

Correlation Between Large Earthquake Activity and Active Tectonic-Block in China Mainland

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Based on the studies about the establishment of active tectonic-block hypothesis, the division of active tectonic-block, the motions of active tectonic-blocks and their interaction, the characteristics of strong earthquake activity were discussed in this paper. Those characteristics include the whole level of strong earthquake activity, earthquake strain energy release rate, frequency-magnitude distribution, the characteristics of earthquake source fracture and earthquake stress field etc. At the same time, the motion and deformation characteristics of active tectonic-block region that were derived from the GPS survey were discussed too. Those characteristics include the velocity, strain rate, orientation of maximum principle compressional strain, compressional-tensional state of active tectonic-block etc. Ground on those studies, the characteristics of strong earthquake activity and the state of crustal motion and deformation in China mainland were compared. Results show that the whole state of earthquake activity in active tectonic-block have been controlled by the tectonic dynamic environment and the state of motion and deformation. The strain rate of present-day crustal motion and deformation is linear related with earthquake strain release rate. The seismic stress field derived from focal mechanics is identified with present-day crustal strain field derived from the GPS survey. The fracture style of earthquake sources is consistent with crustal compressional-tensional state. This research indicates that active tectonic-block and its movements control the outbreak of large earthquakes in China continent. The tectonic deformations and seismicities of 26 active boundaries zones which locate between 6 active tectonic block regions and 22 active tectonic blocks were studiedincluding the relationship of distribution of major earthquakes and active boundary zones, the relationship of tectonic active velocities and level of seismic activities in boundary zones, and the relationship of tectonic activity velocities and recur-periods of large earthquakes in boundary zones, et al. The linear relation between tectonic active velocities and seismic activities and the reverse relation of tectonic active velocities and recur-period of large earthquakes are presented. In addition, it is found that the intensities of the earthquake deduced from the seismic activity parameter (a/b) in the active boundaries are consistent with those of the actual earthquake records. The results show the tectonic characteristics and motion characteristics of active tectonic blocks in continent of China, and indicate that active tectonic blocks control the occurrence of large earthquakes through the tectonic deformation of block boundary zones. Finally, grounded on the hypothesis that the large earthquakes satisfy with Poisson Distributing, the present seismic activities and hazards of these boundaries were discussed.