

应用地球物理学

瞬变电磁法中心回线装置资料解释方法的改进

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摘要 中心回线装置是瞬变电磁勘探中最常用的装置之一.中心回线装置的视电阻率一般从回线中心点场的公式出发导出.在现场实际施工中,为提高工作效率,把发射回线中部三分之一的区域作为观测范围.通过对场分布特征的分析研究表明,与中心点相比,观测区边缘处的感应电动势数值偏离达15%~25%,这与广泛存在于华北型煤系中赋存深度为400~1000 m的陷落柱、导水小断层等引起的异常相比,已经不可忽略.大定源回线公式可以准确地表示任意场点的感应电动势,由此导出视电阻率无边缘效应影响;观测按照中心回线方式并保持在近区进行,可使感应电动势和视电阻率之间的转换简单而直接.理论和实际应用结果表明,这些措施进一步提高了瞬变电磁探测中心回线方法的探测精度.在有上覆低阻屏蔽层的情况下,对埋深500~700 m的陷落柱给出了明显的异常反映,并被井下掘进所验证.

关键词 [瞬变电磁法](#) [中心回线装置](#) [边缘效应](#) [大定源回线](#) [视电阻率](#)

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Improvement for interpretation of central loop transient electromagnetic method

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Abstract The apparent resistivity of the transient electromagnetic central loop configuration is usually derived from the field expressions of the center of the loop source. But in practical explorations, the measurement is taken out in one-third of the area of the center of the transmitter loop in order to raise the efficiency. The analysis on field distribution characteristics shows that the difference between induced electromotive force at the central point and at the edge of the measuring area is up to 15%~25%, which can not be ignored as compared with anomalies caused by collapse columns and conducting small faults buried at the depth of 600 ~ 1000 m widely existing in the north China type coal measures stratum. The equation of the large rectangular loop source cloud expresses induced electromotive force at any field points accurately, the apparent resistivity derived from that is not subject to edge effects; the observation is still made with central loop pattern and in near zone, and the simple and direct relationship between induced electromotive force and apparent resistivity could be maintained. These measures have further improved prospecting precision of transient electromagnetic method of central loop. In the case of existing conductive overburden layer, the anomalous sign of the collapsed column buried at 500 ~ 700 m depth is evident, which has been verified by mining.

Key words [Transient electromagnetic method](#); [Central loop configuration](#); [Edge effects](#); [Large rectangular loop source](#); [Apparent resistivity](#)

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