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The Regolith Expression of Cu-Au mineralisation  
within the Northern region of  
the Project Mawson area, NE Eyre Peninsula,  
South Australia

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## ABSTRACT

The Gawler Craton is a well documented region, and is important because of the many IOCGU style deposits, it hosts. The Eyre Peninsula lies within this district and also within the Olympic Cu-Au province, and OneSteel's current IOCGU exploration also lies within this Cu-Au-rich domain. There has been strong evidence from data gained since the late 1990's by various companies, which suggests that approximately 50km south-west of Whyalla, proximal to Iron Duke, Iron Duchess and Iron Baron, is potential IOCGU mineralisation. Currently; gravity, magnetics, and existing calcrete data are being used to try and assess the validity of the suggested mineralisation, but further exploration is inhibited by extensive regolith cover. To overcome this problem; a vegetation and calcrete sampling program were conducted, targeting the major north-south trending structures throughout the area. From the study, the outcomes were; to uncover the landscape evolution of the area, characterise a biogeochemical signature of the deposit and a plant species which best suits the biogeochemical signature and landscape, and most importantly to suggest potential drilling targets from anomalous Cu-Au results.

The regolith expression was obtained from a regolith-landform map compiled throughout this project period; and western myall (*Acacia papyrocarpa*) pearl bluebush (*Maireana sedifolia*) and calcrete were used to characterise the biogeochemical and geochemical signature of the study area, also known as Project Mawson. The area of interest for this particular manuscript targets the northern half of the Project Mawson area, with a companion study being undertaken in the south of the region (Mitchell, 2010). The commodity elements chosen for detailed analysis included (Au, Cu and U), with secondary mineral trace elements (Al, Fe, Ca, and Zr), and pathfinder and mineralisation accessory elements (Ce, Co, Y, La, Pb, Ag and Zn). The results from this study have highlighted anomalous zones of mainly Cu and Au, particularly in the vegetation results, and there is also a strong structural relationship with these anomalies. This association and the highly anomalous results, indicate that a further biogeochemical survey would be a sound approach for further exploration, but a strong emphasis needs to be put on the understanding of the landscape; as it has the potential to alter soil profiles and to shift anomalous concentrations of target elements. Taking these factors along with others discussed throughout the following manuscript into consideration, would increase the quality of data returned from a future survey, and overall highlight zones of interest and therefore delineate potential drilling targets.

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