Geosystems of Transition Zones, 2020, vol. 4, N 2, p. 169–177
Геосистемы переходных зон, 2020, т. 4, № 2, с. 169–177
https://doi.org/10.30730/gtrz.2020.4.2.160-168.169-177

Full text ENG PDF RUS PDF
https://elibrary.ru/title_about.asp?id=64191

Seismic moment tensor and dynamic parameters of earthquakes in the Central Tien Shan

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Abstract Резюме RUS

In the study, seismic moment tensors (SMT) of 177 earthquakes in the Central Tien Shan with $K \geq 10.5$ ($M \geq 3.6$) occurring from 2007 to 2017 are determined on the basis of the wave inversion method and data from the KNET seismic network. The 177 obtained solutions have been added to an SMT catalogue, which includes 284 events with $2.8 \leq M \leq 6$ that have occurred from 1996 to 2017. Some characteristics of the SMT catalogue are discussed along with constructed principal stress axes azimuth diagrams and dip angle distribution graphs. For the most part of events, the compression axis of the seismic events has a north-northwest direction and a sub-horizontal orientation; the direction of the tension axis does not have a pronounced maximum, while for most events it has a subvertical orientation. In addition to the scalar seismic moment, the dynamic parameters (DP) of the 150 events from the SMT catalogue that have occurred from 1999 to 2014 were computed: the source radius (Brune radius) and tangential stress drop. Studied correlations between the DP and magnitude show the link between the stress drop and earthquake magnitude to be the weakest. The Lode–Nadai factor distribution on the grounds of the seismic moment tensors from the SMT catalogue was constructed and the deformation types typical for the studied area identified. A comparison between deformation regimes and stress drop values is presented.

Keywords

earthquake, seismic moment tensor, moment magnitude, scalar seismic moment, corner frequency, source radius, stress drop, Lode–Nadai factor

For citation: Sycheva N.A. Seismic moment tensor and dynamic parameters of earthquakes in the Central Tien Shan: translation. *Geosistemy perekhodnykh zon = Geosystems of Transition Zones*, 2020, vol. 4, no. 2, pp. 192–209. (In Engl.). https://doi.org/10.30730/gtrz.2020.4.2.178-191.192-209

Для цитирования: Сычева Н.А. Тензор сейсмического момента и динамические параметры землетрясений Центрального Тянь-Шаня. *Геосистемы переходных зон*, 2020, т. 4, № 2, с. 178–191. https://doi.org/10.30730/gtrz.2020.4.2.178-191.192-209.

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