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Research on Heterogeneity and Dynamic Genesis of the Present Tectonic Stress Field in Tianshan Mountain Zone

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Based on the results of previous research and combining the latest geological and seismological data, we study the recent tectonic stress field in Tianshan Mountain Zone and its variation characteristics by inversion of fault slip data and focal mechanism solutions, and discuss its dynamic background. By the investigation of active faults and the measurements of slickensides in north Tianshan Mountain, we get 23 tectonic stress tensors in north Tianshan Mountain Zone by the Sliding Direction Fitting Method (SDFM). The inverted result shows that the recent tectonic stress field in Tianshan Mountain Zone is characterized by near N-S maximum compressional stress, and the stress regime is mainly of reverse slip, with some cases of strike slip. Simultaneously, using 245 middle and strong earthquake focal mechanism solutions happened in the period of 1931-2004 to determine the stress districts in Tianshan Mountain Zone by step by step convergence method. The inverted results indicate there are 3 stress districts in Tianshan Mountain Zone and they are Pamir stress district, Jiashi stress district and Urumchi stress district, respectively. Besides, we also get the general

characteristics of recent tectonic stress field in Tianshan Mountain Zone. First, its direction of the maximum compressional stress is about in N-S direction, but it shows a clockwise rotation from Pamir stress district in the west to Urumchi stress district in the east in the spatial distribution. Second, each stress district has its own different characteristic of tectonic stress field. This phenomenon indicates that the research area in the whole stress background has its local stress changes. And the third is that the stress regime in Tianshan Mountain Zone is almost reverse slip and strike slip. On the basis of above basic research work, we try to analyze and explain the dynamic genesis and the heterogeneity of the recent tectonic stress field in Tianshan Mountain Zone from the angle of force sources.

Key words: Tectonic stress field, Fault slip, Focal mechanism solution, Heterogeneity, Dynamic genesis, Tianshan Mountain (Tianshan Mountain) zone

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