

The Northwest Offshore Otway Basin Well Folio



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Offshore Otway Basin

Most of the offshore, deep-water Otway Basin remains underexplored, even though there is production from the inboard Shipwreck Trough and onshore depocentres. Recent regional studies have highlighted the need for further work across the underexplored parts of the basin and here we focus on the northwest offshore Otway Basin, integrating reinterpreted well data with recently acquired and reprocessed seismic data (Figure 1). The resulting Well Folio of 11 wells consists of composite logs and supporting data which includes interpreted lithologies, petrophysical analyses, and historic organic geochemistry and organic petrology results. In addition, updated well markers are provided based on seismic interpretation and new biostratigraphy in key wells. This integrated study provides the basis for renewed prospectivity assessment in the northwest offshore portion of the basin.

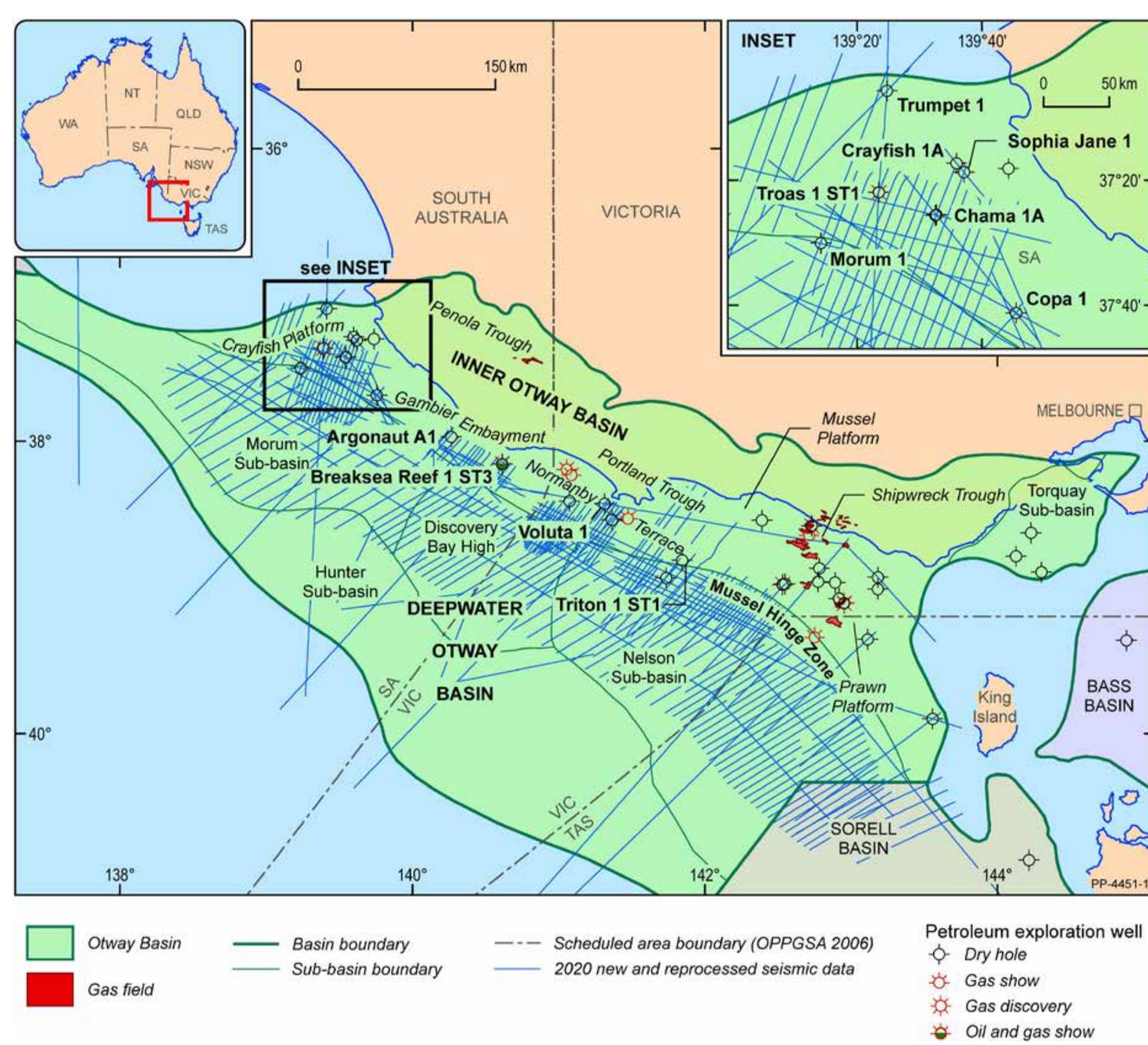


Figure 1 Offshore Otway Basin with the Northwest Offshore Otway Basin Well Folio's wells labelled and the 2020 new and reprocessed seismic data (Lee et al., 2021) in blue.

Well Composites

The well composite for Troas 1 ST1 illustrates the data collected and interpreted in this study, including; supersequences, well logs, lithology, estimated shale volume and reservoir unit characterisation (using >10% porosity and <40% shale volume cut-off), hydrocarbon shows and organic geochemical data (Figure 2). Composites were compiled for the 11 wells shown in Figure 3. The Well Folio is available from Geoscience Australia's Data & Publications website: <http://pid.geoscience.gov.au/dataset/ga/146429>



Discussion

Inter-well correlations were undertaken to understand the regional variation in Cretaceous rock types with shale volume, distribution of potential source rocks, hydrocarbon shows and reservoir quality (Figure 3). The lower Cretaceous fluvial and coaly facies of the Eumeralla Supersequence, and upper Cretaceous to lowest Cenozoic fluvial-deltaic and marine facies mostly within the Shipwreck and Sherbrook supersequences are considered to be the most prospective source rocks in deep-water areas.

While most of the wells reported no significant hydrocarbon shows, gas was reported in Troas 1 ST1 and Breaksea Reef 1 ST3. The RFT pre-tests, wireline and mud

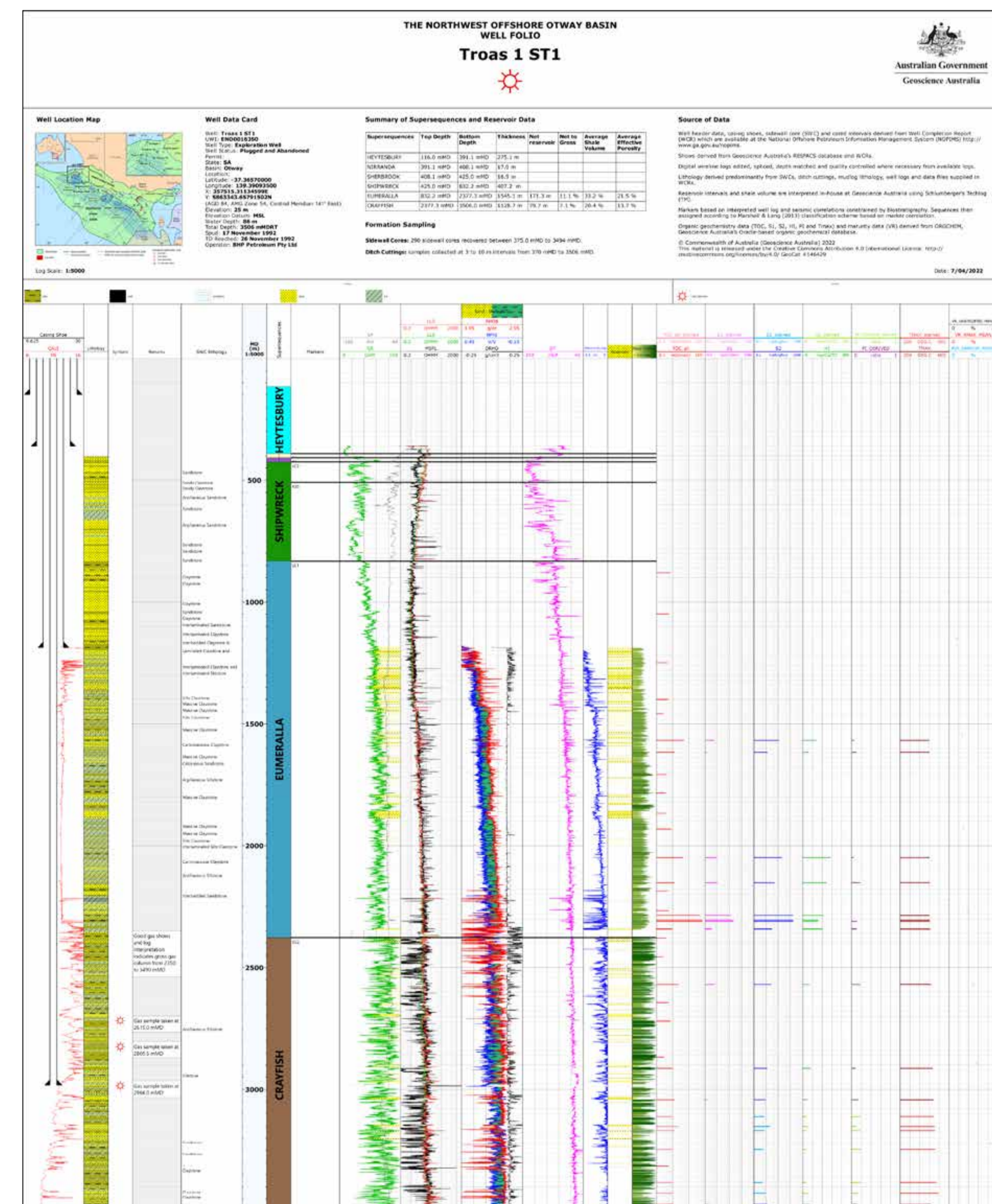


Figure 2 Well composite showing an example from Troas 1 ST1.

logging confirmed the presence of gas in discrete thin sandstone units over 1140 m of a gross gas column in the Crayfish Supersequence in Troas 1 ST1. Mud logging recorded several gas peaks during drilling of the Waarre Sandstone of the Shipwreck Supersequence in Breaksea Reef 1 ST3, but mechanical problems prevented wireline logging.

Petrophysical analysis indicates the potential for good quality reservoirs in the Cretaceous supersequences (equivalent to the Crayfish Subgroup, Eumeralla Formation, Shipwreck Group and Sherbrook Group) in most of the studied wells. For the Crayfish Supersequence, reservoir development (Pretty Hill Formation) is good in Crayfish 1A and Sophia Jane 1 but poor in Troas 1 ST1 and Chama 1A. In contrast, Chama 1A displays the best reservoir development and quality in the Eumeralla Supersequence. Wells from Morum 1 towards Triton 1 ST1 do not reach the Crayfish Supersequence. Fair to good net reservoir thickness occurs within the Shipwreck Supersequence in the studied wells, with the exception of Voluta 1 and Triton 1 ST1. Reservoir quality in the Sherbrook Supersequence is fair to good in Argonaut A1, Breaksea Reef 1 ST3 and Voluta 1, although reservoir facies development and charge remains unknown in the deep-water region.

Key references

- Lee, S., Lim, B., Anarlan, A., and Karvelas, A. (2021) New insights into the deep-water Otway Basin – Part 1. Integrated depth imaging workflows unravelling the subsurface. *APPEA Journal* 2021
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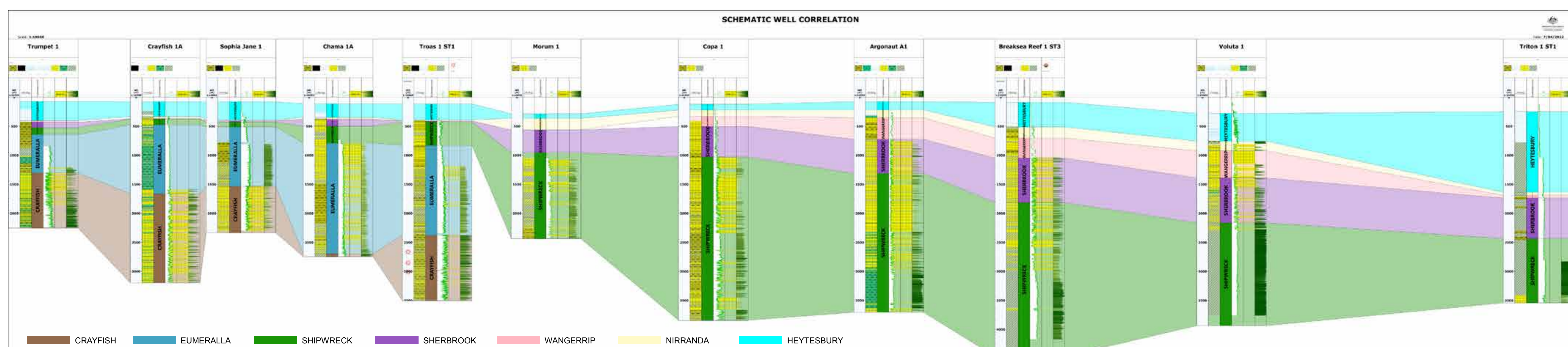


Figure 3 Schematic well correlation showing hydrocarbon shows, lithologies, supersequences, reservoirs rocks and shale volumes.

