

Application of the tectono-geochemistry and C-A fractal method to mineral prospectivity mapping in Gejiu, China

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Geological Setting

The primary mineralization process of Gejiu tin-polymetallic deposit is repeated superimposition and reform by magmatic hydrothermal. Conformation afforded transmit alleyway and deposited space for mineralization. Various wall rock conditions and combination zoniferous character of different mineral elements lead to mineralizing diversity [1].

Factor Analysis

Factor analysis is one of the most important multivariate statistical methods for processing and analyzing geochemical data, and it is appropriate for data reduction and anomalies interpretation in geochemical exploration [2]. In this case study, 4745 fault rock samples collected within the east of Gejiu district were assayed. The correlation among the mineral elements was obtained by cluster analysis, then on this basis, 4 factors were acquired by means of factor analysis.

Anomaly Analysis

Cheng et al. [3] proposed a concentration-area (C-A) fractal model for separating geochemical background and anomalies. In this case, C-A fractal method was applied to determine the anomaly threshold of the first factor (i.e., Sn, Ag, Pb, Zn, Mn) obtained by factor analysis.

Conclusion

The factor analysis method used in this case study delineates the spatial zonation patterns of the principal mineral elements and the C-A fractal method show superior performance for determining the anomaly threshold of the factors.

[1] Shou-yu, C., & Peng-da, Z. (2009). Mineralizing multiformity and deep prospecting of Gejiu super Sn-Cu multi-metal deposit, Yunnan. China, 34(2), 319-324.

[2] Tripathi, V. S. (1979). Factor analysis in geochemical exploration. *Journal of Geochemical Exploration*, 11(3), 263-275.

[3] Cheng, Q., Agterberg, F. P., Ballantyne, S. B., 1994. The separation of geochemical anomalies from background by fractal methods. *Journal of Geochemical Exploration*, 51(2), 109-130.