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**Title: MINERAL MAPPING FROM COPPER PORPHYRY
EXPLORATION USING MULTISPECTRAL SATELLITE AND
HYPERSPETRAL AIRBORNE SENSORS**

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Abstract: Alteration minerals associated with copper porphyry deposits have absorption features in the visible through shortwave infrared (VIS ñ SWIR, 0.4-2.5µm) and/or the long-wave infrared (7.5-13.5 µm). Regional mineral exploration can be conducted using the NASA's ASTER sensor to develop prospects. These potential targets can then be further refined using hyperspectral sensors such as HYMAP and SEBASS. Mineral mapping with these hyperspectral sensors focused on the minerals associated with the deposit model allows for rapid characterization of the surface geology that takes traditional mapping many man-years.

ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) is a multispectral satellite sensor that measures the reflectance and emission of materials in VIS-SWIR. SEBASS (Spatially Enhanced Broadband Array Spectrograph System) is a hyperspectral sensor that can measure mineral absorption features in the mid-wave infrared (2.5-5.3 µm) and the long-wave infrared (7.5-13.5 µm). HYMAP (Hyperspectral Mapping) is a hyperspectral sensor that can measure mineral absorption features in the VIS-SWIR (0.45-2.5 µm). In 1999, SEBASS and HYMAP data were collected over Yerington, Nevada and an ASTER scene was collected in 2001.

Logical operators were used to process the ASTER data for alteration minerals associated with copper porphyry deposits. Mineral maps were produced using a spectral feature algorithm with publicly available libraries containing the spectral signatures of minerals in our copper porphyry deposit model. These mineral maps can be integrated into an exploration database and combined with other geophysical data to refine prospect development. This study shows that regional and prospect exploration can benefit from using satellite and airborne multispectral and hyperspectral sensors processed in accordance with a deposit model.