

Teleseismic earthquake relocation and tomography of Tien Shan mountains, northwestern Tibetan plateau.

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Intra-continental belts have always posed questions regarding the source of seismicity and the controlling factors of the dynamics and formation of the fold and thrust belts. Our study deals with such questions about the world's most active intra-continental thrust belt i.e. the Tien Shan. We used teleseismic earthquake relocation and regional tomography to evaluate the share of each neighboring unit in the relatively rapid formation of Tien Shan. We relocated 7094 earthquakes. We defined a cluster as a set of 10 events with a maximum distance of 35 km between the hypocenters, we discarded all the events with less than 10 phase recordings, thereby leaving only the well-recorded events. These new precise locations of hypocenters were used as initial locations for the tomographic inversion. Our huge data set produced high-resolution tomographic results, providing an insight into the dynamics of Tien Shan. We found low-velocity zones beneath Tien Shan to the east of Talas-Fergana fault. This low-velocity zone within the lithospheric mantle is associated with differential subduction of Tarim basin beneath Tien Shan. At shallow crustal depths, to the east of Talas-Fergana fault, we found high-velocity zone beneath Tien Shan, in addition, we found much deeper crustal events in western Tien Shan.

Keywords: Teleseismic relocation, Low-Velocity Zone, Differential subduction