MESOZOIC STRATIGRAPHY - SW MARGIN OF THE EROMANGA BASIN

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BIOGRAPHY

Greg Ambrose obtained his B.Sc (Hons.) from the University of Adelaide in 1973. He subsequently joined the Regional Geology Division of the Geological Survey of South Australia where a variety of stratigraphic and mapping projects were completed. He later joined the Petroleum Division of the Survey where he was involved in a stratigraphic study of the Eromanga Basin sequence. In 1980 he joined SANTOS Ltd. as an exploration geologist, later transferring to development geology.

Richard Flint obtained his B.Sc (Hons.) from Flinders University in 1974. From that time he has worked in the Regional Geology Division of the Geological Survey of South Australia. Projects completed include mapping of Proterozoic rocks of the Peake and Denison Ranges and also the BILLA KALINA 1:250 000 map sheet. He is currently involved with regional projects on Eyre Peninsula including geochronology of the Gawler Craton.

INTRODUCTION

During 1975-1978 we mapped the Peake and Denison Ranges (between Oodnadatta and William Creek) and the BILLA KALINA 1:250 000 map sheet (southeast of Coober Pedy). The region is on the southwestern margin of the Eromanga Basin and includes the type sections for the Algebuckina Sandstone, Cadna-owie Formation, Coorikiana Sandstone and Wooldridge Limestone. Basal Mesozoic sediments are excellently exposed.

Observations during our mapping support the established regional stratigraphy of Wopfner et al., (1970), with some minor modifications. Our results are summarised very briefly below; for more-detailed information consult Ambrose and Flint (1981) and Flint et al., (1980).

The poster prepared for this symposium will be stored (and available for perusal) at SADME. On the poster are a geological map (at 1:1 000 000), locality map and 21 colour prints illustrating important features of the Mesozoic stratigraphic units.

GEOLOGY

On the southwestern margin of the Eromanga Basin (in the Oodnadatta-"Billa Kalina" region) the Jurassic-Cretaceous sequence consists of the basal Algebuckina Sandstone (Mooga Formation-Namur Sandstone Member equivalent), Cadna-owie Formation (Transition Beds equivalent), Bulldog Shale, Coorikiana Sandstone, Oodnadatta Formation including the Wooldridge Limestone Member, and Winton Formation. This region includes the type sections for most of these units.

The late Jurassic-?early Cretaceous Algebuckina Sandstone consists mainly of fluviatile, fine to medium grained sandstones and conglomeratic sandstones capped locally by ? lake shoreline or bar deposits. Wopfner et al., (1970) proposed a regional disconformity between this sequence and the overlying Cadna-owie Formation. In the field the contact is often difficult to interpret although minor erosion is observed in a few localities. However,

the following data, acquired during recent mapping programmes, lend support to the concept of a weathering event separating the two units on the southwestern basin margin. Firstly, the Algebuckina Sandstone is invariably kaolinised and the degree of weathering often decreases vertically. This in situ weathering profile (cf. Wopfner et al., 1970) is occasionally capped by a silcrete horizon which is well exposed along the margins of the Peake and Denison Ranges. Secondly, acid porphyry clasts are locally abundant in the Algebuckina Sandstone and are far more weathered than those observed in the Cadna-owie Formation. It is unlikely that these highly weathered clasts could have survived prolonged transport from the Gawler Craton source area and hence at least some degree of in situ weathering is implied.

The Cadna-owie Formation consists of mainly marginal marine fine sandstones and siltstones which are commonly ferruginous in outcrop. The Mt. Anna Sandstone Member is a fan-delta facies comprising coarse-grained conglomeratic sandstones characterised by abundant clasts of acid volcanics. This unit, which forms a wedge of sediment abutting the Gawler Craton, dominates the sequence in the Billa Kalina region (Ambrose and Flint, 1981).

Deposition of marine shales (Bulldog Shale) dominated in the Aptian-Albian (Ludbrook, 1966). Basal bouldery shales, which outcrop extensively in the study area, have quartzite clasts containing Devonian fossils not recorded elsewhere in South Australia. Flint et al., (1980) suggested the boulders were transported from the Cobar area by Permian ice and later reworked into the Bulldog Shale by debris flows. The regressive Coorikiana Sandstone consists of fine-grained micaceous, silty sandstones containing abundant burrows and tracks. There follows a succession of shales and siltstones (Oodnadatta Formation) which are mainly marine. The Wooldridge Limestone Member (Toolebuc Formation equivalent) contains abundant ammonites in outcrops north of Oodnadatta. From the late Albian into the Cenomanian, non-marine influences became important in the upper part of the Oodnadatta Formation and this trend continued into the largely non-marine Winton Formation.

In outcrop many of the Mesozoic lithologies have been altered by Tertiary weathering; modifying processes include bleaching, kaolinisation, ferruginisation and silicification.

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