

BEYOND TARANAKI — IS THE NEXT MAUI FIELD WEST OF NORTHLAND?

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Abstract

Regional seismic surveys show that a thick sequence of Cretaceous and Cenozoic sedimentary rocks is present over a large area west of the Northland peninsula. The facies and basin history are very similar to those of Taranaki.

West of Northland, early rifting in the mid to Late Cretaceous was followed by deposition of a regional blanket of coal measures. Further rifting, subsidence, and marine transgression followed in the Late Cretaceous, and the coal measures of the basin axis are now overlain by thick, Late Cretaceous–Paleogene marine sediments. Shelf and paralic facies are present close to the eastern margin of the basin, and there is compelling evidence for a major Paleocene–Eocene deltaic system west of Kaipara Harbour. Renewed tectonism in the earliest Miocene was associated with an active plate boundary on the Pacific side of Northland; this was accompanied by rapid subsidence, emplacement of the Northland Allochthon, and development of a double arc of submarine and subaerial, andesite-dominated volcanoes. Except in the far north, the western limit of the Northland Allochthon is close to the Northland peninsula. Arc volcanism ceased at the end of the Early Miocene, and since then the allochthon and volcanoes have been gradually eroded (onshore) and buried (offshore). The Cretaceous–Cenozoic sequence is 4000–6000 m thick over much of the area, and locally exceeds 7600 m.

There has been no drilling offshore. One deep well has been drilled onshore (Waimamaku-2, 1971–72), but the well was sited at the basin margin, and did not intersect a complete stratigraphic sequence. It penetrated 2747 m of Northland Allochthon, a thin in situ sequence of Paleocene–Eocene glauconitic sandstone; and finished in Early Cretaceous mudstone, which we believe is Murihiku Terrane basement.

Subsidence models based on interpretation of the 1982 GECO seismic surveys suggest that much of the Cretaceous and early Paleogene facies should be mature for hydrocarbon generation and expulsion. The almost ubiquitous Cretaceous coal measures are the most obvious source rocks, but we believe that the marine basin fill includes an equivalent of the Waipawa Black Shale. The Paleocene–Eocene deltaic sequences close to the Northland peninsula may also be mature. There are promising structural and stratigraphic leads, some in shallow water. Reservoirs and seals are expected to be similar to those of Taranaki.

The basin history and hydrocarbon prospects have been assessed by the Institute of Geological and Nuclear Sciences, and the results published as a monograph. Accompanying maps show isopachs, structure, and paleogeography. We conclude the area west of Northland is a frontier basin with considerable potential.

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