

# **MAPPING NORTHERN AUSTRALIA'S PRESENT DAY STRESS FIELD: THE CANNING BASIN**

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The Canning Basin is one of Australia's most prospective onshore petroleum basins, with proven petroleum systems and current production from conventional reservoirs. However, the majority of recent interest has been in unconventional hydrocarbons within the deeper basin depocentres, particularly the Ordovician Goldwyer Formation and the Lower Carboniferous Laurel Formation. Understanding the regional stress regime and geomechanical properties of reservoir units are some of the critical factors required to determine the basin's unconventional resource potential. Fluid flow pathways within the sub-surface units in unconventional plays are controlled by local and regional stresses and so understanding the present-day stress regime is integral to modern petroleum exploration and production. This study characterises the regional stress regime within the Canning Basin using existing well data and well tests to derive stress magnitudes and forms part of a greater effort from Geoscience Australia to understand the present-day stress field of northern Australia.

Generally, interpreted stress magnitudes in the Canning Basin indicate a strike-slip faulting stress regime. However, one-dimensional mechanical earth models constructed from dipole sonic data indicate a consistent transition from strike-slip to normal faulting with depth, as well as limited local transitions to both normal and thrust faulting primarily due to significant local variations in vertical stress magnitude due to varying carbonate thickness and localised uplift, but also as a result of lithology. Borehole failure features interpreted from wellbore image logs yield an approximately NE-SW striking maximum horizontal stress azimuth with noticeable variations that are attributed to local stress perturbations.