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AN INTEGRATED APPROACH TO THE INTERPRETATION OF HIGH-RESOLUTION AIRBORNE GEOPHYSICAL AND REMOTE SENSING DATA TO SIMPLIFY GEOLOGICAL MAPPING AND EXPLORATION FOR WARMBAD AREA, SOUTHERN NAMIBIA

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High resolution airborne geophysical and remote sensing data sets are widely used to assist in improving geological mapping and delineating exploration target areas. The Geological Survey of Namibia in corporation with Council for Geosciences of South Africa have embarked on conducting an integrated airborne geophysics and geological interpretation project of the Warmbad area in the Karas Region, Southern Namibia. The objectives of the project were to conduct thorough integrated interpretations of geophysical and geological data sets to improve and enhance the geological mapping of the area and identify potential economic mineral targets. The specific data sets used included aeromagnetic, radiometric, hyperspectral, satellite imagery, economic and geological maps.

The geology of the Warmbad area comprises of Paleoproterozoic Namaqua Metamorphic Province basement rocks overlain by Neoproterozoic Nama Group, Karoo rocks and tertiary to recent superficial cover [1]. Based on the integrated analyses of the various data sets for this area, it has led to the identification of several magnetic anomalies, new geological units, terrane boundaries and their extension underneath cover [2]. Remote sensing data (Aster and hyperspectral) aided in the identification of various alteration zones within the Warmbad area.

Various major aeromagnetic anomalies were identified and interpreted in parallel with geological structures, lithologies, and mineral occurrences. The identified alterations are typical of the local geology and this signatures was for the first time used for target generation. Majority of reported minerals occur in pegmatite and within linear structures such as faults and shear zones. Some of these pegmatites have a strong magnetic imprint and can therefore be further investigated. The processing, analyses and interpretation of remote sensing data has also shown to be a powerful tool for the evaluation of mineral rich areas when used in conjunction with other geoscientific data sets.

References:

[1] Miller, R.McG. 2008. The geology of Namibia. Handbook, Geological Survey of Namibia, 3 volumes.

[2] Macey, P.H., et al., Explanation to 1:50 000 Geological Map Sheets for 2818 Warmbad sheet.

