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接地源瞬变电磁短偏移深部探测技术

薛国强, 陈卫营, 周楠楠, 李海*

中国科学院矿产资源研究重点实验室, 中国科学院地质与地球物理研究所, 北京 100029

Short-offset TEM technique with a grounded wire source for deep sounding

XUE Guo-Qiang, CHEN Wei-Ying, ZHOU Nan-Nan, LI Hai*

Key Laboratory of Mineral Resources, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

摘要

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摘要

对于接地源时间域瞬变电磁法,当选取适当的激励波形后,可将辐射场与自有场分离开来,实现频率域电磁法无法实现的近源深部勘探;水平分层大地的解析分析表明,随着偏移距的缩短,接地导线源的场对地层的反映变得更为灵敏;时间域瞬变电磁法的探测深度主要由观测时长决定.基于接地源近场测深的优越性,作者提出短偏移瞬变电磁探测技术并首次命名为SOTEM,采用了1000 m的偏移距对埋深为1400 m的某盐矿溶腔进行探测,在全期视电阻率-深度剖面上圈定的溶腔分布被钻孔所揭露,验证了SOTEM方法的探测能力.该方法为大深度、高分辨探测地下矿产资源提供了新的技术手段.

关键词 接地导线源, 瞬变电磁法, 短偏移, 深部探测

Abstract:

Although the loop-source TEM near-field survey system has been widely used, this method still cannot meet the demand for large-area 3D data acquisition and fine probing of deep ore bodies. Based on the advantage of near-field survey, a new configuration called short-offset TEM with a grounded wire-source (named SOTEM by authors) has been proposed and the detecting technique has been studied to solve the problem of detecting underground deep ore targets at high resolution. Analysis of the detection capability of this system such as time-domain response as well as investigation depth suggests that the SOTEM has more merits than the long-offset TEM (LOTEM). Apparent resistivity formula suiting for whole field area has been used to calculate apparent resistivity response of geo-electric models in the short-offset TEM system and the results are consistent with that of the designed geo-electric models. The field data have been collected and the results agree with the drilling data. It is concluded that the proposed method is more easily in exploration and has larger detecting depths and higher detection accuracy. It also shows that the SOTEM is a kind of methods worth to be widely applied.

Keywords [Grounded wire source](#), [TEM](#), [Short-offset](#), [Deep sounding](#)

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About author: 薛国强,男,1966年生,副研究员,主要从事瞬变电磁场理论与应用研究.E-mail: ppxueguoqiang@163.com

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