

# CHAPTER 9 Officer Basin

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OFFICER BASIN SUMMARY .....	2
Age .....	2
Prospective commodities .....	2
Summary geology .....	2
Stratigraphy and geological history (Fig. 9.2) .....	2
Stage 1 .....	5
Stage 2 .....	5
Stage 3 .....	6
Stage 4 .....	6
MINERALISATION.....	6
Lead and zinc .....	6
Evaporite minerals .....	7
Precious opal .....	8
BIBLIOGRAPHY .....	8



## OFFICER BASIN SUMMARY

### Age

Neoproterozoic to Late Devonian.

### Prospective commodities

Lead and zinc, evaporite minerals, precious opal, petroleum.

### Summary geology

The Officer Basin covers an area of ~430 000 km<sup>2</sup> in Western Australia and the adjacent part of South Australia (Fig. 9.1). It is bordered by the Yilgarn Craton, Musgrave Block and Gawler Craton basement provinces, and extends southwards under the Tertiary Eucla Basin. Younger Phanerozoic sediments obscure the eastern limit of the basin, but connections with the Amadeus and Warburton Basins and the Adelaide Geosyncline are inferred in the subsurface.

The main basin elements in South Australia include the Murnaroo Platform, a broad, shelf-like region with relatively thin (<1 km) and undeformed sediment cover. Between the Murnaroo Platform and southern margin of the Musgrave Block is a series of depocentres, including the Birksgate Sub-basin and Munyarai Trough, with interpreted sediment fills of ~5 and ~10 km, respectively. The Ungoolya Hinge Zone forms a transition zone between the Murnaroo Platform and Munyarai Trough. Other significant depocentres include the Tallaringa Trough, and the Nullarbor Platform which underlies the Eucla Basin.

The Officer Basin narrows to the northeast where the Musgrave Block and Gawler Craton reach their point of closest convergence. Thrust faulting in this area has formed a series of southwest-trending structural elements comprising basement highs (Ammaroodinna Ridge and Marla Overthrust Zone, Middle Bore Ridge) alternating with troughs (Manya and Wintinna Troughs).

### Stratigraphy and geological history (Fig. 9.2)

Geological evolution of the Officer Basin can be divided into four stages:

- Stage 1 — development of the Centralian Superbasin.
- Stage 2 — compressional basin development, terminated by the Petermann Ranges Orogeny.
- Stage 3 — Early to Middle Cambrian sedimentation terminated by the Delamerian Orogeny.
- Stage 4 — Late Ordovician to Late Devonian sedimentation terminated by the Alice Springs Orogeny.

