

藏北低速体存在的地震学证据——INDEPTH4宽频地震结果

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引用本文: 薛光琦,赵文津,宿和平,钱辉,冯梅,James Mechie.2011.藏北低速体存在的地震学证据——INDEPTH4宽频地震结果[J].地球学报,32(3):331-335.

DOI: 10.3975/cagsb.2011.03.08

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基金项目:中国地质调查局项目“青藏高原深部结构探测与地壳活动特征”(编号: 1212010511809); 美国自然科学基金委员会(NSF); 德国GFZ地学研究中心

中文摘要:位于青藏高原东北部的INDEPTH-IV地震探测剖面,始于柴达木盆地南缘,穿越东昆仑造山带、金沙江缝合线,终止于羌塘地体。本文作者利用天然地震体波完成了该区的3D走时残差反演,勾勒出了青藏高原东北部的深部构造格局。研究区最显著的现象则是分布在昆仑地体、可可西里地体、羌塘地体北部地壳、上地幔中的低速体。对其成因,有可能北俯冲的印度板片与向南俯冲的欧亚板片在此聚合形成的地幔热物质有关。另外,昆南、昆中断裂、金沙江断裂向南的逆冲现象比较明显;推测柴达木盆地的上地幔中没有热物质的为刚性岩石圈。

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Seismological Evidence for the Existence of the Low-velocity Body in Northern Tibet: A Result from INDEPTH-IV Based Broad-Band Seismological Study

Abstract:The INDEPTH-IV seismic profile, located in northeastern Qinghai-Tibetan Plateau, starts at the north end of Qaidam Basin, extends across East Kunlun Fault Zone Jinsha Suture, and ends at Qiangtang Terrain. The authors implemented a 3-D travel-time residual reversion using body-wave from the natural earthquake, and outlined the pattern of the deep-seated structure underneath the northeast part of the Qinghai-Tibetan Plateau. The most notable phenomenon in the area of interest is the existence of low-velocity bodies distributed between the lower-crust and the upper-mantle beneath the Kunlun Terrain, Hoh Xil Terrain and the north part of Qiangtang Terrain, probably relate to the hot mantle material derived from the collision between the northward thrusting Indian Plate and southward moving Eurasian Plate. The result obviously indicates that the South Kunlun Fault, Central Kunlun Fault and Jinshajiang Fault are all southward thrusting. It is then presumed that the upper-mantle beneath the Qaidam Basin is rigid, where there is no exchange of hot material.