Rivard B, Lypaczewski P, Feng J, Perrouty S, Lee RG, Linnen RL, 2018, Alteration footprint of mineral deposits from spectral investigations of drill core and outcrops: examples from Canadian mines, Abstract, Virtual Geoscience Conference, Kingston, ON

Hyperspectral imaging for proximal sensing in mine settings is a field of applied imaging spectroscopy that is rapidly expanding. This study reports on the use of shortwave infrared hyperspectral imagery acquired in mine settings to map the abundance and distribution of key alteration minerals, and in some instances their compositional variability. We present imagery of mine walls (cm to dm pixels) acquired at a range of standoff distances from tens to hundreds of meters. A gold mine and a copper mine are used as primary geological settings. From the former we show the use of mine wall spectral imagery for mapping lithologic assemblages and the transition between proximal and medial alteration as seen in white mica chemistry. In the specific mine example used, the white mica chemistry can be shown to relate to ore grade in drill core on the basis of assays. Observations derived from mine wall imagery are also compared to that derived from spectral imagery of drill core that were acquired at much higher spatial resolution (sub-millimeter pixels). For the copper mine setting, the use of mine wall imagery is shown for the characterization of alteration domains and links to known structures (e.g. faults). We also discuss the potential use of such imagery for ore characterization, here in the context of the presence of clays, as it relates to geometallurgy and ore processing. Lastly in examples of this study where changes in mineral chemistry are inferred from the detailed characterization of mineral absorption features, we discuss the importance of wavelength calibration. For this purpose, measurements obtained in the laboratory and in the field for the same geological medium are compared.

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