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## 低阻区利用地回路标定航空TEM系统的理论研究

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Theoretical study of airborne TEM calibration in low resistance areas by using ground loop

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摘要

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摘要 本文针对吊舱式航空TEM系统,建立了基于地回路的系统参数标定模型,并分别计算了自由空间模型响应(TLR)、均匀大地模型响应(TER)、地回路与大地耦合模型响应(TELR和TLER).由于TER响应表现为幅度沿测线不变,据此提出通过增加拟合参数的方法实现系统标定,消除了TER响应对标定的影响. TELR和TLER早期响应具有过零特点,据此通过合理选择过零点附近的早期道,可以显著降低TELR和TLER响应对标定的影响. 本文在理论上证实了在低阻区利用地回路实现航空TEM系统标定的可行性和准确性.

关键词 瞬变电磁, 标定, 地回路, 最小二乘拟合, 航空电磁

Abstract: Models are established for ATEM (Airborne transient electromagnetic) system calibration by using ground loop. The responses of the free space model (TLR), homogeneous earth model (TER) and ground loop coupled with homogeneous Earth model (TELR and TLER) are calculated. Because the amplitude of the TER response is invariant along the test line, we propose a new fit method to calibrate the AEM system and remove the influence of the TER response. Amplitude of TELR and TLER responses are found to be zero at early time, so we select the window near the zero point, and the TELR and TLER responses are remarkably reduced, and their influence on calibration is removed. In this paper, we validate theoretically that ATEM system calibration using ground loop is feasible and accurate in low resistance areas.

Keywords Transient electromagnetic (TEM), Calibration, Ground loop, Least square fit, Airborne electromagnetic (AEM)

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