

https://dspace.org/

The application of dynamic anisotropy in the kriging estimation process to improve resource estimation on a folded and undulating stratiform copper deposit

Tembo, Zifa

2019

https://hdl.handle.net/10539/29296

Tembo, Zifa, (2019) The Application of dynamic anisotropy in the Kriging estimation process to improve resource estimation on a folded undulating stratiform copper deposit, University of the Witwatersrand, https://hdl.handle.net/10539/29296

Downloaded from a DSpace repository. https://dspace.org/

ABSTRACT

This research study was motivated by the geological complexity of Konkola orebody. It is a well-known fact that the geological complexity of an orebody will add to the risk associated with the Mineral Resource estimation of the deposit. In this research report the applicability of Ordinary Kriging with a dynamic search ellipse is investigated on the Konkola copper orebody where traditionally Ordinary Kriging with a fixed global oriented search ellipsoid is applied in the resource estimation. The regional and local geology of the mine was studied including prominent structures that had potential to affect the final estimates. Exploratory Data Analyses were carried out and the orebody was domained into three zones based on grade variation and structural orientation. Variograms, capturing the spatial correlation of the Total Copper % (TCu%), were calculated and modelled for the individual zones, this was followed by a kriging neighbourhood optimisation process. Grade interpolation was done using both the interpolation techniques and the estimate results were compared to the input sample data. An analysis on the financial benefits of adopting Ordinary Kriging with dynamic search was also conducted. This research study concludes that it is beneficial to domain the orebody and to use Ordinary Kriging with a Dynamic Anisotropic search approach for resource estimation and therefore recommends that Konkola Mines adopt this methodology to improve its resource estimation and save costs.