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PROBABILISTIC INTEGRATION OF INTEGRATED GOLD MINERAL POTENTIAL MAPS USING
GIS

Abstract

Modern exploration is a multidisciplinary task requiring simultaneous consideration of numerous numerical models and disparate geological, geochemical and geophysical datasets. So, the aim of this study is to integrate the mineral potential maps which were created using probabilistic and statistic models. For this, relationships between vein-type gold deposits and related geological factors were analyzed, the relationships using probabilistic and statistic models were integrated to mineral potential maps and the integrated maps were integrated again using the probabilistic model in GIS. A variety of spatial geological data were compiled, evaluated and integrated to produce a map of potential gold deposits in the Zaamar district, Mongolia. A spatial database including vein-type gold deposits, geological, and geochemical data was constructed for the study area using GIS. The factors relating to 105 gold deposits were the geological data such as lithology and fault structure, geochemical data including Ag, Co, Cu, Mo, Ni, Pb, Sn, and Zn. By using the constructed spatial database, the relationships between mineral deposit areas and 10 related factors were identified and quantified by frequency ratio and logistic regression models. All the factors were combined to produce a map of the regional mineral potential using the overlay method in GIS. The mineral potential maps were then verified by comparison with known mineral deposits. Then the mineral potential maps were integrated again using frequency ratio model to make integrated mineral potential map. The integrated mineral potential map was also verified by comparison with known mineral deposits. The integrated mineral potential map can be used as a source of basic information for mineral resource development. GIS is not only capable of routine display, but also offers great potential by providing a range of tools to query, manipulate, visualize and analyze a variety of spatial data in space applications.