Geophysical Research Abstracts
Vol. 20, EGU2018-19635, 2018
EGU General Assembly 2018

High-resolution seismic imaging and modelling of the Cu-Au New Afton porphyry deposit, SW British Columbia, Canada

Ernst Schetselaar, Gilles Bellefleur, and Devin Wade
Geological Survey of Canada, Ottawa, Canada (ernst.schetselaar@canada.ca)

3D insight into the geological structure of hypogene ore zones of porphyry deposits is critical in evaluating the extent and tonnage of minable ore, including resources that may extend below existing open pits. The infrastructure of block caving operations at New Afton, SW British Columbia, Canada, provides a unique opportunity for developing and testing new geophysical imaging and modelling methods for characterizing the host rock environment of hypogene Cu-Au porphyry mineralization at depth. We report preliminary results of the Geological Survey of Canada's Targeted Geoscience Initiative program, in which high-resolution vertical seismic profiles (VSP), wireline log and petrophysical data were acquired in two underground boreholes, reaching a depth of 750 m below the bottom of the open pit. The VSP data were acquired with a distributed acoustic sensing (DAS) system using various configuration of fibre-optic cables. The advantage of this system is that it can be employed under challenging drillhole conditions with single dynamite shot per source location at relatively low cost and environmental impact. Although the disseminated Cu-Au mineralization with up to 4% sulphide minerals of the New Afton deposit is most likely not detectable, initial processing results based on single shots yield well-defined seismic reflectors. Some of these reflectors correspond to sheared lithological contacts, fault zones and possibly the outer boundary of potassic alteration, approximately coinciding with the contour of economic cut-off copper grade (0.4% Cu). After processing of the VSP data will be complete, forthcoming work in this project will focus on integrated 3D modelling of physical rock property, structural, alteration and lithological log data to elucidate the geological significance of seismic reflectivity in the VSP data in more detail.