

## **Redefining Jurassic and Triassic Play Fairway Limits on the Ashmore High Using Depth Migrated, Broadband 3-D Seismic Data**

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### **ABSTRACT**

The Ashmore Platform is considered the north western boundary of the southern Vulcan Sub-Basin, within the greater Bonaparte Basin of the North West Shelf of Australia. The high has been typically overlooked by explorers due to a historically poor success rate with hydrocarbon exploration wells, and the perception that key Mesozoic hydrocarbon play system elements have been eroded, or not deposited, particularly the Jurassic -Triassic system which is the main objective within the Vulcan sub-Basin. Modern 3D seismic covers a portion of the Ashmore Platform to the northwest. However, seismic imaging of the Platform is historically difficult due to complex velocity trends. The reprocessing of the 3D seismic survey through pre-stack depth migration, source and receiver de-ghosting (Broadband), and modern denoise and demultiple processes has resulted in a significant uplift in seismic imaging over the original 3D and existing 2D seismic data. First interpretation, over the approximately 1,600km<sup>2</sup> area, uses well calibration from 14 hydrocarbon exploration wells in conjunction with the reprocessed data as well as newly acquired long offset 3D seismic data acquired in the dip direction. The work identifies several graben structures on the Platform which appear more significant than previously believed. These grabens are interpreted to host significant thicknesses of Lower Jurassic shales of the Lower Vulcan Fm, with potential for associated Montara and Tithonian sands, as well as upper Triassic reservoir sandstones of the Nome Fm. Mapping of growth within the grabens would also suggest that there has potentially been significantly less uplift on the Ashmore High than previously thought. The pre-stack depth migrated data has demonstrated that the effect of the carbonate dominated overburden is such that, if Lower Vulcan shales are present, they may also be mature at the present day for oil generation. The study has demonstrated that although initially the area was considered to be a major high with limited exploration potential, our updated hydrocarbon play fairways maps extend the proven limits further onto the Platform and suggest opportunities for a Jurassic-Triassic hydrocarbon system. The results of this interpretation have positive implications for the Vulcan Sub-Basin, as they demonstrate significant imaging uplift within the basin, which may potentially lead to a review of other areas of the Vulcan where imaging in the pre-Cretaceous section to date is poor.