3-D SIP FOR PODIFORM CHROMITE EXPLORATION

Rujun Chen, Central South University; Xuefeng Zhao, Champion Geophysical Technology; Xiaolu Xi, ; Hongchun Yao, Champion Geophysical Technology; Lanfang He, Nanjing University; Ruijie Shen, Champion Geophysical Technology

It's proved that the podiform chromite ore shows no induced polarization (IP) anomaly and low resistivity anomaly. However, metallogenic system of podiform chromite may produce low resistivity anomaly and strong IP response. The area with low resistivity anomaly and strong IP response may offer clue for podiform chromite location. We carried out a 3D spectral induced polarization (SIP) experiment on a known podiform chromite deposit to study the space relationship among podiform chromite ore, resistivity and IP anomaly. The experiment area is about 320 x 320 m with a known chromite ore body at depth between 40 - 50 m. We adopted pole-dipole array with distributed SIP system with potential line spacing as 40 m and potential electrode spacing as 20m. 17 potential electrodes are used for each potential line and the total potential lines are 8. The same setting is used for current line and current electrodes. However, the spacing among one current line and nearest potential lines is 20 m. Therefore, the electrode grid including current electrodes and potential electrodes is 20 m x 20 m. We have 136 current injections and 128 potential measurements are obtained for each current injection. The SIP data set is inverted by Zondres3d in a workstation with 192GB RAM, 12 CPU cores.

We find very interesting results based on the comparison between inverted resistivity/IP model and known geology information. At first, we find a low resistivity zone just on the top of the known ore body. The width of the low resistivity zone almost is the same as the width of the ore body. Secondly, we find a high IP zone just below the bottom of the ore body. The high IP zone and low resistivity zone offers a very valuable clue to the location of podiform chromites.