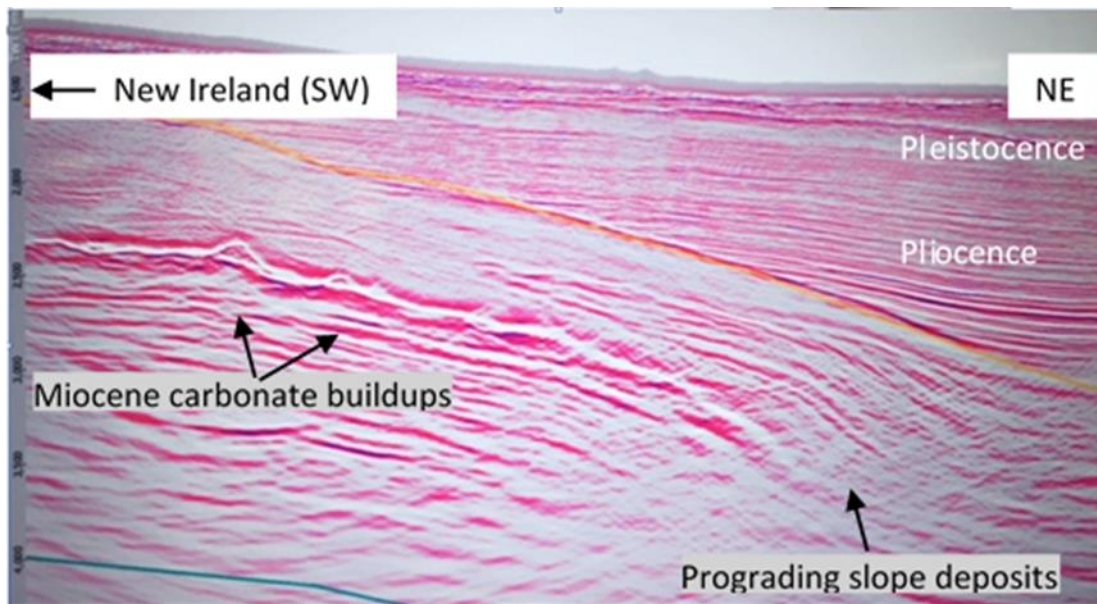
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The New Ireland Basin (NIB) is one of three frontier onshore / offshore basins in NE Papua New Guinea, including the Cape Vogel and the Bougainville Basins. The NIB is a 900 km by 180 km fore-arc basin initially formed between the New Ireland island arc and the Manus trench during westward subduction of the Pacific Plate below NE PNG. Oligocene to Early Miocene rocks exposed on New Ireland include interbedded volcanoclastics, tuffaceous limestones and mudstones with up to 2.7% TOC (Jaulu Volcanics and Lossuk River Beds) deposited at neritic to upper bathyal depths (Sandy, 1986). Basinward equivalents recovered during dredging operations include intercalated foraminiferal wackstones and organic-rich claystones (1.3% TOC) which infer that periods of oxygen minima existing across the basin during this period.

Around 15 million years ago, the Ontong Java Plateau (OJP), an unusually thick volcanic province of the Pacific Plate, collided with the Australasian-Pacific plate margin. The thickness and relative buoyancy of the OJP prevented it from subducting, resulting in subduction reversal and tectonic inversion of the forearc to shallow depths where regionally continuous deposits of Late Miocene shelf limestones (Lelet Limestone) accumulated. On New Ireland, Miocene exposures of massive foraminiferal-algal biomicrite sediments, occasionally interbedded with minor lenses of cannel coals (up to 43% TOC), have been interpreted as variants of back reef lagoonal sediments (Glikson and Owen, 1986; Sandy, 1986). The absence of framework reef lithologies on New Ireland suggests the likely existence of a drowned platform margin offshore.

In 2017, Searcher Seismic and BGP acquired a new long offset, deep tow 2D multichannel seismic survey in the New Ireland Basin. The processed lines reveal a significant depocentre in the basin with over 5 km of sediment. A line perpendicular to the strike of New Ireland (figure 1) has imaged apparent Miocene carbonate buildup structures with prograding slope sediments that extend eastwards into the basin and which are overlapped by a thick sequence of Pliocene-Pleistocene sediments. Miocene algal and coral boundstones with 11-16% porosity dredged in the central basin may be the lateral equivalents of a basin-wide carbonate platform, and indicate that potential for a basin-wide carbonate play exists.

Evidence for charge includes active thermogenic hydrocarbon (C1 –C4) seeps (Schmidt et al., 2002) and pyrobitumen-bearing sandstone clasts within volcanic rocks erupted 220Kyr ago in the central basin. Offshore seismic and bathymetric surveys reveal sediment deformation by horst blocks, half grabens and positive flower structures. Pliocene to Pleistocene alkaline volcanism is coincident with, and controlled by, the development of horst structures, and suggests a link between mantle upwelling, thermal inversion and transpressional shortening processes in the New Ireland Basin.



### References

Glikson M. and Owen J.A.K.. 1986. A New Ireland coal and associated sediments: hydrocarbon generation from pollen exines at low maturation. *Journal of Southeast Asian Earth Sciences* v1: p.221-234.

Sandy M.J. 1986. GPNG Report 86/19.

Schmidt M et al. 2002. Seeping hydrocarbons and related carbonate mineralisations in sediments south of Lihir Island (New Ireland fore arc basin, Papua New Guinea). *Chemical Geology* 186: p.249-264.