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**MAPPING OF HYDROTHERMAL ALTERNATION ZONES AND REGIONAL ROCK TYPES USING COMPUTER ENHANCED ERTS MSS IMAGES**

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**ABSTRACT**

A combination of digital computer processing and color compositing of ERTS MSS images has been used to map hydrothermal alternation zones and regional rock types in south-central Nevada. The technique is based on enhancement of subtle visible and near infrared reflectivity differences between mineralogically dissimilar rocks, especially unaltered and altered rocks. MSS spectral bands are ratioed, pixel by pixel, in the computer and subsequently stretched. These ratio values are used to produce a new black and white image which shows the subtle spectral reflectivity differences. Additional enhancement is achieved by preparing color composites of two or more stretched ratio images.

The choice of MSS bands for rationing depends on the spectral reflectance properties of the rocks to be discriminated. For south-central Nevada, the most effective composite for detecting the alternation zones and for discriminating the rock types was prepared using the following color and stretched ratio image combination; blue for 0.5-0.6/0.6-0.7  $\mu\text{m}$ ; yellow for 0.6-0.7/0.7-0.8  $\mu\text{m}$ ; and magenta for 0.7-0.8/0.8-1.1  $\mu\text{m}$ . Altered areas appear green to brown and show a pronounced correlation with known mineralized areas. These altered areas are not apparent on the individual MSS images, color IR composites images, or SKYLAB S190A color photographs. Silicic volcanic and intrusive rocks are mapped as a single rock type on the color ratio composite; some of these rocks have large intrinsic albedo differences, which commonly prevents their discrimination from mafic rocks in the other types of images.

Although this technique is in the initial stage of development and is untested in other areas, it already appears to have considerable potential for targeting mineral prospects and for regional geologic mapping.

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