Metal Zonation and Geological Model of the Mesoproterozoic Sullivan SEDEX Deposit, Kimberley, British Columbia, Canada

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Abstract

The Geological Survey of Canada, through the current SEDEX/MVT Ore Systems project of the Targeted Geoscience Initiative Program (TGI4), is constructing a 3D digital model of the Mesoproterozoic Sullivan deposit and its regional setting in the Purcell anticlinorium of southeastern British Columbia. The aim of both 3-D modelling projects is to lever existing data sets and expert knowledge to support the development of 3D perspectives that will help mineral exploration of the area and in sedimentary basins in general. The spatial relationships recognized through these models have the potential to provide a better understanding of this highly productive SEDEX system. This study is focused on 3D integration and visualization of the stratigraphy, structure and ore zonation of the Sullivan deposit. Stratigraphic and geochemical data have been extracted from drill logs and georeferenced to 3D digitized drill holes. This data will be interpolated between drill holes to build a stratigraphic, structural and ore zonation model within the boundaries of the Sullivan mine, and complements the regional scale modelling efforts. In particular, the model will show the architecture and metal zonations (Pb, Zn, Ag, Fe) of the sulphides relative to mine siliciclastic stratigraphy. By combining 3D structural and stratigraphic modelling with 3D geostatistical mapping of the ore, and combining these data with a detailed geochemical transect through the deposit, it is hoped to gain a deeper insight into the mechanisms of the ore-forming process and the nature of the ore system. In turn, it is hoped that this information will be useful into formulating criteria for the recognition of sedimentary basins that have produced SEDEX/MVT ore systems.