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Alteration Targeting and Geophysical Exploration of the Little Hatchet Mountains, New Mexico

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As part of the southwestern North American porphyry copper province, mining of natural resources in New Mexico has historically played a crucial role in economic development for over 150 years and includes this project area in the Little Hatchet Mountains. The northern half of the Little Hatchet Mountains lies in Grant County and includes the Eureka Mining District (EMD) whereas the southern half is in Hidalgo County and includes the Sylvanite Mining District (SMD). The EMD, a copper and silver-lead mining district from 1880-1961, had a total estimated production from the Laramide veins of 2.9 million lbs. Pb, 1.7 million lbs. Zn, 500,000 lbs. Cu, 5,000 ounces Au, and 450,000 ounces Ag. The southern half is home to SMD, a silver-gold mining district from Laramide skarn, vein, and placer deposits occur in the district and production including 2,500 ounces Au, 130,000 lbs. Cu, and 8,000 lbs. Pb from 1902-1957. This study focuses on remotely sensed mineral alteration zones detected using Mars 2014 USGS shapefiles of hydrothermal alteration in the Basin and Range province, which allowed for the targeting of electromagnetic surveys that have been conducted, and electrical resistivity surveys to be conducted of potential mineral deposits. Electromagnetics survey readings, using the Geonics EM34-3XL that reaches a depth of ~180 ft, have resulted in areas of interest that are most likely mineralized. These surveys have also allowed us to determine where the electrical resistivity surveys, using the SuperSting R8 112 electrode 5 m interval spacing for a max depth profile of 555 m, will be performed. Spectral microscopy and x-ray diffraction on up to 18 samples was conducted to test remote sensing ground truth certainty. The present study is enhancing the knowledge base of these deposits and southwest New Mexico.