

引用本文(Citation):

张帆, 魏文博, 金胜, 叶高峰, 景建恩, 张乐天, 董浩, 谢成良, 王辉. 海岸效应对近海地区大地电磁测深数据畸变作用研究. 地球物理学报, 2012, 55(12): 4023-4035
10.6038/j.issn.0001-5733.2012.12.014

ZHANG Fan, WEI Wen-Bo, JIN Sheng, YE Gao-Feng, JING Jian-En, ZHANG Le-Tian, DONG Hao, XIE Cheng-Liang, WANG Hui. Ocean coast effect land-side magnetotelluric data in the vicinity of the coast. Chinese J. Geophys. (in Chinese), 2012, 55(12): 4023-4035, doi: 10.6038/j.issn.0001-5733.2012.12.014

海岸效应对近海地区大地电磁测深数据畸变作用研究

张帆^{1,2}, 魏文博^{1,2,3}, 金胜^{1,2}, 叶高峰^{1,2}, 景建恩^{1,2}, 张乐天^{1,2}, 董浩^{1,2}, 谢成良^{1,2}, 王辉^{1,2*}

1. 中国地质大学(北京)地球物理与信息技术学院, 北京 100083;
2. 地下信息探测技术与仪器教育部重点实验室, 北京 100083;
3. 地质过程与矿产资源国家重点实验室, 北京 100083

Ocean coast effect on land-side magnetotelluric data in the vicinity of the coast

ZHANG Fan^{1,2}, WEI Wen-Bo^{1,2,3}, JIN Sheng^{1,2}, YE Gao-Feng^{1,2}, JING Jian-En^{1,2}, ZHANG Le-Tian^{1,2}, DONG Hao^{1,2}, XIE Cheng-Liang^{1,2*}
WANG Hui^{1,2*}

1. School of Geophysics and Information Technology, China University of Geosciences, Beijing 100083, China;
2. Key Laboratory of Geo-detection, Ministry of Education, Beijing 100083, China;
3. State Key Laboratory of Geological Processes and Mineral Resources, Beijing 100083, China

摘要

参考文献

相关文章

Download: [PDF](#) (7430 KB) [HTML](#) (0 KB) Export: [BibTeX](#) or [EndNote](#) (RIS) [Supporting Info](#)

摘要

在近海地区采集的大地电磁测深数据通常受到海岸效应的影响,使得大地电磁测深数据发生畸变,因而很难利用大地电磁测深资料较为可靠地获得地下深部的电性结构.本文通过正演模拟方法,分析和总结海水深度变化和海底地形变化对近海地区大地电磁测深数据的畸变影响.当测区与海岸线的距离小于目标频率的大地电磁场趋肤深度时,高导海洋的存在会严重影响测区内电磁场的分布.由于海岸效应的影响,大地电磁测深视电阻率曲线和相位曲线均会发生不同程度的畸变,在低频部分,这种畸变作用尤为明显.大地电磁测深一维Occam反演方法和二维非线性共轭梯度反演方法,对近海地区浅部地层具有较好的反演效果.随着海水深度的增加和海底地形的复杂变化,两种反演方法均会出现不同程度的假异常,为地质解释工作造成了影响.近渤海地区的实测大地电磁测深数据在低频部分可能受到海岸效应的影响而导致视电阻率曲线的严重畸变.

关键词 海岸效应, 大地电磁测深, 正演模拟, 反演

Abstract:

When land-side magnetotelluric (MT) data are obtained in the vicinity of the coast, observed MT responses are distorted because of the ocean coast effect. It is difficult to interpret subsurface electrical structures by using MT method. This study is supported by SinoProbe-01-02. The effects of the ocean coast with various depths of seawater and various topographic conditions of seabed on MT data have been studied by forward modeling in this article. The results are also described in this article. When the distance between MT sounding stations and the coast is smaller than the skin depth of the frequency of interest, the existence of conductive sea around the survey area affects the electromagnetic distribution. Ocean coast effects lead to the modification of the apparent resistivity and phase of MT responses in varying degrees. At long periods, MT responses are affected seriously by ocean coast effects. There are good results in the shallow strata in the vicinity of the coast using both 1D Occam inversion and 2D NLCG inversion. When the surrounding sea is deep enough or topographic condition of seabed is complicated enough, it can generate artificial resistivity anomalies in both 1D Occam inversion and 2D NLCG inversion. It is difficult to interpret subsurface electrical structures correctly. The MT data at low frequencies may suffer severely from coast effect contamination in the vicinity of the Bohai Sea.

Keywords Ocean coast effect, Magnetotellurics, Forward modelling, Inversion

Received 2012-05-03;

Fund:

Service

- [把本文推荐给朋友](#)
- [加入我的书架](#)
- [加入引用管理器](#)
- [Email Alert](#)
- [RSS](#)

作者相关文章

- [张帆](#)
- [魏文博](#)
- [金胜](#)
- [叶高峰](#)
- [景建恩](#)
- [张乐天](#)
- [董浩](#)
- [谢成良](#)
- [王辉](#)

