

Australian Gondwanan Petroleum Systems

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Using the petroleum system concept of Magoon & Dow (1991), Phanerozoic Australian sedimentary sequences have been grouped into six broad petroleum super-systems termed the Larapintine, Gondwanan, Westralian, Austral, Capricorn, and Murta systems (Bradshaw, 1993). These supersystems link individual petroleum systems that share the same age and facies of source rock across basin boundaries, providing a framework to understanding the occurrence of hydrocarbons in Australia.

The Gondwanan Supersystem includes those sequences influenced by the late Carboniferous / Early Permian Gondwana glaciation and dominated by fluvio-deltaic source rocks. Whilst nowhere near as prolific as the extensive Westralian Supersystem of the North West Shelf, the late Paleozoic Gondwanan Supersystem contains hydrocarbon reserves within the Bonaparte, Perth, Cooper and Bowen basins, accounting for 7% of Australia's recoverable hydrocarbon reserves.

This study utilises IHS' global basin database to compare the individual petroleum systems that comprise the Australian Gondwanan Petroleum Supersystem. Whether the presence of a Gondwanan Petroleum System results in a significant hydrocarbon discovery is dependent on a variety of factors, including tectonic history and re-activation of trapping mechanisms, seal integrity and maturity of source, which are shown to vary considerably between studied basins. Placing the components of the petroleum system in a basin-history context enables processes to be analysed and a systematic comparison of mature Australian basins to be made. Hence potential can be assessed at the play and prospect scale in frontier areas e.g. the Houtman and Abrolhos sub-basins (Perth Basin) and the Petrel Sub-basin and Londonderry High (Bonaparte Basin).