



Polarization Anomaly Characteristics and Prospecting in Ag-Pb-Zn Polymetallic Ore Deposit in Changtuxili Area of Inner Mongolia

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Citation: Ma et al., 2019. S Polarization Anomaly Characteristics and Prospecting in Ag-Pb-Zn Polymetallic Ore Deposit in Changtuxili Area of Inner Mongolia. *Acta Geologica Sinica* (English Edition), 93(supp.2): 442–443.

Abstract: The mining area is located in Dongwuqi area on the west slope of the middle-south section of the Daxing'anling metallogenic belt. The area is mostly covered by grasslands, and it is difficult to identify geological outcrop. Previously (Cheng, 2012), the Tianjin Geological Survey Center of China Geological Survey discovered the Changtuxili Ag-Pb-Zn polymetallic deposit in the study area through 1:50,000 mineral geological survey. On the basis of previous studies, this work delineates four IP anomalies by carrying out 1:10,000 IP elevator and sounding work, and discovers multi-layered ore bodies through drilling, which proves the effectiveness of IP method in prospecting in the area. In addition, IP4 is the largest IP anomaly found this time, and it can be used as a key target for prospecting in the next step.

The Changtuxili Ag-Pb-Zn deposit in Inner Mongolia is located in the Yanshan period polymetallic metallogenic belt in the middle-south section of the Daxing'an Mountains. The Tianjin Geological Survey Center found the deposit by screening 1:50,000 soil measurements. However, due to the serious surface coverage, the prospecting work can not be further understood. Based on the electrical characteristics of rocks and ores in the area, the induced polarization method is used to directly identify the possible occurrence location of ore bodies within the geochemical anomaly range, and good results have been achieved through drilling verification. This provides a practical reference for searching for similar polymetallic deposits in the region.

The main strata exposed in this area are andesite and andesite volcanic breccia of the Manitou Formation of the Upper Jurassic, rhyolite and rhyolitic lava tuff of the Cretaceous Gaolao Formation of the Lower Cretaceous, mudstone and conglomerate-bearing sandstone of the Upper Pliocene Baogda Wula Formation, Quaternary Holocene Lake Alluvial-diluvial beds (Jin et al., 2017). The strata are generally NE-trending, and the ore bodies are mainly developed in the Cretaceous Cretaceous Gaolao In the broken rock of the group. The volcanic structure is well developed in the area. The NW-trending faults are the main ore-controlling structures. The intersection of NNW-E-trending faults is the favorable position for mineralization. Ore bodies are often rich in manganese and silver in the upper part and lead and

zinc in the lower part. Ore minerals are mainly rhodochrosite, pyrolusite, galena, sphalerite and independent silver minerals. At present, it is preliminarily considered that the deposit is a continental volcanic manganese-silver-lead-zinc deposit controlled by volcanic structure, and the metallogenic period is divided into early, middle and late stages.

Physical data in the area show that the ore and mineralized rocks are characterized by high polarizability, the average polarizability is more than 5%, and the polarizability of other rocks is less than 2%. Based on this physical premise, the working range of IP is determined according to geological data and geochemical anomaly distribution characteristics. The aim is to improve the accuracy of direct prospecting for concealed ore bodies in the area by superimposing IP anomalies with geochemical anomalies. Experiments show that resistivity parameters are relatively weak because of the influence of low resistivity layer on the surface.

The results of IP middle-level measurement (fig.1) show that the apparent polarizability of most measuring points in the area is less than 3%, and the range of apparent polarizability is 0.01%–4.8%, which belongs to the low polarization background area as a whole. Taking 1.5% as the lower limit of anomaly and combining with physical characteristics, four IP anomalies were delineated in the region (Fig. 1), which were IP1–IP4 in turn. IP1 is located in the north-central part of the survey area, with a small scale and a maximum apparent polarizability of 3.1%. Geochemical anomaly is also shown in this area. IP2 is located in the middle part of the survey area, with a banded distribution in the north-west direction. The anomaly scale is medium and the maximum apparent polarizability is 4.8%. It is the extreme point of the apparent polarizability in the survey area. The geochemical anomaly shows a strong difference in the apparent polarizability within this range. Changhe geochemical anomalies are well integrated, and IP2 is a NW-trending ore-bearing structure, which is more continuous, based on physical data and structural characteristics of the study area; IP3 is located in the middle and south of the survey area, with NW-trending distribution, small scale and 2.1% maximum apparent polarizability, within which geochemical anomalies are relatively weak; IP4 is located in the eastern part of the survey area, with NW-trending distribution, large scale and maximum apparent polarizability of 3.8%. Mineralization alteration was found in

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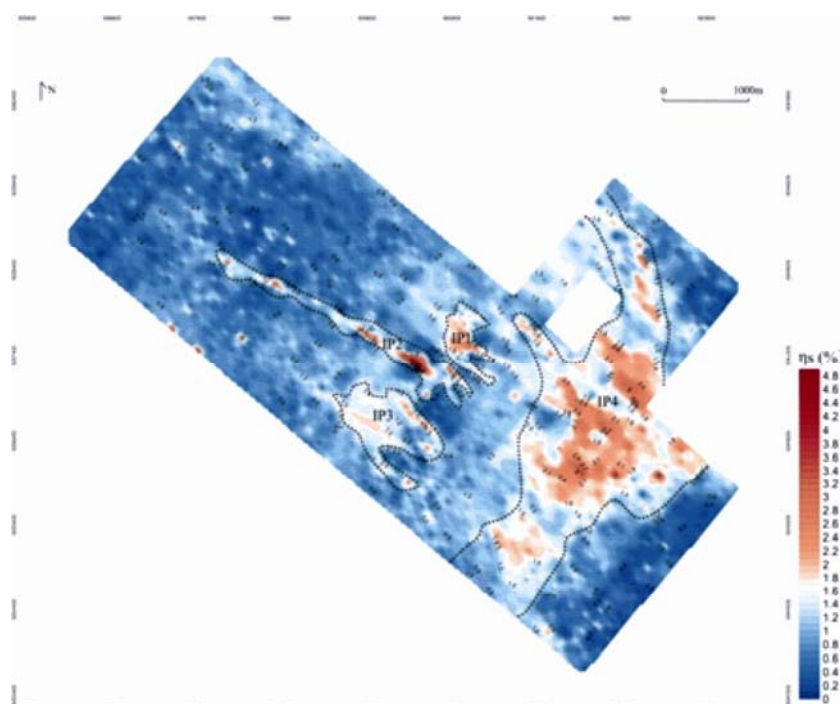


Fig. 1. Apparent polarizability contour map

this area by anomaly survey, and geochemical anomalies were also shown, but the scale was smaller than the apparent polarizability anomaly. Generally speaking, IP1 and IP3 apparent polarizability anomalies are obvious, but their anomalies are weak and small in scale, so they have little prospecting potential. IP2 apparent polarizability anomalies are well integrated with geochemical anomalies, and mineralization phenomena are observed on the surface, and the anomalies conform to regional tectonic characteristics, and have a certain scale, and prospecting prospects are better; IP4 has a large scale, strong anomalies and apparent polarization. Rate anomaly and geochemical anomaly have a certain combination, which can be used as a key target for prospecting in the study area.

The Tianjin Geological Survey Center has drilled IP1, IP2 and IP3, and more than ten ore holes have been found. Among them, ZK37401, ZK39201 and ZK46401 have delineated 51m, 50m and 15m industrial grade orebodies of manganese, silver, lead and zinc respectively, which has made a breakthrough in prospecting in this area. It is preliminarily predicted that the silver deposit will reach a large scale and the lead-zinc deposit will reach a medium scale.

Key words: Daxinganling metallogenic belt, Changtuxili Ag-Pb-Zn polymetallic ore deposit, induced polarization method, induced polarization anomaly

Acknowledgments: This study was jointly supported by the National Key R&D Program of China (Grant no. 2018YFC0603806) and the Geological Survey Project of the China Geological Survey (DD20160050).

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