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ABSTRACT

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A PROSPECTIVITY REVIEW OF THE WEST SULAWESI FOLDBELT AND OTHER NEW PLAYS WITHIN THE NORTH MAKASSAR STRAITS.

The Makassar Straits exploration arena has received much attention from both the drill bit and technical authors in recent years, notably the deep-water Kutai Basin. Already the site of the world's largest LNG plant and with worldscale remaining hydrocarbon reserves, the structural history of the Straits and its outboard, inferred hydrocarbon-rich depocentres remains poorly understood.

Recently acquired deep-water MC2D seismic data covering some 100,000 sq km, extending across the Straits from Kalimantan to Sulawesi, have enabled a more coherent interpretation to be constructed, revealing a number of new exploration opportunities in open acreage.

This paper examines the overall geohistory of the Makassar Straits, along with some of the features recognised within the new data. A petroleum system is promulgated for the West Sulawesi Foldbelt, and its attributes examined.

The Makassar Straits opened during the Eocene in response to crustal extension propagating southwestwards from the Celebes Sea spreading centre. After initial opening of the both the North and South Makassar Straits, early phase Eocene horst and graben terrains were replaced by basinal sag sediments during the subsequent Oligocene to Miocene era. In response to massive outbuilding of the Mahakam Delta during the Neogene, considerable debouchment of highly prospective turbidite facies to the Makassar Straits basin floor occurred at this time.

During the Plio-Pleistocene, prior extensional settings in the Makassar Straits became compressional as successive Australoid fragments collided with the south eastern corner of Sundaland. This recent collision not only assembled the island of Sulawesi into its current (and ephemeral) K-shape but also formed the West Sulawesi Foldbelt which obscures the eastern part of the original Eocene rift in the Makassar Straits



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Much of the foldbelt extends into the deep-water domain where exploration is now facilitated by modern deepwater drilling techniques. Earlier onshore exploration efforts in southern Sulawesi were mostly unsuccessful despite oil shows and the existence of active oil seeps. The foldbelt is progressively consuming the Eocene Makassar Straits, and eventual closure will cause major changes to the oceanic circulation of cool water flowing from the Northern Pacific into the warmer Indian Ocean.

Traps within the foldbelt are mapped as compressional folds over a thin-skinned detachment within probably overpressured Late Eocene clayrocks. Marine sand reservoirs are postulated to be charged from both Paleogene and Neogene source rocks.

Regional data based on paleogeography and depositional settings is used to more clearly identify the petroleum system attributes. Regional exploration fairways are identified and relevant risks are examined.