

Research Group of Innovative Development in Theory and Technology of Deep Resources Exploration and its Applications, Institute of Geology and Geophysics, Chinese Academy of Sciences

Based on the urgent need for new methods and key equipment development in deep resource exploration area, innovative researches related to theoretical improvement, technical development and exploration breakthrough were conducted by this group. The propagation characteristics of electromagnetic wave in "Ionosphere-Atmosphere-Lithosphere" was established, the method for calculating near source point-charge infinitesimal response was obtained; the high performance magnetic sensors and the Surface Electromagnetic Prospecting (SEP) system have been developed independently; and the short offset transient electromagnetic method (SOTEM) was proposed. These achievements have not only significantly increased the resolving depth of active source EM method from a few hundred meters to several kilometers, they also ensure high precision at large depth in deep exploration study with less time and low cost on a large scale. Hence, the innovative achievements of this research group has subdued the monopoly of electromagnetic equipment in China by foreign companies, encouraged national "Key Equipment Development for Deep Resources Exploration" and other major scientific projects; also made significant contributions to the development of geophysical exploration technology.

Outstanding contributors of this research group

Di Qingyun Institute of Geology and Geophysics, Chinese Academy of Sciences

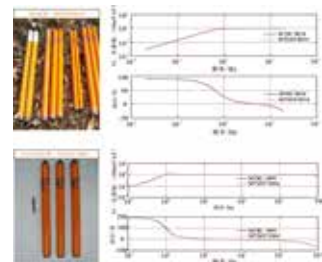
Studied the propagation law of electromagnetic wave in "Ionosphere-Atmosphere-Lithosphere", developed the Surface Electromagnetic Prospecting (SEP) system, and successfully applied these techniques in field exploration.

Fang Guangyou Institute of Electronics, Chinese Academy of Sciences

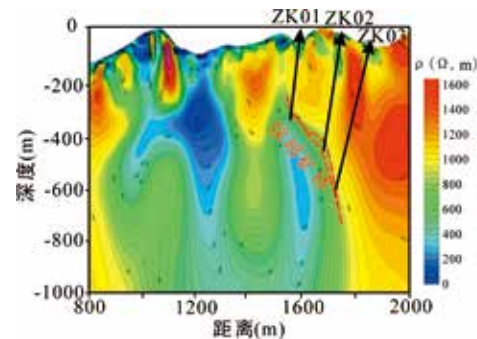
Developed high performance magnetic sensors, and changed the passive situation of main reliance on importation of high performance magnetic sensors in geophysical exploration field in China.

Xue Guoqiang Institute of Geology and Geophysics, Chinese Academy of Sciences

Developed the method for calculating near source point-charge infinitesimal response, and independently proposed and researched short offset transient electromagnetic method (SOTEM).



自主研发的高性能磁传感器与标定曲线
Developed coil sensors and their calibration curves



某金矿探测电阻率剖面
Resistivity profile of a certain mineral deposit



地面电磁探测系统性能测试
The performance test of surface electromagnetic prospecting (SEP) system

深部资源探测理论技术突破与应用研究集体

研究集体推荐单位：中国科学院地质与地球物理研究所

研究集体主要科技贡献：

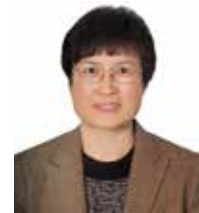
围绕深部资源探测的新方法与核心装备关键环节，开展了集“理论创新、技术研发、勘探突破”三位一体的创新性研究。揭示了“电离层-大气层-岩石层”电磁波传播特征，发展了近场点微元响应计算方法，研发了具有自主知识产权

的高性能磁场传感器和地面电磁探测系统，提出了短偏移瞬变电磁勘探方法。这些成果不仅使主动源电磁探测深度从几百米拓展到几公里，而且可以在大范围内实现大深度、高精度、快速度、低成本探测。该集体打破了电磁探测装备被国外垄断的局面，推动了国家“深部资源探测核心装备研发”等重大科研项目的实施，为我国地球物理探测技术的发展做出了重要贡献。

研究集体突出贡献者

底青云 中国科学院地质与地球物理研究所

主要科技贡献：研究了“电离层-大气层-岩石层”电磁波传播规律，组织实施了地面电磁探测系统研发，并成功进行了勘探实践。



底青云 Di Qingyun

方广有 中国科学院电子学研究所

主要科技贡献：研发出高性能磁场传感器产品系列，打破了我国地球物理勘探领域高端磁传感器依赖进口的被动局面。



方广有 Fang Guangyou

薛国强 中国科学院地质与地球物理研究所

主要科技贡献：发展了近场点微元响应计算方法，自主研发了短偏移瞬变电磁勘探技术。



薛国强 Xue Guoqiang

研究集体主要完成者

杨长春 张一鸣 李德亨 殷长春 王自力 陈文轩 安志国 付长民 王中兴 朱万华 王若 张文秀 雷达 周楠楠 杨永友 孙云涛 黄玲



自主研发的瞬变电磁短偏移距探测方法
Developed SOTEM system

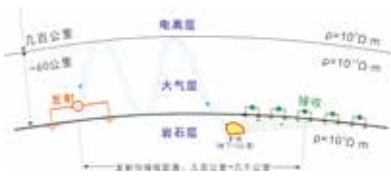


自主研发的地面电磁探测系统通过了专家组的野外测试鉴定

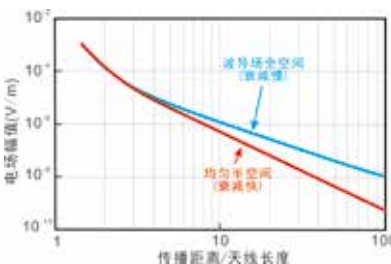
The experts successfully qualified the surface electromagnetic prospecting (SEP) system



自主研发的地面电磁探测系统接收机
Developed receivers and function parameters



长偶极电磁波远距离传播示意图
The wave propagation diagram for long dipole electromagnetic source



波导电磁场传播特征
Waveguide electromagnetic field characteristics

Other members

- Yang Changchun
- Zhang Yiming
- Li Deting
- Yin Changchun
- Wang Tsili
- Chen Wenxuan
- An Zhiguo
- Fu Changmin
- Wang Zhongxing
- Zhu Wanhua
- Wang Ruo
- Zhang Wenxiu
- Lei Da
- Zhou Nannan
- Yang Yongyou
- Sun Yuntao
- Huang Ling