

SAMPLING OPTIMIZATION OF A VOLCANO-SEDIMENTARY DEPOSIT USING GEOSTATISTICAL SIMULATIONS

Jacques Deraisme, Javier Miranda

Geovariances, France

Orlando Rojas

Compañía Minera Doña Inés de Collahuasi, Chile

ABSTRACT

Exploration drillholes usually provide block estimates with large confidence intervals. Additional drilling is then required to achieve a more accurate resource classification. The paper presents an innovative methodology based on geostatistical simulations to quantify the relationship between the additional drillholes density and the confidence in the resource classification.

The key principle is to generate, by means of simulations, several realizations of the main parameters of the mineralization, i.e. geological features and grades. In a second stage the simulated deposits are sampled by “fictitious” drillholes that may be added to the existing ones. These drillholes are then used for estimating ore tonnages and grades. The comparison with the simulated values provides statistics on the estimation errors. This exercise can be repeated with another set of planned drillholes. The optimum between the number of drillholes and the confidence in the resource estimation can then be obtained from a limited number of tests.

An application to the Rosario Oeste deposit of Collahuasi copper mine is presented. The mineralization is concentrated in a high sulphidization vein system slightly inclined and located below a leached zone covering the orebody. The resource classification is based on tonnage and grades estimates obtained after a three step approach:

Determination of the volume of the leached zone by simulating the surface boundary between this volume and the mineralized zone and simulations of the geometry of the mineralized veins.

Simulation of the alteration code, that is the determinant factor of the mineralization.

Simulation of grades within the mineralized veins.

The paper emphasizes the original approach, combining different techniques chosen to fit at best the characteristics of the deposit. Discussion about the practical results and the consequence on resource classification will be presented.