

Lithogeochemical characterisation of
cover sequence on Yorke Peninsula,
South Australia, and identification of
pathfinder elements for IOCG
exploration.

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LITHOGEOCHEMICAL CHARACTERISATION OF COVER SEQUENCE ON YORKE PENINSULA, SOUTH AUSTRALIA, AND IDENTIFICATION OF PATHFINDER ELEMENTS FOR IOCG EXPLORATION.

GEOCHEMICAL EXPLORATION OF YP COVER ROCKS

ABSTRACT

Discoveries of major ore deposits have declined as the average depth of cover material overlying mineralisation has increased, resulting in a marked increase in the cost of greenfields exploration. In the past, the cover material has been discarded as it was not thought to be of use in exploration, however recently cover sequence geochemistry has been utilised in the exploration for various commodities, including base metals and gold. The Yorke Peninsula, South Australia, hosts economic and sub-economic IOCG deposits within the basement rocks which are overlain by Cambrian – Quaternary cover. Background geochemistry of whole rock samples were statistically determined, and pathfinders As, Co, S, Sb, Cu, Au, Ce and La were identified as potential vectors towards IOCG mineralisation on the Yorke Peninsula. Using the prospectivity index proposed by Fabris et al (2013), with a modified threshold of 3x average crustal abundance for cover rocks, areas of potential expression of basement mineralisation on the Yorke Peninsula were identified. Evidence of mechanical transport of elements from the basement was identified in diamictite samples, while chemical transport is seen in conglomerate samples. Pathfinder elements As and Sb were hosted in remobilised pyrite, while Co and Ni were hosted within primary pyrite grains. If the depositional and post-depositional environment of the cover material is understood, sulphide chemistry is a potential exploration tool for the Yorke Peninsula.

KEYWORDS

IOCG, Yorke Peninsula, exploration, lithogeochemistry, geochemistry, pyrite, pathfinders

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