

地震学★地磁学★地球动力学

2003年8月16日赤峰地震：一个可能发生在下地壳的地震？

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摘要 利用宽频带远震数字地震记录, 计算赤峰台下方接收函数, 得到了MOHO面深度为34~35 km, 并结合CRUST2.0模型等前人工作成果得到了赤峰地区的速度结构. 我们以此速度结构作为模型, 利用中国国家地震台网(CDSN) 5个台站的宽频带地震数据, 采用CAP方法反演2003年8月16日赤峰地震震源机制解并初步确定震源深度; 再利用IRIS 9个台站远震体波数据, 通过对比理论计算和观测记录的方法进一步精确确定震源深度并验证反演得到的机制解, 得出此次地震矩震级为5.2, 震源机制解为: 节面I: 315° /64° /19°, 节面II: 216° /74° /152°, 震源深度为25±2 km, 已深达下地壳. 本文初步讨论了这样的发震深度所对应的可能发震机理和岩石物理特征, 认为赤峰地区的下地壳处于相对低温的状态.

关键词 [震源机制解](#) [震源深度](#) [近震波形](#) [远震波形](#) [下地壳地震](#)

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The 16 August 2003 Chifeng earthquake: Is it a lower crust earthquake?

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Abstract We used broadband teleseismic data of Chifeng station to calculate the Receiver Functions, then obtained a velocity model with H-K stacking method in combination with CRUST2.0 and other previous work. With this velocity model and broadband records from 5 CDSN stations, we inverted focal mechanisms of Chifeng earthquake on August 16th, 2003 with the “Cut and Paste” (CAP) method. Then we confirmed focal depth and the source mechanisms by comparing synthetic body waves at teleseismic distance with broadband records of 9 IRIS stations. Our result shows that the best double couple solution of this M_w 5.2 event is 315°, 64° and 19° for strike, dip and slip angles respectively, the second nodal plane solution is 216°, 74°, and 152°. The focal depth is 25±2 km, suggesting that this quake occurred in the lower crust which is much deeper than most continental earthquakes. This lower crust earthquake requires that the rock should be colder than expected. We proposed generation mechanism of this deep earthquake and its implications in rock strength and thermal state.

Key words [Source mechanism](#); [Focal depth](#); [Local waveform](#); [Teleseismic waveform](#); [Lower crust earthquake](#)

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