Geochemical and mineralogical pattern recognition and modelling with Bayesian approach at the hydrothermal gold deposits

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The Bayesian approach is an effective method of identifying the certain probability mineralogical and geochemical type mineralization on trace element in galen, pyrite and other distribution ore mineralization. Monomineral samples have been identified using computer upon Bayes method and exploration geochemical techniques of gold deposits for MGT. In order to realize the method, we have used a data bank consisting of analysing more than 12000 monomineral samples collected from main hydrothermal gold deposits on territory of CIS. Bayes approach applied to geochemical data such as posteriori probabilities and discriminate analysis provide a numerical and graphical means through which the relationships of the trace elements and samples can be studied. There methods were used here beside GIS to find MGT that can be used as geochemical indicators of regions with gold mineralization.

The results of analyzing 100 monomineral samples of pyrite from Au-Ag Shkolnoe deposit (Tajikistan) reveals multiformational anomaly of superposition which is a combination of three MGT as:

1. Gold - silver type (85 % and more)
2. Gold- sulfide - polymetallic type (46 %).
3. Gold - sulfide type (40 %).

Mineralogical and geochemical maps (MGM) are results of generalization and analysis of MGT and GIS of different objects. There arises the possibility of quantitative modeling using spatial links of objects and multivariate models helps significantly in making optimal managerial decisions that give maximum economic effect.

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