



JW-8D型地下电磁波层析成像系统 Underground Electromagnetic Wave Tomography System

地下电磁波法系统是以所勘探目标体与围岩存在高频电性差异为基础而设计，广泛应用于矿产、水电、铁道、煤炭、地质灾害、工程地质与水文地质勘查等领域。

在国家863项目支持下，研制开发了JW-8D地下电磁波法系统，该系统集数据采集系统和数据处理系统为一体。数据采集系统包括钻孔发射机、接收机及地面采集监控器。数据处理系统包含了数据整理、数据预处理和图示、模型正演分析和层析成像解释四个模块。

Based on the high-frequency electrical difference between the exploration targets and surrounding rocks, the underground electromagnetic wave method is widely used in mining, hydropower, railways, coal, geological disasters, engineering geology and hydrogeology survey etc.

Under the support of the National 863 project, the JW-8D underground electromagnetic wave tomography system is developed, which integrates the data acquisition system and data processing system. The data acquisition system contains a transmitter, a receiver and a ground acquisition monitor. The data processing system includes four modules: data processing, data preprocessing and graphic representation, model forward and tomography.

数据采集系统主要技术参数:

工作频率 扫频范围: 0.1 ~ 40.0MHz;
扫频间隔: 0.1 ~ 9.9MHz;
发射机峰值功率: 100W;
接收机测量范围: 0.1μV ~ 30mV;
钻孔发射机和接收机尺寸: Φ=50mm;
L ≤1680mm;
钻孔仪密封性能: ≤25MPa;
仪器工作温度: 0 ~ 85℃。

Main specification of data acquisition system:

Operating frequency Sweep range: 0.1 ~ 40.0MHz;
Interval: 0.1 ~ 9.9MHz;
Peak power of transmitter: 100W;
Measurement range of receiver : 0.1μV~30mV;
Size of receiver and transmitter: Φ=50mm;
length ≤1680mm;
Sealing property: ≤ 25MPa;
Operating temperature : 0 ~ 85℃.

数据处理系统主要功能

数据整理: 数据传输和文件整理;
预处理与图示: 数据点交互式删除, 数据平滑, 误差统计; 显示曲线图、模型分布图等;
模型正演: 无限长水平圆柱体和二度直立板状体模型的正演计算;
层析成像: 包含代数重建技术、联合代数重建技术、共轭梯度法等反演方法。

Main functions of data processing system

Data processing: data transmission and file tidying;
Pre-processing and graphic: data points interactive deletion, data smoothing, error statistics, display curve, model distribution, etc.;;
Model forward: model forwarding of infinite horizontal cylinder and two-dimensional vertical plate;
Tomography: inversion methods including Algebra Reconstruction Technique, Simultaneous Iterative Reconstruction Technique, Conjugate Gradient , etc.

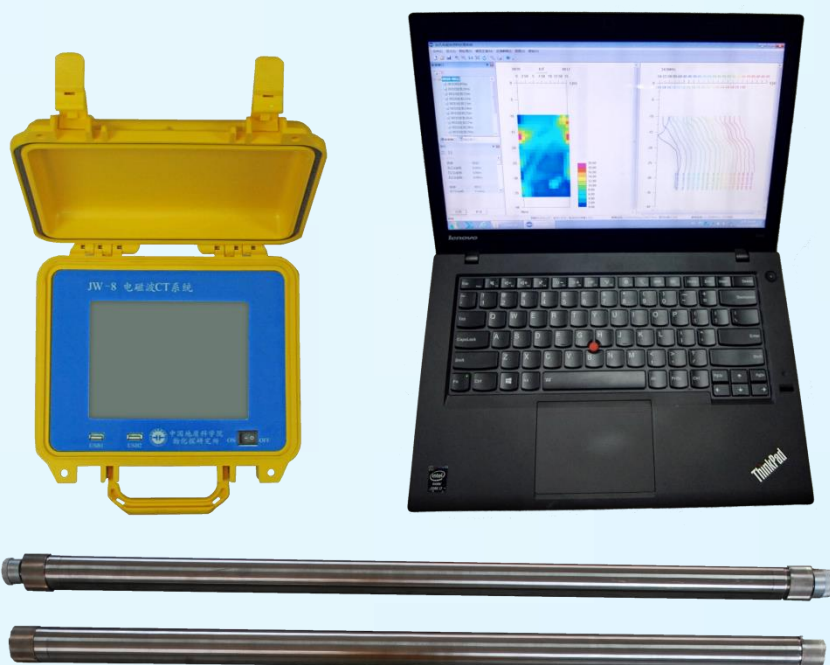


图1 JW-8D地下电磁波数据采集系统
JW-8D Underground Electromagnetic data acquisition system

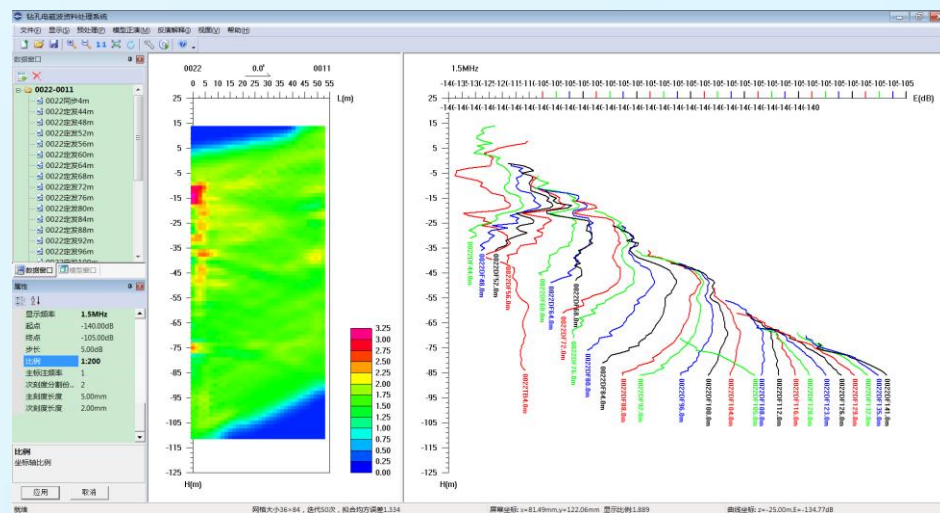


图2 JW-8地下电磁波数据处理系统
JW-8 Underground Electromagnetic data processing system

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