

Geochemistry of the Yandicoogina Paleochannel: From Headwaters to Main Body

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Channel iron deposits (CID), such as BHP Billiton's Yandi deposit, are generally believed to be large, homogeneous bodies composed variously of iron hydroxides to oxides and clay minerals. However, the true distribution and origin of this mineralogy is only loosely understood.

Analysis of geochemical data from the headwaters through the central section of the palaeochannel was conducted to better understand mineralogic distribution and provenance. Using 3D modelling software, geochemical domains for major iron ore analytes were created along the channel. These domains include iron, silica, alumina, and titania at a range of cut-offs. These domains were compared with drilled core to interpret the mineralogy and alteration processes that the Yandicoogina channel has undergone. Additional mineralogic interpretations have been performed by hyperspectral analyses of core and a best-guess estimation of mineralogy based on known minerals and chemical assays of core.

Utilising research on soil and laterite formation in climates similar to that during the deposition of the Yandicoogina channel, a likely source rock for the CID is proposed. Using the geochemical domains created through this research, the genesis of the Yandicoogina paleochannel is analyzed. Finally, using source rocks as a predictor for CID geochemistry at other deposits is further discussed.