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大容量气枪震源特征及地震波传播的震相分析

林建民[1],王宝善[2],葛洪魁[2],唐杰[1],张先康[3],陈颙[2]

1 中国科学技术大学地球与空间科学学院，合肥 230026;2 中国地震局地球物理研究所，北京 100081;3 中国地震局地球物理勘探中心，郑州 450002

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摘要 利用大容量气枪震源在陆上水库进行地震波激发试验，研究陆上水库环境下激发气枪震源所产生的地震波特征及传播距离. 试验结果表明，大容量气枪震源是具有丰富的10 Hz以下低频信号的低频震源，其激发的地震波具有传播距离远，穿透深度深的特点. 在185 km长的测线上均记录到了气枪信号，成功检测到Pg，Pc，P2，PmP和Pn等多组震相，并在此基础上对地下深地壳结构进行了一维速度结构正演，讨论了该区域壳幔过渡带的低速结构. 气枪震源还具有一般炸药震源不具有的特征，如长期定点重复激发和有效转换S波的优点，是陆上进行长炮检距深穿透地下结构研究的一种优良人工震源.

关键词 气枪震源,水库,深地壳结构,震相分析

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Study on large volume airgun source characteristics and seismic phase analysis

LIN Jian-Min[1], WANG Bao-Shan[2], GE Hong-Kui[2], TANG Jie[1], ZHANG Xian-Kang[3], CHEN Yong[2]

1 School of Earth and Space Science, University of Science and Technology of China, Hefei 230026, China;2 Institute of Geophysics, China Earthquake Administration, Beijing 100081, China;3 Research Center of Exploration Geophysics, China Earthquake Administration, Zhengzhou 450002, China

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Abstract A field experiment using large volume airgun source was conducted in an onshore reservoir. The characteristics of the waveform and its propogation has been studied. The result shows that large airgun source excited in reservoir environment is rich in low frequencies (<10 Hz), and is effective to produce waves with long-offset and deep crustal penetration. The airgun signal was detected all along the line of the largest offset equal to 185km, seismic phases Pg, Pc, P2, PmP and Pn have been picked successfully, based on which 1-D forward modeling of deep crustal structure has been conducted and the low velocity layer of crust-mantle transition zone has been discussed. Further more, airgun source has good repeatability and is effective to produce S wave, it has been proved to be an effective artificial source on land to provide wide angle and long-offset recording to study deep crustal structure.

Key words Large airgun source Reservoir Deep crustal structure Phase analysis

通讯作者:
林建民 jmlin@mail.ustc.edu.cn
作者个人主页: 林建民[1];王宝善[2];葛洪魁[2];唐杰[1];张先康[3];陈颙[2]