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## 中国东北地区远震P波走时层析成像研究

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The travelttime tomography study by teleseismic P wave data in the Northeast China area

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摘要

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摘要

利用中国东北流动和固定台网的234个宽频带地震仪记录的远震波形数据,采用波形相关方法拾取了57251个有效相对走时残差数据,进一步采用FMTT(Fast Marching Teleseismic Tomography)层析成像的方法,反演获取了研究区下方深达800 km的P波速度结构.结果显示:在长白山下方发现有一个高速异常结构,这可能就是俯冲到欧亚大陆板块下方的太平洋板块,由于板块的部分下沉,使得板块的形状并没有呈现出明显的板片状.长白山、阿尔山、五大连池火山下方都有低速异常体,长白山和阿尔山下的低速异常向下延伸至地幔转换带,可能与其上部的火山形成有关.五大连池火山下方的低速异常向下延伸至200 km左右,不同埋深的低速异常结构可能意味着五大连池与长白山和阿尔山有着不同的成因.松辽盆地呈现以高速异常为主导高低速异常混合分布的特性,暗示松辽盆地可能有岩石圈拆沉的过程,盆地南部下方的低速异常与长白山和阿尔山下的低速异常有连通性,可能是下地幔热物质上涌的一个通道.

关键词 中国东北, 长白山, 阿尔山, 五大连池, 层析成像

Abstract:

We picked the relative travelttime residuals from the teleseismic waveform data by waveform correlation method, and got 57251 usable relative travelttime residuals. The teleseismic waveform data were recorded by the temporary and permanent seismic networks in Northeast China, the total number of the station is 234. We imaged the P-wave velocity structure beneath Northeast China down to 800 km depth by the FMTT (Fast Marching Teleseismic Tomography). The results reveal that there is a high-velocity anomaly beneath the Changbaishan volcano, maybe this anomaly is the Pacific Plate, which subducted under the Eurasian Plate. Because of local depressing of the plate, the shape of the plate doesn't appear as an obvious slab. There are low-velocity anomalies beneath the Changbaishan volcano, Aershan volcano and Wudalianchi volcano. The low-velocity anomalies under the Changbaishan and Aershan volcano extend down to the mantle transition zone, while the low-velocity anomaly under the Wudalianchi volcano extends down to about 200 km depth, which may indicate that Changbaishan and Aershan volcano have some relationship with the low-velocity anomalies under them, and the different depths of the low-velocity anomalies represent the different origin of the Wudalianchi volcano. There is a mainly high-velocity zone with a mixed high- and low-velocity distribution character beneath the Songliao Basin area. The mixture character suggests that lithospheric delamination may have occurred and greatly affected the Songliao Basin. The low-velocity anomaly, beneath the southern part of Songliao Basin area connecting to the low-velocity anomalies beneath the Changbaishan and Aershan volcano, may be a upwelling material channel from the lower mantle.

Keywords [Northeast China](#), [Changbaishan Volcano](#), [Aershan Volcano](#), [Wudalianchi Volcano](#), [Tomography](#)

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