

COMPARISON OF REGIONAL DETERMINATIONS OF EARTHQUAKES FOCAL MECHANISMS OF CENTRAL ASIA WITH CENTROID MOMENT TENSOR SOLUTIONS USING DATA OF GLOBAL SEISMIC NETWORKS

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The Republic of Kazakhstan possesses data of more than 9000 focal mechanisms that have been accumulated since 1969 till present time for wide energy range (from energy class 6 up to $M_w=7.3$). This information is used for reconstruction of tectonic stress field. To obtain real pattern of the regional stresses field using data of small earthquakes is possible only if representative mechanisms statistics is used. The same pattern could be given by a few, but larger earthquakes of this region.

Also, there are other approaches to determine stress field characteristics using seismic methods, for instance, using observations of digital broadband seismic stations in CMT calculation (centroid moment tensor).

The task of the present work was a comparison of results obtained under reconstruction of tectonic stress field on the basis of two different seismic methods applied to the same large earthquakes. 20 earthquakes with $M_s \geq 4.5$ included in focal mechanisms catalogue of Seismological Experiences-Methodical Expedition of MES RK and CMT-catalogue of Harvard were chosen for analysis. Time period: 1978-2004.

As a result, the pattern of stress-strain state of earth structure according to parameters of centroid moment tensor is almost the same to those that were obtained earlier on data of focal mechanisms using standard methods.

However, there are some events that have inherent difference in parameters characterizing stresses and rupture planes. The most important are differences in dislocation types. According to CMT catalogue all analyzed events are related to shear faults or shear-thrust faults. According to regional data there are earthquakes of "normal fault" and "transtensional fault" types.

The most interesting is the fact that focal mechanisms that differ much on two methods of definitions are related to the events that were earlier considered as abnormal according to other independent characteristics. Conclusion on possible connection of variations in mechanisms with nature of events and misfit of model used to actual processes in focal was derived.

For more complete characteristic of medium stress-strain state it is necessary to use data of both methods as supplemental to each other. Thus, use of focal mechanism determinations on first arrivals on the basis of dislocation model allows including in analysis wide energetic range of events that makes it possible to observe main pattern of regional field stresses, reveal local zones of heterogeneity and observe its variations. CMT-catalogue data allow making reconstruction of regional stress field. Events which mechanism of main phase differs much from initial phase is an indication of abnormal physical conditions in focal and may be signals on preparation of larger events.