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**The Mesozoic sediments around Andamooka, South Australia; Stratigraphy, geochemistry and IOCG exploration potential**

**Oliver Hughes**

Discipline of Geology and Geophysics, School of Earth and Environmental Sciences

University of Adelaide, Adelaide SA 5005 Australia

**Supervisor: Dr Robert Dart**

**Co-Supervisor: Dr Steven Hill**

## **Abstract**

The Gawler Craton, South Australia hosts the Olympic Dam Iron Oxide Copper Gold deposit as well as a number of other IOCG, copper, gold, and iron ore deposits. In the Stuart Shelf region (eastern Gawler Craton), primary mineralisation is generally hosted within basement granites and volcanics of the Hiltaba Suite. Basement rock, potentially containing mineralisation, on the Stuart Shelf is often overlain and concealed by Adelaidean sequences as well as highly weathered, altered and complex Mesozoic cover sequences. These sedimentary basin sediments can conceal mineralisation and are a major frontier for mineral explorers to overcome. Identification of key physical, chemical and biological interfaces, such as basal gravels, redox zones and palaeosols, within the cover sequences and understanding the processes which have led to their formation can be a useful tool in exploration.

Andamooka, South Australia lies on the Stuart Shelf near the southern margin of the Eromanga Basin. Exposed Mesozoic sediments of the Eromanga basin at Andamooka are in close proximity to the Olympic Dam IOCG deposit and are therefore important in understanding dispersion patterns within the cover sequences of elements and minerals associated with IOCG type mineral systems. This understanding can be used for further exploration in the area, where mineralisation may be concealed by Mesozoic sediments.

The purpose of this paper is to describe the Mesozoic sediments around Andamooka, identifying any key interfaces and to devise a geochemical footprint of the Mesozoic sediments in this area, which can be used to aid exploration. Gold, nickel, zinc, lead and copper are found to be elevated in multiple regions within the Mesozoic stratigraphy. Several geochemical conceptual models are presented, including; a detrital source of gold and base metals in the basal region of the Algebuckina Sandstone, and a relationship between base metal accumulation and a major redox zone in the Cadna-owie Formation. Other outcomes of this study include; A proposed structural framework of the region, where extensional block faulting has impacted the landscape structure and the relative

positions of Mesozoic sequences, and a revision of previous geological mapping. As well as, a possible mechanism for the formation and distribution of opals within the Bulldog Shale, as a direct result of oxidation of pyrite and organic material causing the breakup of aluminosilicates.

**Key words:** Andamooka, Mesozoic, IOCG, mineral exploration, cover sequence, redox, ferruginisation, opal

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