

高分辨率声波钻孔电视及其在核废物地质处置深部岩体研究中的应用

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摘要 声波钻孔电视测量是最早能获得钻孔直观图像的地球物理测井方法, 新一代声波钻孔电视探头采用了先进的声波束聚焦技术、数字记录技术和数字化数据处理技术, 具有精度高、分辨率高和测井速度快等特点。在高分放废物深地质处置库场址预选和场址评价研究中, 深部岩体的节理裂隙特征参数是场址性能评价的基础数据之一。利用高分辨率声波钻孔电视测井技术, 可获得钻孔孔壁直观图像和孔壁各点的三维磁坐标和倾斜坐标参数。利用这些参数, 计算钻孔的偏移量、进行钻孔裂隙统计分析、岩芯定向排列和评价局部范围内深部岩体节理裂隙和断裂构造的延伸特征等。声波钻孔电视是一种方便、快捷、精度高的深部岩体裂隙测量工具。

关键词 [岩石力学; 高分辨率声波钻孔电视; 核废物地质处置; 深部岩体; 裂隙](#)

分类号

ACOUSTIC BOREHOLE TELEVIEWER WITH HIGH RESOLUTION AND ITS APPLICATION TO DEEP FORMATION FOR GEOLOGICAL DISPOSAL OF NUCLEAR WASTE

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Abstract

Acoustic borehole televiewer (BHTV) logging is the first geophysical approach to obtain the intuitionistic image of borehole wall. New generation BHTV is characterized with high accuracy, resolution and high logging velocity for the advanced technology of focused ultrasound beam and digital recording and digital data process are adopted. It is one of the most direct and effective methods to detect fracture in boreholes. The main advantages of the BHTV are of high resolution and full 360-degree coverage of the borehole circumference from which the character, relation, and orientation of structural planar features can be defined. Simple introduction of the acoustic imaging method is presented, and its application and integrated studies on pre-siting and site characterization for deep geological disposal of high-level radioactive waste are described. The borehole images, three magnetometer coordinates, and two inclinometer coordinates of each point of borehole wall are obtained by using BHTV. Based on this borehole information, location, size and orientation of fractures that intersect the borehole are

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determined. The calculation of borehole deviation is performed; and the rock cores taken from borehole are oriented in the laboratory. The extension of joints/fractures and faults surrounding the borehole is assessed. Therefore, it is considered that BHTV is a useful tool to detect the joints and fractures in the deep geological formation. But as a geophysical approach, limitations of this tool in practice should be considered.

Key words [rock mechanics](#); [acoustic borehole televiewer with high resolution](#); [geological disposal of nuclear waste](#); [deep rock mass](#); [fracture](#)

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