

## 3D geological-geophysical comprehensive modeling technology in an ore district

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### 1 Research Content

We systematically collected and collated relevant geological and comprehensive geochemical exploration data and existing research results in the Tongling area. Under the guidance of modern geological theory, based on high-precision geophysical data and rock physical properties, geological models are used as the link to give full recognition to modern computing technology, and advanced processing explains the advantages of software.

### 2 Technical Route

The quantitative study of the gravity-magnetic integrated backbone section, the qualitative inference interpretation of the gravity-magnetic plane and the three-dimensional physical inversion results of the gravity and magnetic are complementary. The geophysical data are processed and analyzed in detail, and the deep anomaly information was extracted and studied to find out the distribution law and characteristics of the geophysical field in this area. We fully excavated the deep tectonic geological information of the comprehensive geophysical data to study the deep structural framework of the region, and study the distribution range, burial depth and undulating shape of the important strata closely related to the minerals, as well as the distribution, scale and burial of the rock mass. We compiled relevant basic maps and inferred results maps, screen key anomalies, circled prospecting prospects, conducted geophysical prospecting predictions, and conducted a prospecting potential analysis.

### 3 Technical Process

- (1) Collecting prior information
- (2) Study of lithology-physical relationship
- (3) Establish a 2.5D initial model
- (4) Gravity and magnetic 2.5D joint inversion
- (5) Gravity and magnetic 3D physical inversion
- (6) Combination of gravity and magnetic 2.5D joint inversion and 3D physical inversion
- (7) 3D model establishment
- (8) Model accuracy evaluation and comprehensive explanation

### 4 Conclusion

- (1) Using physical data as the link, the joint inversion results of the gravity and magnetic 2.5-dimensional profile and the three-dimensional inversion results were coupled and further transformed into a 3D geological model, which breaks through the problem of information loss in the single method and the refinement of the target geological body shape.
- (2) Using the gravity-magnetic plane to infer the interpretation results and the gravity-magnetic 2.5-dimensional profile inversion results and the three-dimensional physical inversion results, the three-dimensional identification and division of the magmatic rocks and strata in the area were carried out, and the prospecting target was three-dimensionalized. Deep prospecting is of great significance.
- (3) The comprehensive geological geophysical modeling of the Tongling area provides a demonstration for the deep mineral exploration of the Nanling-Xuancheng mining area (coverage area), and provides a basis for exploring the geological geophysical modeling technology of the deep minerals in the covered area.

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