Probabilistic Analysis for Regional Mineral Potential Mapping with GIS for the Hydrothermal Ore Deposits in East Korea

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The east Korea consists of Precambrian metamorphic complex, Paleozoic sedimentary rocks, Mesozoic sedimentary and volcanic rocks, Mesozoic to Cenozoic plutonic rocks. Identified mineralized areas of hydrothermal ore deposits classified into three types: (1) Hydrothermal veins such as mainly Au-Ag, Pb-Zn and small amount of Cu, Fe, Mo W, (2) Hydrothermal replacement such as Fe, (3) Hydrothermal alteration such as talc and porcelain stone. Techniques for mineral resources management, assessment and prediction must be developed for the exploitation of the mineral resources. The most common approach to mineral potential mapping is data-driven and exploits knowledge about how known deposits spatially relate to their surroundings. The aim of this process is to analyze relationships between hydrothermal mineral deposits and related factors to identify areas that have not been subjected to the same degree of exploration. The relationship coefficient (R^2) can be used for how to relate between mineral deposit and factor. So we used the coefficient value as the criteria. In the study we set the criteria such as followings: (1) $R^2 < 0.4$; Weak relationship, (2) $0.4 < R^2 < 0.6$; Normal relationship, (3) $R^2 > 0.6$; Strong relationship. From the criteria, the Cl, Fe, NO_2, showed the strong relationships between hydrothermal mineral deposits. But DEM, slope, bouguer anomaly, freeair anomaly, magnetic anomaly, Al, Ba, conductivity, Cr, Cu, F, K, Li, Mg, Mo, Na, Ni, pH, Si, V, W showed the very weak relationship between hydrothermal mineral deposits. These results are well matched with the hydrothermal mineral deposits. Therefore, the relationships can be used for mapping of regional mineral potential using overlay method in GIS environment. A GIS was used to efficiently analyze the vast amount of data and the probabilistic model was turned out be an effective tool to analyze the mineral potential mapping.