

Big data space mining of Jiaojia gold district for deep targeting(China)

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The deposit- and district-scale three-dimensional (3D) models for deep targeting were constructed, based on multiple-scale geosciences big data including geology maps and drillholes and channels with assay and geophysics of gravity and magnetic and MT images additional several seismic images and rock-type geochemical assay and high spectral data in the Jiaojia gold district. This study presents a combination of 3D geometric reconstructions of the Xincheng gold deposit and the Jiaojia gold district in China. Our intention is to demonstrate that these computer-based applications represent an innovative approach for metallogenic modeling, exploration criteria definition, and mineral potential targeting using multi-scale and multi-source geoscience big data in 3D space.

The methodology are summarized as follows:

(1) 3D geological model constructing and reconstructing using multi-scale and multi-source geosciences to respect pre-defined constraints to obtain the required accuracy and enable detailed integration of big data. In this study, we exploited the benefit of a geology-constrained 3D model using GOCAD and GeoCube2.0 to mimic ore genesis issues by using exploration drillhole and mining channel datasets.

(2) The faults of ore-bearing structure analysis using 3D multi-source geological modeling and a numerical simulation was implemented in the Jiaojia gold district, China.

(3) A Clustering modeling method was used to identify the samples geoscience features of geochemical and rock-type high spectram and the other features including geophysical physics in 3D space, and it can be used to delineate the gold-forming path and trap using mineral system thoery, for example, the hydrothemaal genesis of Jiaojia gold district additional fault structure constrain using 3D geological block cell model.

(4) Newly developed geostatistical interpolation algorithms enable reconstruction of deposit-scale attributes at high resolution 3D space environment: such that the 3D grade modeling using SGS simulation modeling becomes not just a mineral resource definition tool but also a scientific tool for examining ore genesis and exploration targeting criteria; the altered rocks modeling using SIS simulation modeling to analyze and identify metallogenic model of exploraiton criteria and exploration model using highspectal dataset with drillhole samples.