

POTENTIAL OF SPACEBORNE IMAGING SPECTROSCOPY FOR GEOLOGICAL/MINING ACTIVITIES

^aRivard, B., ^bRogge, D., and ^cLaakso, K.

^aDepartment of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, Canada

^bGerman Remote Sensing Data Center, Germany

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ABSTRACT:

The upcoming launch of the EnMap hyperspectral satellite will open up new opportunities to map and explore geological regions of the world where bedrock is not obscured by high standing vegetation. Investigations of arctic and subarctic regions stand to particularly benefit from the availability of such data. The benefits to regional lithological mapping are illustrated using an EnMap image simulated from a large airborne hyperspectral survey over a Ni-Cu ultramafic belt. The merits of EnMap for baseline bedrock identification in the context of spectrally similar rocks (mafic-ultramafic) are shown as well as the benefit to target prospective units for exploration.

We then discuss a more challenging scenario where EnMap offers a potential in the context of mineral exploration and the regional scale detection of deposit alteration footprints. Results are shown for alteration vectoring using the detection of white mica from airborne spectral sensing in northern Canada. In this case detection is more challenging in the context of EnMap as results were achieved after rejecting most of the available pixels due to contamination with vegetation.

EnMap should also be of value for monitoring aspects of mining activities including the moisture and mineral characteristics of mining residue (e.g. tailings). Examples will be presented in the context of acid generating residue relevant to a spectrum of economic deposits and of clay rich residue relevant to oil sand mines.