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## 2003年青海德令哈6.7级地震序列的震源机制解及其构造含义

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Focal mechanism solutions of 2003 Delingha, Qinghai, M6.7 earthquake sequence and its tectonic implication

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摘要

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摘要 利用8个流动数字地震台和国家数字地震台站的地震波形记录,测量了2003年4月17日青海德令哈6.7级地震及其主要余震的直达P波、SV波、SH波的初动方向和振幅比,应用Snoko(2003)的测定震源机制解的格点尝试法,测定出德令哈地震序列的48个2.4级以上地震的震源机制解.搜集分析了美国哈佛大学测定的德令哈6.7级主震和2004年二期地震活动中的7个地震的震源机制解.基于余震空间分布特征和对震源机制解特征的分析,讨论了德令哈地震序列的可能断层活动方式和地震的构造含义.结果表明,主震和大部分余震都是沿NWW-SEE走向的逆断层错动,北边的上盘可能沿低角度向北倾的断层面向南仰冲;个别正断层余震可能是震源区挤压变形弧顶区附近发生的局部张性破裂;在二期地震活动中,逆断层和走滑断层都有,走滑断层地震主要发生在震源区东侧.德令哈地震活动是青藏高原东北缘NWW-SEE向延伸的挤压带继续处于隆升活动中的表现,这一继承性新构造运动是德令哈地震序列的可能发震原因.

关键词 德令哈地震序列, Snoko震源机制解测定法, 断层活动方式, 青藏高原东北缘

Abstract: Using digital seismic records from 8 portable stations and from stations of National Digital Seismic Network, we have measured the polarities and amplitude ratios of direct P, SH and SV waves of 2003 Delingha, Qinghai, M6.7 earthquake and its aftershocks. Applying Snoko's (2003) grid search algorithm we determined focal mechanism solutions of 48  $M \geq 2.4$  earthquakes. We also analyzed Harvard focal mechanism solutions of the Delingha mainshock and 7 late aftershocks. Our study result shows that the mainshock and most aftershocks have a reverse faulting mechanism with fault strike in NWW-SEE and the northern hanging wall moving southward and upward. Two normal faulting aftershocks may come from possible tensile fractures in front part of the compressive thrust arc. During the second phase of earthquake activity in 2004 the motion of main thrust fault might have induced rupture of some strike-slip faults in eastern part of the source region. The Delingha earthquakes are located in a wide NWW-SEE trend compression zone in northeastern Qinghai-Xizang plateau region, and the present-day uplift of this compression zone serves as the seismogenic origin of the Delingha earthquake sequence.

Keywords Delingha earthquake sequence, Snoko's algorithm of focal mechanism determination, Faulting style, Northeastern Qinghai-Xizang plateau

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