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Acoustics at Stick-slip under external forcing as a model of seismic process triggering/synchronization

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According to modern concepts, seismicity is viewed as a result of frictional instability of Earth crust. When the friction between solid rocks shows velocity weakening behavior, stationary motion becomes unstable and stick-slip motion appears. Seismic process is a kind of stick-slip motion, where earthquakes are assumed as 'slips' and the 'stick' is a period of elastic strain accumulation between successive earthquakes.
The elementary slip event is accompanied by acoustic/seismic emission.
Thus stick-slip acoustic emission is often used as a laboratory model of seismic process.
Laboratory set up used in this research consists of two samples of roughly finished basalt. The lower sample is fixed and upper one is pulled with constant speed. Acoustic emissions accompanying stick-slip motion is registered.
It was shown that the number of stick-slip generated acoustic emission trains increases proportional to the rate of applied elastic stress increase. At the same the duration of acoustic emission trains decreases.
When external mechanical or electromagnetic forcing is applied to the natural stick-slip motion, acoustic events are delayed relative to the phase of forcing: the lag is reversely proportional to the intensity of forcing.
At certain forcing conditions stick-slip motion reveals effect of high-order synchronization (HOS).
Additionally, field seismic data analysis around large water reservoir was carried out. It was shown that for time period when water level variation in reservoir is periodic, monthly frequency of earthquake occurrence reveals two maximums: in spring and autumn.
Based on the results of this analysis we suggest that relatively small external forcing, caused by the one year period variation of water level, may induce changes in regional seismic process, which resemble HOS.