

# Geodynamic Evolution of the Northwest Margin of Australia Since the Late Jurassic

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The Argo, Gascoyne and Cuvier Abyssal Plains off western and northwestern Australia have produced plenty of insights but also long-standing debates about the plate tectonic evolution of eastern Gondwana and Australia's most important hydrocarbon province. The oceanic crust adjacent to the NW Australian margin is one of the World's oldest and hence a very important piece in reconstructing the fit of eastern Gondwanaland. We have revisited the marine magnetic anomaly record of the Argo and Gascoyne Abyssal Plains in combination with other geological and geophysical data from the North West Shelf and southeast Asia. Based on this integrated dataset, we have created a revised plate tectonic model and a set of palaeogeographic reconstructions for the evolution of the North West Shelf and the eastern Tethys/Indian Ocean from the Jurassic to present. The main difference between this model and other published models is that we have interpreted a complete section of anomalies, M25A – M22A, in the Gascoyne Abyssal Plain. Our plate tectonic reconstructions show that continental breakup in the Argo and northern Gascoyne Abyssal Plains, east and northwest of the Exmouth Plateau, respectively, started simultaneously in the Oxfordian with M25A identified as the oldest anomaly. This event separated the West Burma Block and possibly smaller continental fragments from the northern Australian margin. Structural lineaments and faults on the Northwest Shelf and western Australian margin support this model, indicating that the initial break-up along the Northwest margin affected an area as far south as the southern Exmouth Plateau. The second stage of rifting with faults parallel to the India-Australia break-up affected only the southern Exmouth Plateau.