Paper Number: 1708

Lumping geology units in drill holes for simplified 3D modelling

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A 3D geology model is a simplified version of the true geology, designed to give a visual summary of the geometry and distribution of major geological elements in a specified region. Drill holes provide detailed data of the subsurface that can be classified into geological units (e.g. rock types and structures). The geological units are the fundamental elements of the 3D model. Generally, lumping is required to reduce the number of geological units in the drill holes prior to model building. Lumping is a subjective process, which means that different geologists will lump in different ways and will typically not record the rationale behind their decision, this means the "experiment" is not reproducible.

We present a method of lumping geological units using a continuous wavelet transform and tessellation (cwt-tess) based on Hill et al. [1]. This method reduces subjectivity and requires parameters to be assigned which guide the process. The lumping process can easily be repeated (e.g. on an updated or new drill hole) by using the same parameters, this ensures that the lumping process is consistent over all drill hole data. Using automation means that it is a relatively simple process to change any parameter over the whole data set, for example, if the method of classification or degree of lumping is changed.

The Kevitsa Nickel-Copper-PGE sulphide orebody in northern Finland is hosted in a Proterozoic layered intrusion [2], [3]. There are a number of different classes of ore and waste and, in order to understand the distribution of the different ore types, we require 3D models of each class. In this presentation we illustrate how cwt-tess can be used to selectively reduce the number of units in the drill hole data for creating a simplified 3D model of the orebody.

Acknowledgements:

We thank First Quantum Minerals Ltd for access to drill hole data from the Kevitsa mine.

References:

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