

## **FIELD-SPECTROSCOPY AND SELECTIVE SPECTRAL LIBRARIES FOR SPECTRO-MINERAL MAPPING OF MESOTHERMAL GOLD DEPOSITS**

1SOUZA FILHO, C.R. 1Instituto de Geociências, Universidade Estadual de Campinas, Campinas, SP, Brazil

In recent years, portable, hand-held spectrometers have been developed for mineral exploration purposes. Such spectrometers are now employed as a fast, non-destructive spectro-mineral mapping tool that is particularly applicable to mapping clays, carbonates, Fe-minerals and sulphates. The technique has seen major applications in outlining hydrothermal alteration systems at the detailed mineral species level. This paper considers the application of reflectance spectroscopy to study the composition, distribution and geometry of hydrothermal alteration zones associated with mesothermal gold deposits hosted by the Rio das Velhas Greenstone Belt (RVGB), Quadrilátero Ferrífero, Brazil. Samples were collected along the main gold deposits attempting to depict alteration profiles and ore zones. The most representative samples of each deposit were first submitted to petrographic, X-Ray Diffraction and Scanning Electron Microscope analysis in order to constrain the compositions of the alteration zones. The same samples were further analysed using a FieldSpec FR spectrometer, which records reflectance spectra between 0.3 and 2.5  $\mu\text{m}$ . The cross-correlation of these data allowed us to propose a specially designed spectral library, calibrated for those minerals or mixture of minerals commonly found in the gold deposits of the RVGB. This library was adjusted to automatically classify spectral data collected over a much larger number samples from known representative profiles of each deposit yielding results with little ambiguities. The extension of this work show that the alteration zones approached in many of these deposits transcend the notion of symmetric haloes and instead are a complex of alternating and intercalated mineral assemblages with no particular zoning.