

Regionalized Classification of Geochemical Data with Filtering of Measurement Noises for Predictive Lithological Mapping

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Abstract

A method for predictive lithological mapping is proposed, which combines geostatistical simulation of geochemical concentrations with coregionalization analysis and decision-tree classification algorithm. The method consists of classifying each target point based on simulated values of the geochemical concentrations, filtered from the short-scale spatial components corresponding to noise and measurement errors. The procedure is repeated over many simulations to give finally as a result the most probable lithology at each target point. An application to a set of geochemical samples of soils and surface rocks is presented, in which lithology is recorded from an interpretive geological field map. It shows significant classification improvement when pre-processing the sampling data through geostatistical simulation with filtering of the nugget effect, with rates of correctly classified data increased by 3.5 to 11 percentage points depending on whether training or testing data subset is considered. The lithological prediction allows generating geological maps as complementary activities to exploration of mineral resources to be able to forecast and/or to validate the geology mapped at each point of explored areas.

Palabras clave

Palabras clave de autor: [Geochemistry](#); [Geostatistical simulation](#); [Coregionalization analysis](#); [Nugget effect](#); [Decision trees](#)

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