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Seismicity of the Erguna region (northeastern China)

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We consider the seismicity of the Erguna region in NE China (48°–51° N, 117°–123° E) which is poorly-studied from seismological point of view as it is characterized by a low level of seismic activity. We calculate focal parameters (focal mechanisms, scalar seismic moments, moment magnitudes and hypocentral depths) for 7 regional earthquakes with Mw 4.2–4.6 occurred in 2000–2017 from the data on Rayleigh and Love wave amplitude spectra and P-wave first-motion polarities. Additionally, we estimate a corner frequency, source size, stress drop, apparent stress, radiated seismic energy, and energy-to-moment ratio for 5 of them from S-wave amplitude spectra. The obtained focal mechanisms demonstrate a very complex pattern of the stress-strain state of the crust which can not be easily explained in a framework of only global or regional tectonic stresses and reflects local stress redistribution in small-scale crustal blocks bordered by local faults. Low values of the calculated stress drops, apparent stresses and the energy-to-moment ratios also evidence the proposed suggestion. The available geophysical and geological data confirm that the observed features of the seismic process in the Erguna region are likely to be controlled by the structure of the crust and the upper mantle. The rather high lithosphere thickness and smoothness of the lithosphere-asthenosphere boundary are likely to be responsible for the lack of earthquakes with M > 5.0. The occurrence of weak and medium seismic events is conditioned by crustal heterogeneities, probably, associated with magmatic intrusions. The obtained results partly fill the gap in seismic information in the Erguna region and provide unique experimental data for development of geodynamical models of the whole Amurian plate and its inner parts and for seismic assessments of the territory which is of great interest due to its polymetallic ore deposits.
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