

## **MINERAL INDICES FROM PRINCIPAL COMPONENT ANALYSIS OF GEOSCAN AMSS DATA: AN EXAMPLE FROM THE CHAÑARCILLO SKARN DISTRICT, CHILE.**

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Relationships between different ore deposits in the Chañarcillo district, III Region, Chile, are not well understood. Ag (Chañarcillo veins), Fe-Cu-Au (Anamar) and Fe (Bandurrias) ore deposits are hosted in Upper Jurassic-Lower Cretaceous volcanics and sediments which are intruded by Lower Cretaceous intrusives. Some workers have associated skarn with mineralisation in the district while others deny the presence of skarn altogether. With the aim of improving both the metallogenic understanding of the district and developing a useful regional exploration tool for the identification of skarn, Geoscan MkII multi-spectral data were processed to produce an interpretive mineral alteration map. Geoscan data from Ludwig skarn, Yerington, Nevada, where garnet was successfully discriminated, were used to develop a skarn discriminator over Chañarcillo. The data were processed using Principal Component Analysis, on selected bands in the Short Wave and Visible Near InfraRed wavelengths, to generate alteration facies indices such as propylitic, phyllic and argillic alterations and ferruginisation respectively. Thermal InfraRed bands, were used to create indices for silica and garnet and indicated extensive areas of garnet rich rock, interpreted as skarn. The distribution of skarn indices appeared to be associated with known mineralisation and was subsequently verified by field checking. Garnet was found to be intergrown with magnetite, galena, sphalerite, and copper oxides, suggesting a genetic relationship between the different ore deposits in the district and skarn forming hydrothermal processes. The potential of this data, as a tool for the identification of skarn related mineral deposits in regional mineral exploration programmes, is well demonstrated.