Regularities of acoustic pulse radiation in the laboratory stick- slip fault.

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The heterogeneity of frictional properties of the central zone of a fault has a great influence on the dynamics of fault deformation. Fault segments where the co-seismic rupture starts exhibit velocity weakening, while the segments where the rupture stops are characterized by velocity strengthening. To a great extent the frictional behavior is determined by the structure of the central fault zone. The orderliness of the central zone structure and the dynamics of its change can be estimated by applying methods of correlation analysis to seismic records, while the heterogeneity of its composition is not taken into account at all at present.

In this work, acoustic manifestations of shear deformation of a fault with a fine-dispersed multi-component filler are considered in laboratory experiments and the effect of the structure of the central part of the model fault on the parameters of acoustic emission is investigated. The laboratory experiments were held in the 'slider' statement, when a granite block slides along a rough granite base under normal and shear loads.

In the course of the work, variations of the parameters of the Omori and Gutenberg-Richter laws were considered. For all the experiments, the activity at the 'pre-seismic' stage obeys the Omori law, and at the foreshock stage - the inverse Omori law. For all the realized regimes the following condition is true: $p_b < p$, where p_b is the index of the inverse Omori law, p is the index of the Omori law. During the experiments, changing the proportion of quartz sand in the filler mixed of quartz sand and glass beads was accompanied by a monotonic increase of p from 1.00 ± 0.02 (quartz sand) to 2.00 ± 0.10 (glass beads). Similar monotonic changes were established for the b-value of the Gutenberg-Richter law, which changed from 0.55 ± 0.01 to 1.1 ± 0.1.

The results show that in case the location of acoustic pulses is provided, the presented analysis can be used to determine the spatial heterogeneity of the interface structure.