Multi-scale and Progressive Intelligent Prospecting Prediction Using Geological Big Data

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Abstract

As the surface and shallow mineral resources are searched out, in order to meet the demand of social and economic development for mineral resources, strengthening the prediction of deep hidden mineral resources has become the top priority of mineral resources exploration. Based on large geological data multi-scale progressive prospecting prediction method is the key to realize the deep hidden mineral intelligent prediction, reasonable inheritance theory model is not constrained by theoretical model, take big data and small data, all the data with random samples, deep mining and statistical analysis, using no model and model, data driven and model, correlation and cause relationship. The core problems include progressive data mining, mining knowledge fusion, and data-model joint drive. This paper aims to promote the assimilation and integration of physical and big data according to the scale, reveal the background conditions of mineral formation and possible ore control factors through model mining, establish the knowledge map through knowledge correlation, quantification, cause and effect, combine model and model; based on the 3D structure-attribute integrated geological model, and adopt machine-learning prediction driven by data-model, to provide support for the delineated target area. Under the guidance of the above theories and methods, this paper first analyzes the metallogenic mechanism of lead-zinc deposits in Bijie working area, collects relevant data including these factors, and establishes a data set for prospecting prediction. Secondly, the geophysical, geochemical and remote sensing data are mined to obtain metallogenic conditions and ore-controlling factors. Thirdly, through 1:500000 and 1:200000 geochemical exploration and gravity anomaly, the concealed east-west rift zone is excavated and determined as the Probable ore-forming area. According to the 1:200000 geochemical exploration and gravity anomaly, the northwest small rift valley is excavated to provide deep source lead-zinc and iron, and the Permissive ore-finding area is determined. Using the established prospecting prediction data set, the training convolutional neural network prediction model is constructed through the known ore spots and attribute data, and the prospecting prediction is carried out to determine the Preferable ore-finding area.

Keywords

Multi-scale, Geological Big Data, Progressive, Data Fusion, Prospecting Prediction