Abstract: The Huangshaping W-Sn-Cu-Pb-Zn polymetallic deposit has a long mining history, and it is one of the deposits in the highest research level. With the increase of mining depth, the ore-prospecting difficulties is harder and harder, therefore is urgent to find the effective exploration methods of deeply concealed deposits and orebodies. Generally, geophysical exploration methods (such as direct current resistivity, magnetic, and electromagnetic methods) are used in a conductive half space (surface) to detect deeply buried ore bodies. However, locating ore deposits and orebodies accurately in a whole-space domain using these geophysical methods presents a major challenge because they produce multiple solutions and are easily affected by electromagnetic interference, and it is difficult to meet the needs of deep prospecting. Till now, traditional gravity geophysical exploration method for the regional scale has formed a complete system in theory, data processing, instruments and exploration specifications, etc., and is widely used in the division of tectonic structures and regional tectonic units, and the study on deep structure of the earth.

The Huangshaping polymetallic deposit is one of the typical deposits in the world's famous Nanling polymetallic metallogenic belt. In the mining area, the exposure strata are mainly ore-hosted limestone at the Shidengzi Fm. In upper Devonian and lower Carboniferous. A series of compound folds and oblique-slip faults widely distributed. The deposit consists of a series of orebodies related to quartz porphyry and granite porphyry, and occurs in a large buried depth. So it is difficult to obtain satisfactory results by applying traditional gravity exploration method on the surface. The successful application of the large scale tunnel gravity exploration in the Maoping, Huize rich Ge-Pb-Zn deposits (Han RS, Li WY et al. 2014) provides a typical example for the Huangshaping mining area. There is obvious difference in density between the ore and surrounding rock of the deposit, and the scale of the ore body is large, which provides a physical premise for the gravity exploration of large-scale tunnel.

Based on the collection of gravity data by CG-5 gravimeter at -176 m, -216 m, -256 m levels in the mining area, the characteristics of tunnel gravity anomalies and the interference factors have been comprehensively analyzed, and it is found that the method is feasible and effective in the deep ore-prospecting due to not be affected by the electromagnetic interference and high detection precision, and has obvious difference with the traditional gravity exploration method. However, topographic features and distribution characteristics of chambers, shafts and goaf, as well as disturbance factors such as tunnel elevation and vibration directly affect the interpretation of spatial positioning of deep orebodies. Therefore, in order to obtain satisfactory deep detection effect, for observation data, in addition to the correction of solid tide, zero drift correction, Bouguer correction, topographic correction, tunnel correction, goaf correction and backfill correction are also required.

Key words: high-precision, tunnel gravity exploration, influencing factors

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