

SPECTRAL MODELING FOR IDENTIFICATION OF MINERAL ASSEMBLAGES ASSOCIATED WITH GOLD MINERALIZATION IN TROPICAL /SUB-TROPICAL ENVIRONMENTS: A CASE STUDY IN CENTRAL-WESTERN BRAZIL.

Patricia S. Swalf, Alvaro P. Crósta and Carlos Roberto de Souza F^o

Lithologic and structurally-controlled gold mineralization, including the world class Morro do Ouro Mine, occurs in central-western Brazil. A spectral study was conducted in this region, based on field and laboratory analysis. The objective was to characterize mineral assemblages occurring at the surface of the mineralized areas, in order to derive useful information for regional exploration purposes using remote sensing data. Spectra were analyzed in order to establish characteristic mineral assemblages. These spectra, representing the lithological units associated with the mineralization, were convolved to Landsat-TM, ASTER and AVIRIS wavelengths. The model was tested using a TM scene from Paracatu (MG), converted to reflectance. A group of spectra representing the composition of the scene (endmembers) was selected as input to spectral classification using Spectral Angle Mapper. Despite TM spectral limitations and the environmental constraints, the results obtained identified the test areas with relative accuracy. ASTER and AVIRIS interpolated-spectra suggested that spectral bands better positioned in the SWIR region could individualize mineral assemblages associated to the gold mineralization, based on the depth of the main hydroxyl-related absorption feature at 2.2 μm . These results are scene-independent since they are based on reflectance data, and strongly support the idea that an improvement in spectral resolution provided by future sensors such as ASTER could benefit geological applications of remote sensing in tropical and sub-tropical environments.