New Biostratigraphic and Seismic Correlations for the Vlaming Sub-Basin, Offshore Perth Basin, Western Australia

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The Vlaming Sub-basin, which forms part of the Perth Basin on the south-western margin of Australia, is under-explored. However, with a petroleum system demonstrated by oil recovered at Gage Roads 1 and gas at Marri 1, and oil shows at Araucaria 1 and Gage Roads 2, the Vlaming Sub-basin may have significant petroleum potential. Key exploration risks in the Vlaming Sub-basin result from poor seismic data quality and the vintage and inconsistency of biostratigraphy, and hampers well correlations and prediction and mapping of seals and reservoirs.

To address these issues, Geoscience Australia has acquired, re-processed, and analysed 2,300 line kilometres of 2-D seismic data and reviewed comprehensively existing biostratigraphic data. In addition, over 200 samples from cores and cuttings, from 11 wells have been analysed for palynology and organic geochemistry. Results of sampling addressed potential source rocks of the Middle to Late Jurassic Yarragadee Formation, and biostratigraphy of reservoir and seal intervals of the Late Jurassic to Early Cretaceous Parmelia and Warnbro Groups. The new study also considered the younger Cretaceous post break-up section that includes a significant unconformity, encompassing five dinoflagellate cyst zones and spans the earliest Cenomanian and Early Campanian.

New key markers and bioevent identification has resulted in more detailed and confident biostratigraphic correlations, and improved well-seismic ties through the sub-basin and across the Perth Basin. This work allows correlation with the well-established local North West Shelf biozonation and provides supplementary biostratigraphic tie points with the international Standard Stages.