

引用本文(Citation):

张辉, 高原, 石玉涛, 刘小凤, 王熠熙. 基于地壳介质各向异性分析青藏高原东北缘构造应力特征. 地球物理学报, 2012, 55(1): 95-104, doi: 10.6038/j.issn.0001-5733.2012.01.009

ZHANG Hui, GAO Yuan, SHI Yu-Tao, LIU Xiao-Feng, WANG Yi-Xi. Tectonic stress analysis based on the crustal seismic anisotropy in the northeastern margin of Tibetan plateau. Chinese J. Geophys. (in Chinese), 2012, 55(1): 95-104, doi: 10.6038/j.issn.0001-5733.2012.01.009

基于地壳介质各向异性分析青藏高原东北缘构造应力特征

张辉^{1,3}, 高原², 石玉涛², 刘小凤¹, 王熠熙^{1*}

1. 中国地震局兰州地震研究所, 兰州 730000;
2. 中国地震局地震预测研究所, 北京 100036;
3. 地球物理国家野外科学观测研究站, 兰州 730000

Tectonic stress analysis based on the crustal seismic anisotropy in the northeastern margin of Tibetan plateau

ZHANG Hui^{1,3}, GAO Yuan², SHI Yu-Tao², LIU Xiao-Feng¹, WANG Yi-Xi^{1*}

1. Lanzhou Institute of Seismology, China Earthquake Administration, Lanzhou 730000, China;
2. Earthquake Science Institute, China Earthquake Administration, Beijing 100036, China;
3. Lanzhou National Observatory of Geophysics, Lanzhou 730000, China

摘要

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摘要 青藏高原东北缘由于受到多个构造块体的共同约束,表现出复杂的地球物理特性和地质特性,本文利用甘肃数字地震台网(2001—2008年)的观测资料,采用系统分析方法(SAM),进行地壳剪切波分裂分析,获得研究区内18个台站共1005条记录的剪切波分裂参数.研究表明,青藏高原东北缘介质各向异性在空间上存在差异,慢剪切波延迟时间表明了地壳介质各向异性的强弱变化特征,快剪切波平均偏振方向则反映了本区区域构造应力的空间变化特征.分析认为,祁连山—河西走廊活动构造区直接受青藏地块与阿拉善地块间相互作用,与青藏地块构造应力一致;甘东南活动构造区的应力环境主要受到内部活动断裂的共同作用,具有局部构造应力的特征.

关键词 青藏高原东北缘, 地震各向异性, 剪切波分裂, 构造应力

Abstract: The northeastern margin of Tibetan plateau is controlled jointly by several tectonic blocks and shows complicated geophysical and geological characters. In the paper, the data from Gansu Seismological Network (2001—2008) are analyzed with the seismic anisotropy analysis method in crust (SAM). 1005 shear-wave splitting parameters from 18 stations are obtained. The results show that the crustal seismic anisotropy in the northeastern margin of Tibetan plateau varies in space. The delay times of slow shear-waves show the variation characteristics of the strength of crustal seismic anisotropy and the average polarizations of fast shear-waves reflect the spacial variation characteristics of regional tectonic stress. It is shown that the interaction of Tibetan plateau block and Alxa block controls the region of Qilianshan-Hexi corridor active structures, where the direction of tectonic stress is the same as in Tibetan plateau block. In the southeast of Gansu active structure region, it is regarded that active faults are influential on the stress field, which shows local tectonic stress characteristics.

Keywords Northeastern margin of Tibetan plateau, Seismic anisotropy, Shear-wave splitting, Tectonic stress

Received 2011-02-09;

Fund:

国家自然科学基金(41040034)、地震行业科研专项(201008001)和南北地震带北段大震危险性强化跟踪项目资助.

Corresponding Authors: 高原,男,1964年生,中国地震局地震预测研究所研究员,博士生导师,主要从事地震波理论与应用研究.
E-mail: gaoyuan@seis.ac.cn. Email: gaoyuan@seis.ac.cn

About author: 张辉,男,1978年生,助理研究员,主要从事地震学及数字地震资料的应用研究.E-mail: zhh_gx@163.com.

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<http://118.145.16.227/geophy/CN/10.6038/j.issn.0001-5733.2012.01.009> 或 <http://118.145.16.227/geophy/CN/Y2012/V55/I1/95>

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