

ABSTRACT

The current research investigates applicability of stochastic approach to simulation of gold distribution to assess uncertainty of the associated mineralisation and proposes a practical workflow to be used in future for similar problems. Two different techniques are explored in the research: Direct Sampling multi-point simulation algorithm is used for generating realisations of lithologies hosting the gold mineralisation, Sequential Gaussian Simulation is applied to generate multiple realisations of gold within them. A number of parameters in the Direct Sampling algorithm are investigated to arrive at good reproducibility of the patterns found in the training image. The findings arrived at are aimed to help when undertaking simulation in future and choosing appropriate parameters. The resulting realisations are analysed for assessment of combined uncertainty in the lithology and gold mineralisation. Different assessment criteria are demonstrated to visualise and analyse uncertainty. Block scaling to a panel size resolution is carried out to compare the results of the stochastic modelling to a kriged model and assess global uncertainty which stems from this analysis. A practical workflow has been reached as a result of the research.

The approach confirms usefulness of the simulation in the estimation of uncertainty and provides some practical considerations in usage of Direct Sampling method which can be applied to other MPS algorithms with further improvements.