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## 玉树地区地壳介质的各向异性特征

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### Characteristics of crustal anisotropy beneath the Yushu region

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摘要

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**摘要** 本文利用2010年5月7日到10月18日玉树地震震源区及其周边22个地震台站记录的2010年4月14日玉树地震余震数据资料,使用剪切波分裂分析方法初步得到了每一个台站的剪切波快波偏振方向和慢波时间延迟,并分析了玉树及周边地区地壳介质各向异性特征.在该研究区域,甘孜-玉树断裂上部分台站快波偏振方向近于东西向,这一结果与该区域的水平主压应力方向一致.甘孜-玉树断裂带南段玉树周边的台站快剪切波偏振方向为南东向,与断裂带的走向一致,显示了此次地震断裂走滑性质的特征.位于杂多断裂和清水河断裂上的台站及其附近的台站,快波偏振方向与所处的断裂走向基本一致,多为南东东向.各个台站的慢波延迟时间结果分布在4.23~7.01 ms/km范围内,平均慢波延迟时间是5.68 ms/km.在甘孜-玉树断裂带和乌兰乌拉湖-玉树南断裂相交的位置慢波延迟总体较高;而低值区位于打贝通-小苏莽断裂的北西端与杂多断裂之间的位置.沿玉树断裂带,慢波延迟时间的梯度值较大,本文这一结果揭示了慢波延迟时间的分布和破裂带的走向、余震的分布有很大关系.

**关键词** 玉树地震, 剪切波分裂, 快剪切波偏振方向, 慢波延迟时间

**Abstract:** This work uses seismic data of the aftershock sequence of the 14 April 2010 Yushu earthquake recorded by 22 seismic stations at the Yushu epicenter and surrounding areas from 7 May 2010 to 18 October 2010 and the analysis method of shear-waves splitting to determine the polarization direction of fast shear-wave and the delay time of slow shear-wave below every station, and analyze the crustal anisotropic characteristics in Yushu and adjacent areas. The results show that the polarization directions of fast shear-waves at some stations which are located at the Garz?-Yushu fault zone are nearly in the east-west direction, consistent with the direction of the horizontal principal compressive stress in this region. The polarization directions of fast shear-waves at stations which are around the Yushu station located at south of the Garz?-Yushu fault belt are southeast, which is consistent with the strike of the faults. These patterns of the polarization directions of fast shear-waves indicate that this fault on which the earthquake happened is a strike-slip fault. The polarization directions of fast shear-waves of stations located at and around the Zadoi fault and Qingshuihe fault are the same as the strike of the faults, which are SEE direction. The delay time of slow shear-wave of every station is in the range of 4.23~7.01 ms/km, and the average delay time of the slow wave is 5.68 ms/km in the study area. The slow-wave delay time is higher in the intersection location between the Garz?-Yushu fault belt and Ulan Ul lake-Yushu South fault. And the area with lower values is located at the position which is between the northwestern segment of the Dabeitong-Xiao Surmang fault and Zadoi fault belt. The gradient of the slow-wave delay time is higher along the Yushu fault zone. This paper indicates that there is a definite relationship between the distribution of the slow-wave delay time, the strike of rupture zone and the distribution of aftershocks.

**Keywords** Yushu earthquake, Shear-wave splitting, Polarization direction of fast shear-wave, Delay time of slow shear-wave

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