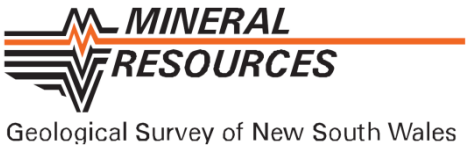

An evaluation of new mineral exploration technologies for effective mineral exploration undercover near Broken Hill.

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Table of Contents

Abstract:

The concealed nature of much of the Broken Hill Domain has led to a need for viable regolith sampling techniques. The Rockwell study area located 12 km south of Broken Hill, NSW, can be considered an analogy for the wider region, as it hosts multiple mineralization styles, including the Pb-Zn-Ag Broken Hill type. Surface samples were collected to assess the application of Niton field portable XRF geochemistry, soil geochemistry, biogeochemistry and regolith carbonate sampling. In order to accurately assess these methods, a 1:25000 regolith-landform map was also generated. Sampling targeted known Broken Hill (Pb-Zn-Ag), Great Eastern (Cu) and Au bearing quartz mineralization, with the aim to establish regolith geochemical characterization of each. Elevated commodity concentrations were found over Broken Hill type mineralization in all sampling media, while the Great Eastern type was identified by regolith carbonates and biogeochemistry, and Au mineralization only in regolith carbonates. The results support previous findings on the ability of biogeochemical sampling to identify mineralization, and the positive accumulation of Au in regolith carbonates. It also highlights the need for further regolith carbonate analysis in the region, as the geochemistry of regolith carbonate samples identified base metal mineralization contradicting existing literature. The exploration strategies proposed have been designed to use a composite of sampling methods to overcome limiting factors, with avenues suggested for further exploration research in the Broken Hill Domain.

KEY WORDS: Broken Hill, Regolith expression, Mineral exploration, Geochemical, Regolith carbonates, Biogeochemical, Niton FP-XRF.