

勘探地球物理学

误差对大地电磁测深反演的影响

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摘要 本文讨论了几种不同分布的误差对大地电磁测深反演的影响. 首先基于给定的正演模型计算得到相应的理论合成数据, 然后在合成数据中分别加入满足不同均值和方差的高斯分布、均匀分布和Gamma分布的误差, 最后使用非线性共轭梯度法进行反演. 反演结果表明, 较简单的模型在考虑的几种误差分布下可以较好地给出模型的基本信息; 但复杂的模型随着误差方差的增大, 与已知模型的偏差越明显; 在均值和方差相同时, 上述三种不同分布的误差的反演结果相差很小.

关键词 [大地电磁测深](#) [二维反演](#) [误差影响](#) [数值模拟](#)

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Error effects on magnetotelluric inversion

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Abstract We investigate the effects of various error distributions on magnetotelluric (MT) inversion using numerical model simulations. We first generate the ideal noise-free synthetic data from forward modeling of some known models. Then the above ideal synthetic data sets are contaminated by the random noise satisfying Gamma, Gaussian and Uniform distributions with different means and standard deviations respectively. Finally, we make the MT inversion by applying the nonlinear conjugate gradients algorithm to the above synthetic data with various noises. The preliminary results showed that the error effects on MT inversion seem not significant for the simpler model considered in this study. However, such influence cannot be neglected for some complicated models, because the inversion results deviate more from the known complicated models with increasing error levels in the synthetic data. Our results also indicated that the inversion results are not sensitive to the error distributions as long as they have the same mean value and the same standard deviation.

Key words [Magnetotelluric sounding](#); [2D inversion](#); [Error effects](#); [Numerical simulations](#)

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