

HOVEA 3 CORE

HOVEA MEMBER

INTRODUCTION

- The Hovea 3 petroleum well is located within the northern Perth Basin (Fig. 1)
- The Hovea Member of the Kockatea Shale is located at the Permian–Triassic boundary (Fig. 2)
- The Hovea 3 well was continuously cored from 1968.6 to 2049.3 m
- The core was scanned by the Hylogger and the resulting images and spectral analysis are shown in Figs 3, 4 and 5
- The section of the Hovea Member that contains high-quality source rock was analysed by hylogger scanner, as shown in Fig. 6
- Detailed source rock analysis from Hovea 3 is shown in Fig. 7, modified from Thomas et al (2004)
- Thermal maturity of the Hovea Member source rocks in Hovea 3 was calculated by burial and thermal history modelling (Figs 8 and 9)

HOVEA 3 CORE HYLOGGER SCAN



Figure 3. Hovea 3 high-resolution photography from Hylogger scanning of core from 1968.6 m to 2049.3 m.

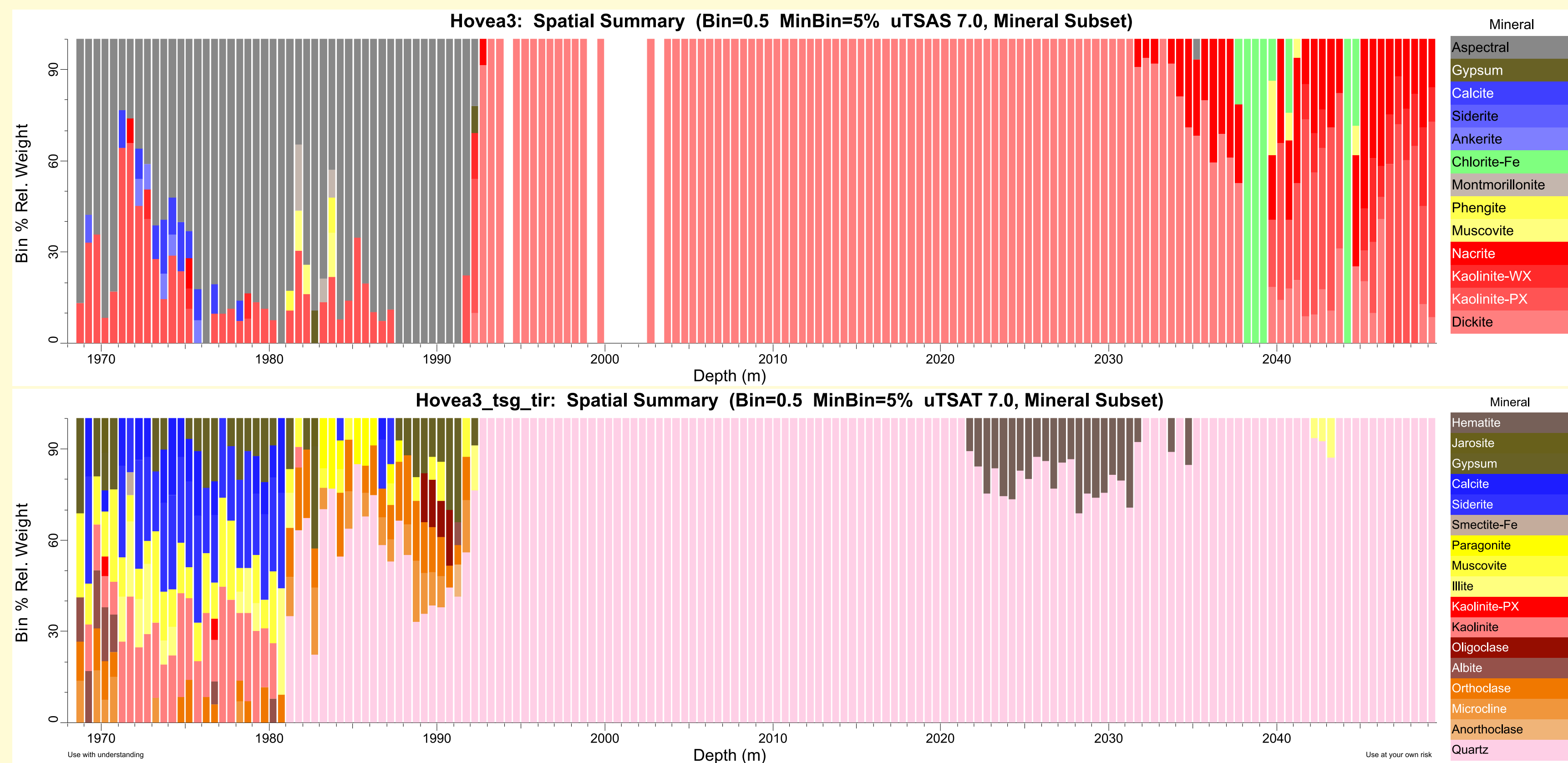


Figure 4. Spectral analysis of Hovea 3 core analysis by hylogger scanning highlighting the mineral assemblages (mosaic core image).

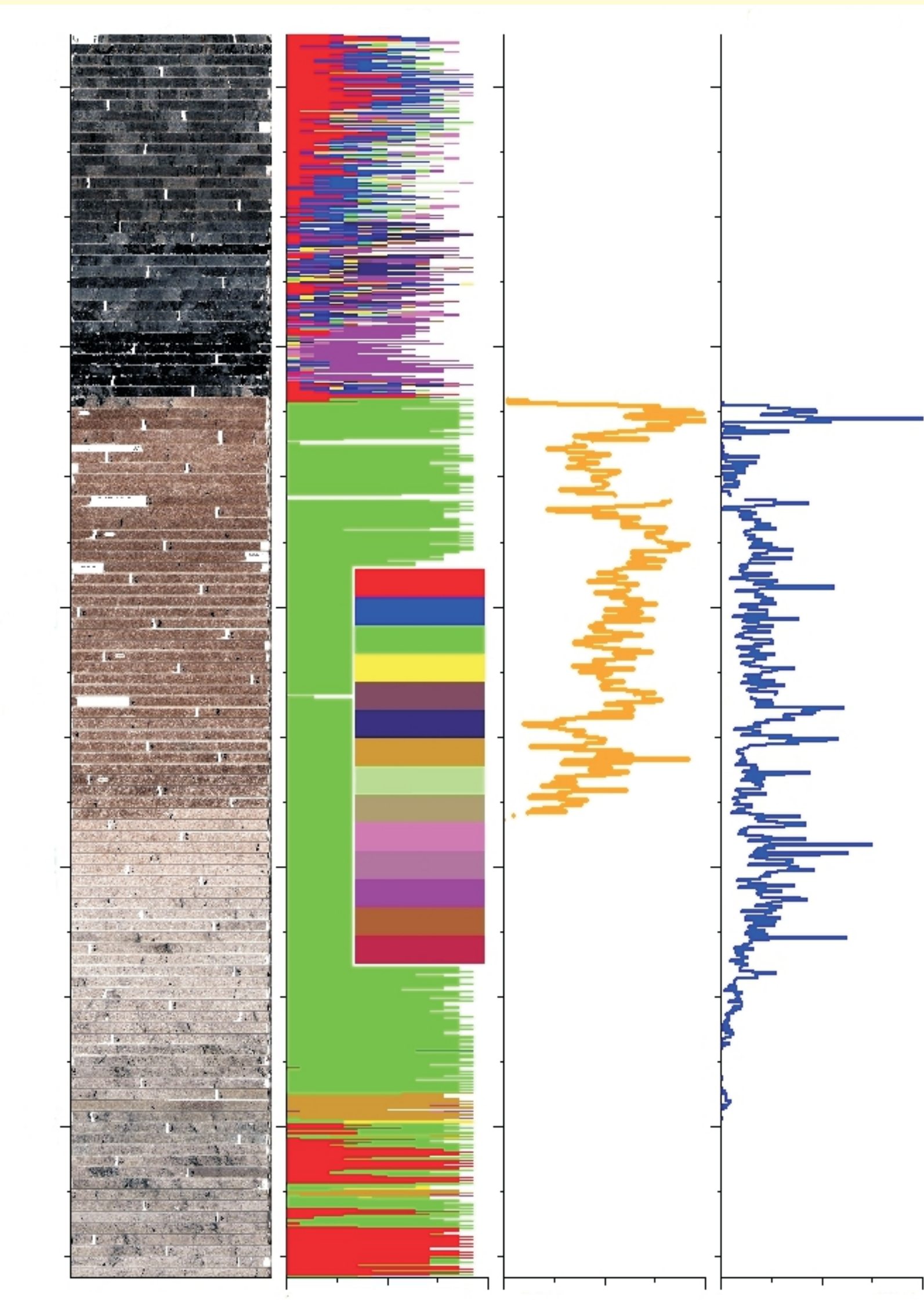
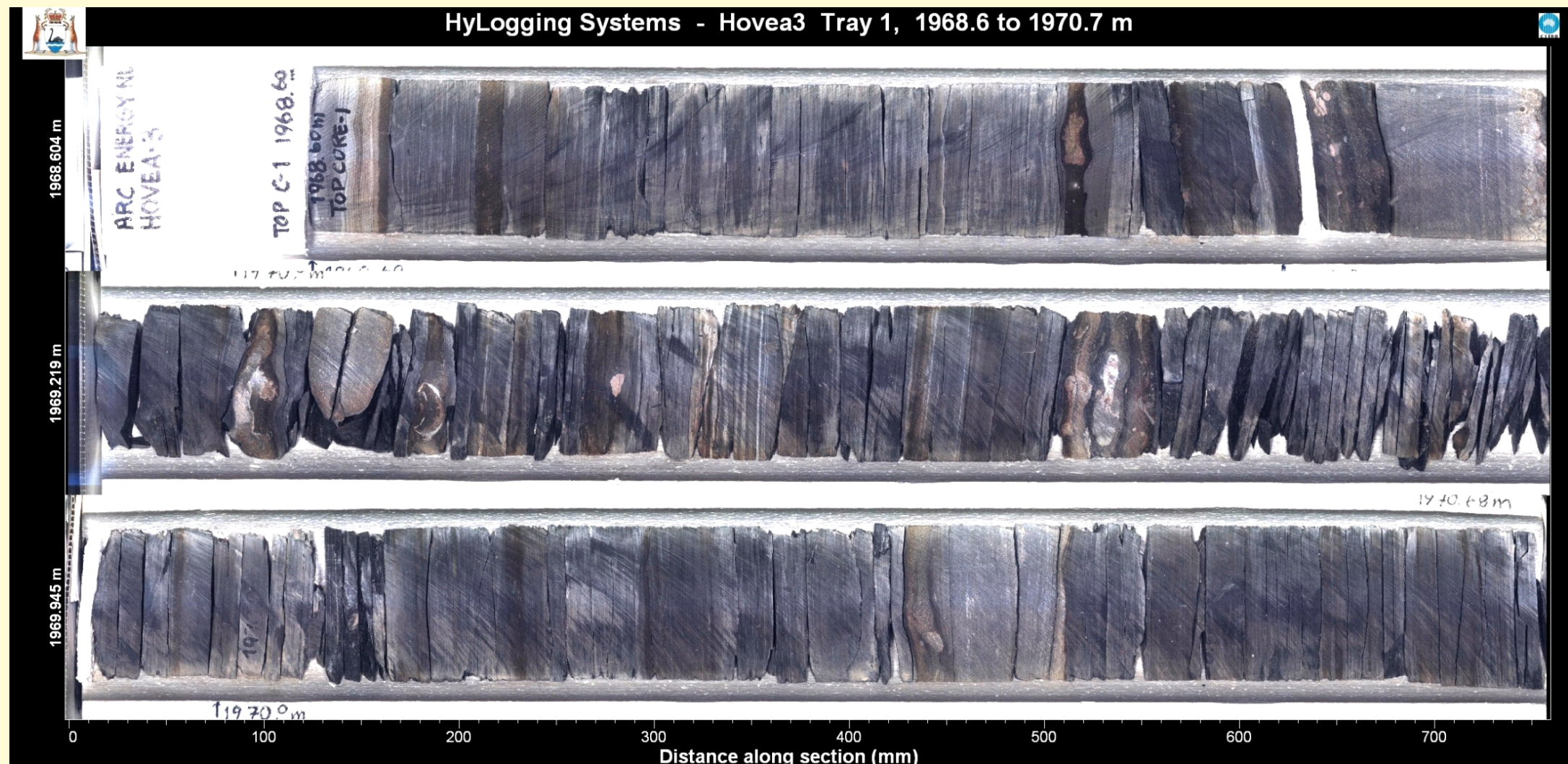
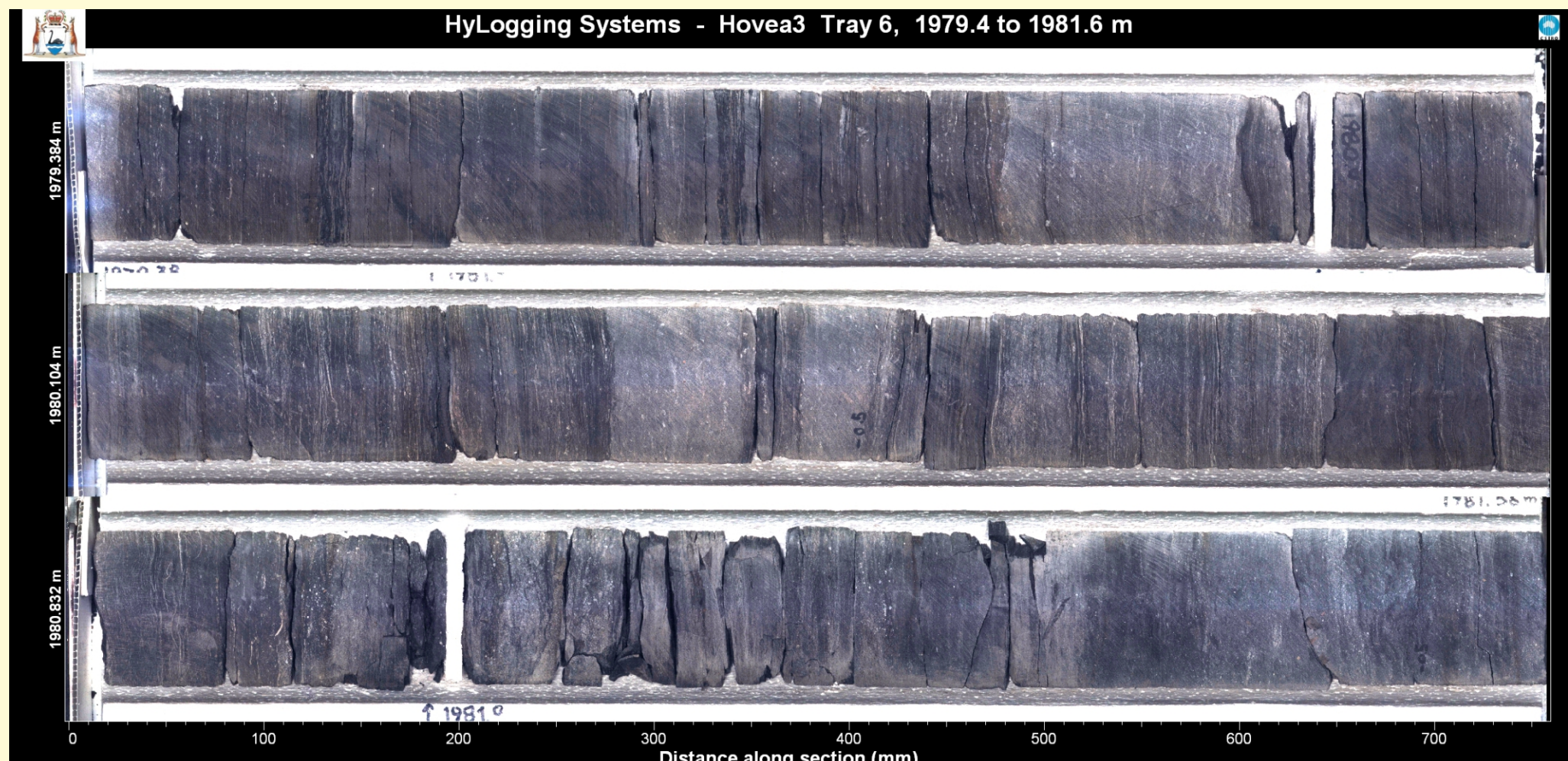


Figure 5. Log of the Hovea 3 well showing image of core, oil-bearing dickite sandstones (light green), oil interval based on the 1730 and 2308 nm absorption bands depth (light brown), and permeability of core (blue; Hancock and Huntington, 2010)

Tray 1 core 1968.6 to 1970.7 m



Tray 6 core 1979.4 to 1981.6 m



Tray 7 core 1981.6 to 1983.7 m

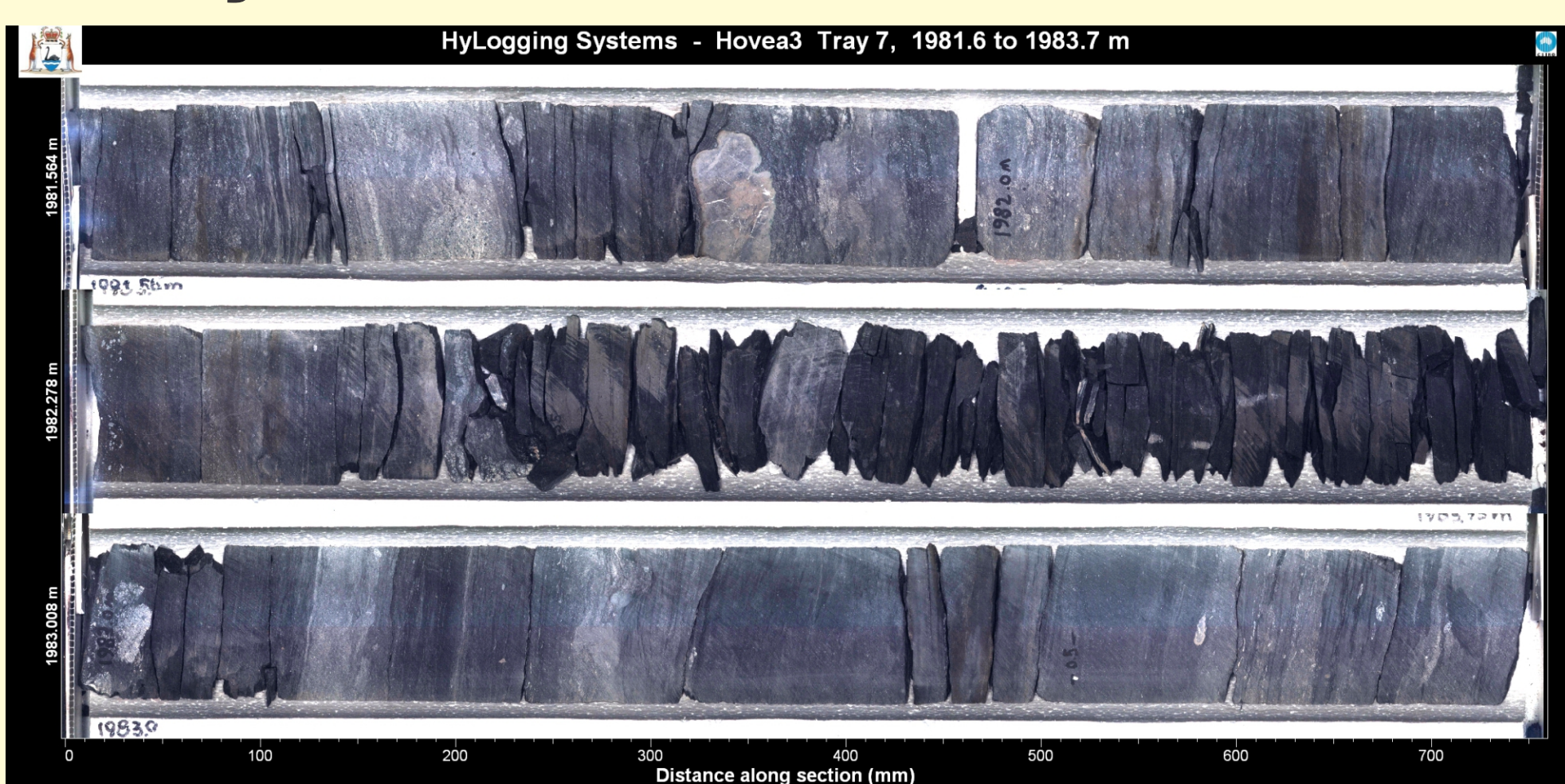


Figure 6. High-resolution photography from Hylogger scanning of selected Hovea 3 core through the Hovea Member from 1968.6 m to 1970.7 m, 1979.4 m to 1981.6 m, and 1981.6 m to 1983.7 m. This interval contains high-quality oil source-beds.

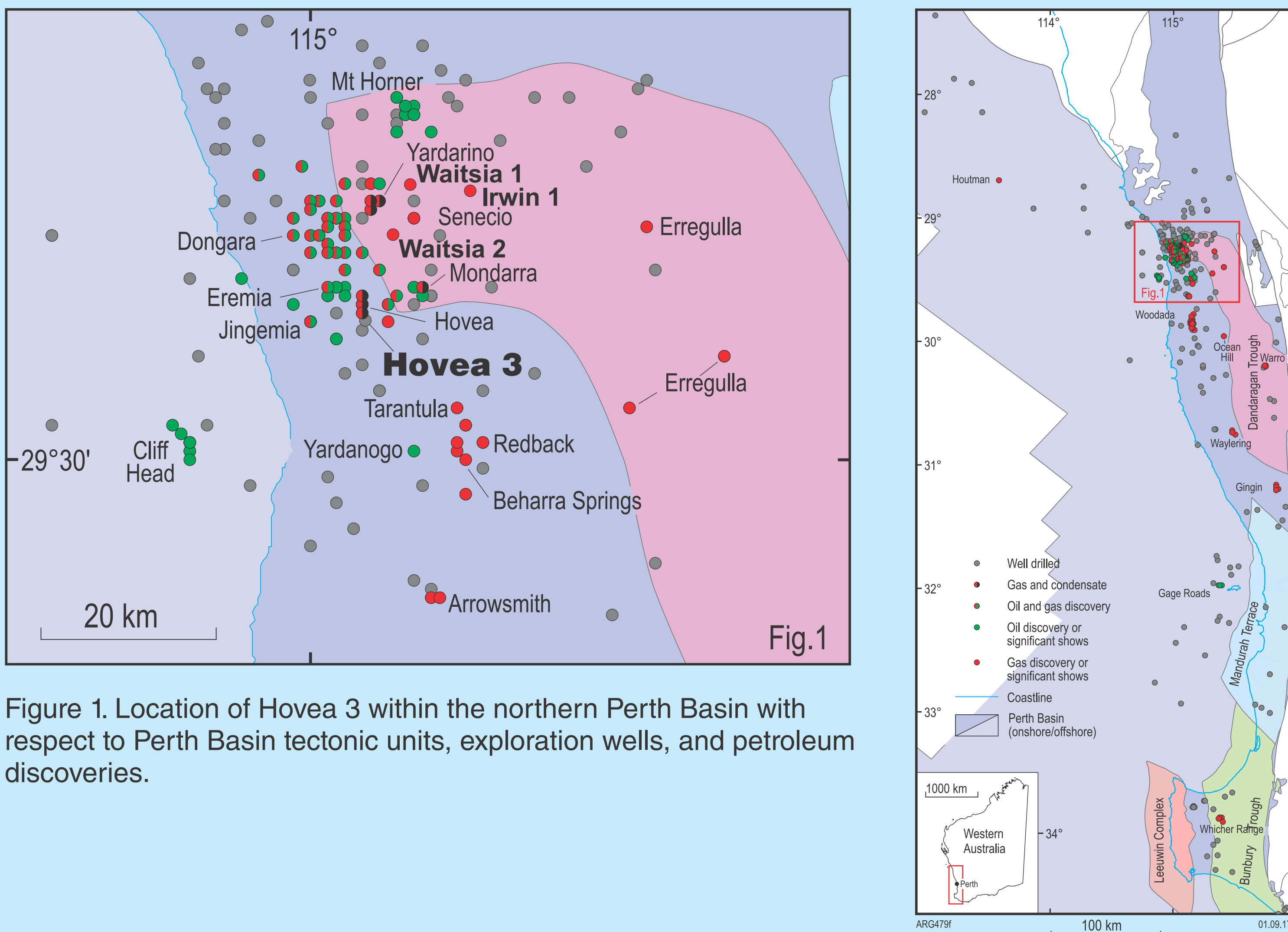


Figure 1. Location of Hovea 3 within the northern Perth Basin with respect to Perth Basin tectonic units, exploration wells, and petroleum discoveries.

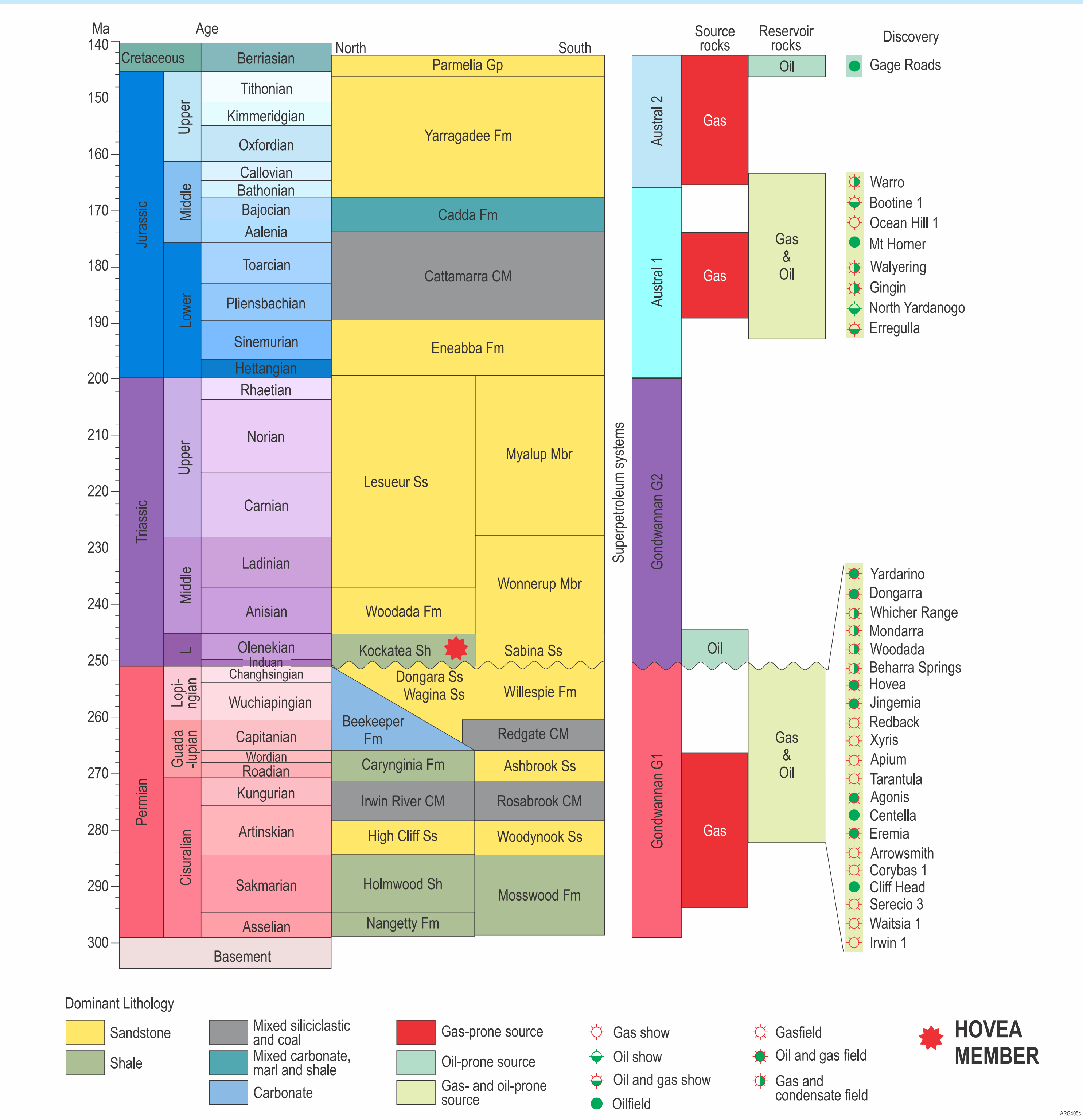


Figure 2. Stratigraphic position of the Triassic Kockatea Shale, which contains the Hovea Member source-beds with respect to stratigraphy, petroleum source and reservoir rocks and petroleum discoveries of the Perth Basin

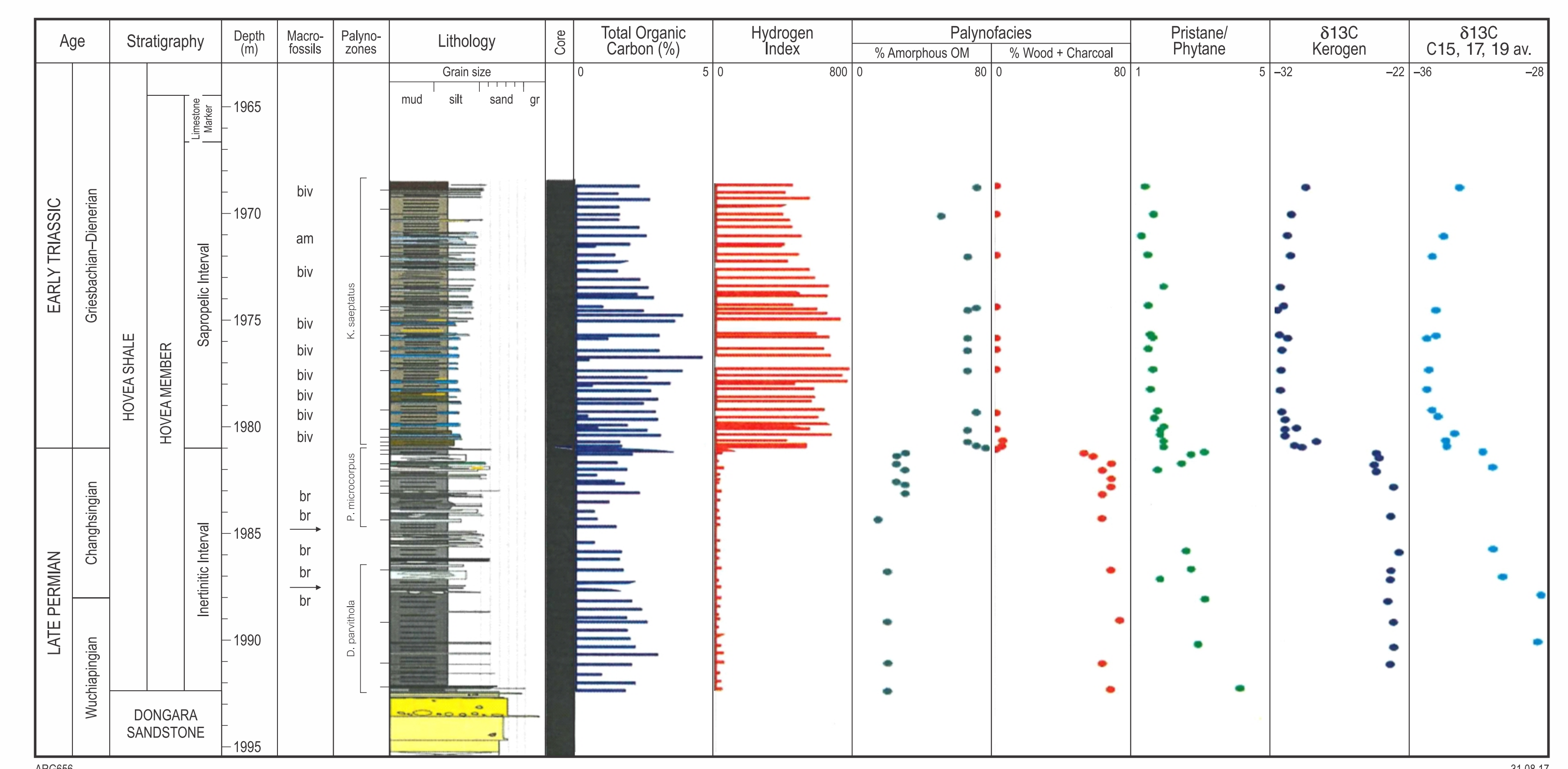


Figure 7. Composite log of the cored section of the Hovea Member in Hovea 3 showing high-quality oil source beds within the Triassic Kockatea Shale, modified from Thomas et al (2004). The core section that contains these source beds is displayed (Fig. 6) in three trays.

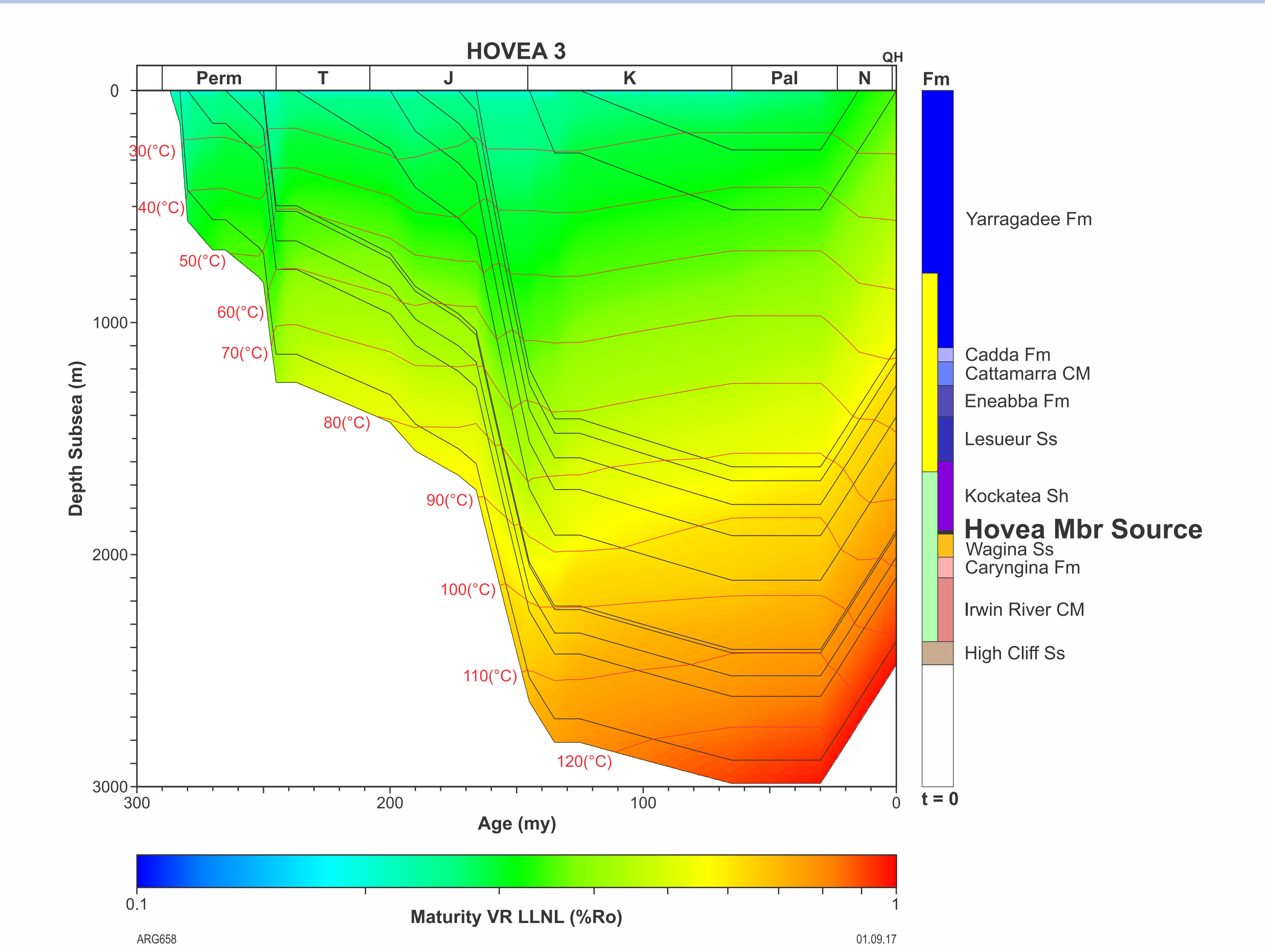


Figure 8. Burial and thermal history modelling of the Hovea 3 well showing thermal maturity of the Hovea Member source beds.

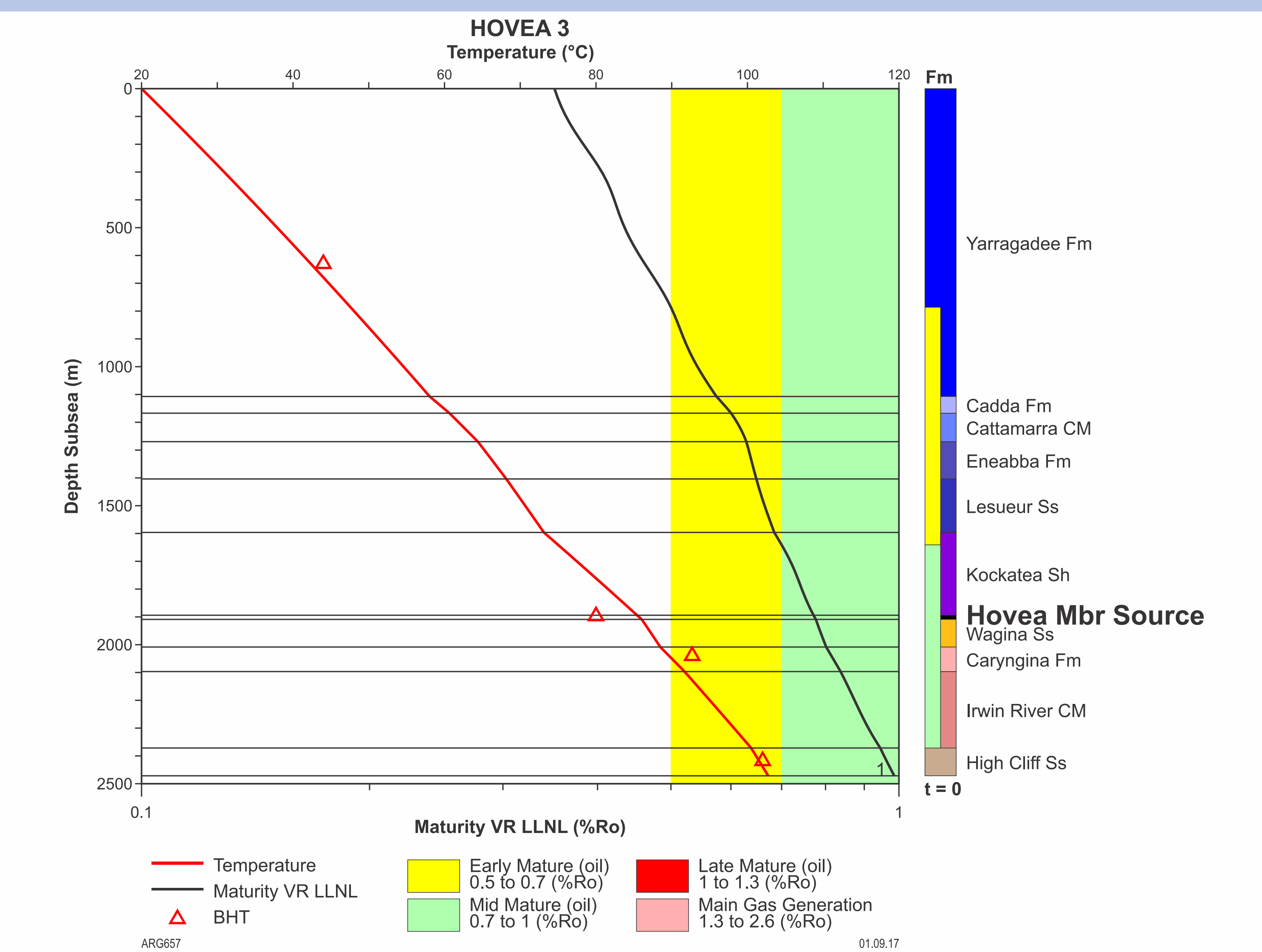


Figure 9. Burial and estimated subsurface temperatures from measured Bottom Hole Temperatures to constrain maturity modelling of Hovea 3. No other thermal maturity data are available for this study.

References

Thomas, BM and Barber, CJ 2004, A re-evaluation of the hydrocarbon habitat of the northern Perth Basin: APPEA Journal, v. 44, no. 1, p. 59-92.

Thomas, B, Willink, R, Grice, K, Twitchett, R, Purcell, R, Archbold, N, George, A, Tye, S, Alexander, R, Foster, C and Barber, C 2004, Unique marine Permian–Triassic boundary section from Western Australia: Australian Journal of Earth Science, v. 51, p. 423–433.

Hancock, EA and Huntington, JF 2010, The GSWA NVCL Hylogger: rapid mineralogical analysis for characterizing mineral and petroleum core: Geological Survey of Western Australia, Record 2010/17, 21p.

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