

青藏高原东北缘上地幔各向异性研究

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摘要 通过分析位于青藏高原东北缘的区域数字地震台网30个台站的远震SKS波形资料, 采用最小切向能量的网格搜索法和叠加分析方法求得每一个台站的SKS快波偏振方向和快、慢波的时间延迟, 获得了青藏高原东北缘上地幔各向异性图像. 从得到结果看, 青藏高原东北缘的各向异性快波方向基本上呈NW-SE方向, 并有一顺时针旋转趋势, 快、慢波时间延迟是0.70~1.51 s. 青藏高原东北缘的SKS快波偏振方向与区域内主要构造断裂走向基本一致; 各向异性快波偏振方向变化与区域内最小平均主压应力方向变化相似, 也与由GPS测量得到的速度场方向变化相似. 研究表明青藏高原东北缘上地幔物质在区域构造应力场的作用下, 发生了顺时针旋转的形变以至流动, 使得上地幔中橄榄岩的晶格排列方向平行于物质形变或流动方向, 上地幔变形和上覆地壳变形可能存在垂直连贯变形特征.

关键词 [青藏高原](#), [各向异性](#), [SKS波](#), [快波方向](#), [岩石圈变形](#)

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Seismic anisotropy of upper mantle in the northeastern margin of the Tibetan Plateau

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Abstract Based on the polarization analysis of teleseismic SKS waveform data recorded at 30 seismic stations in the regional digital seismograph networks of the northeastern margin of the Tibetan Plateau, the SKS fast-wave direction and the delay time between the fast and slow shear waves at each station were determined by use of the grid searching method of minimum tangent energy and the stacking analysis method, and then we acquired the image of upper mantle anisotropy in the northeastern margin of the Tibetan Plateau. In the study region, the fast-wave polarization direction is basically in NW-SE direction with a clockwise rotation trend, and the delay time falls into the interval from 0.70 to 1.51 s. The fast wave polarization direction is consistent with the strike of the major faults in the region. The variation of the fast-wave directions is similar to the variation of the minimum average principal compressional stress directions in the northeast margin of the Tibetan Plateau, and to the variation of GPS velocity directions. The research results imply that the regional tectonic stress field has resulted in deformation and flow of upper mantle material with clockwise rotation, and make the alignment of upper mantle peridotite lattice parallel to the direction of material deformation. The deformation of the crust and upper mantle is possibly vertically coherent deformation.

Key words [Tibetan Plateau](#), [Anisotropy](#), [SKS wave](#), [Fast-wave direction](#), [Lithospheric deformation](#)

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