



Singularity analysis of multisource geodatasets for information extraction and integration for mineral prospecting

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Local singularity analysis (LSA) developed in the context of fractal and multifractals has been utilized as an efficient way to characterize non-linear geological phenomenon like flood, landslide, tectonic evolution, etc. In the past decade, this technique has been successfully applied for mineral exploration in many areas for various types of mineral deposits. Mineralization as a cascade geo-process is associated with multiple geological processes including tectono-magmatism, sedimentation, and metamorphisms which often depict non-linear properties. Proper description of spatial distributions of these geological bodies can benefit mineral exploration. Current study is about identification of geological bodies in eastern Tianshan mineral district, a Gobi-desert area with thick overburden. LSA technique was utilized to identify weak anomalies associated with mineralization from both weak and strong background. In addition to geochemical data, this study employs LSA to analyze geological and geophysical data for extracting geo-anomalies for mapping spatial distributions of felsic intrusions, intermediate-mafic volcanic strata, and faults that are associated with iron mineralization. Furthermore, these diverse geo-anomalies are integrated for delineating targets for iron mineral deposits in the covered areas.