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Response in thermal neutrons intensity on the activation of seismic processes

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Results of study of thermal and high-energy neutrons intensity during the activation of seismic activity are presented. Installations are located close to the fault of the earth′s crust at the high-altitude station of cosmic rays (3340 m above sea level, 20 km from Almaty) in the mountains of Northern Tien-Shan.
High correlation and similarity of responses to changes of space and geophysical conditions in the absence of seismic activity are obtained between data of thermal neutron detectors and data of the standard neutron monitor, recording the intensity of high-energy particles. These results confirm the genetic connection of thermal neutrons at the Earth's surface with high-energy neutrons of the galactic origin and suggest same sources of disturbances of their flux.
However, observations and analysis of experimental data during the activation of seismic activity showed the frequent breakdown of the correlation between the intensity of thermal and high-energy neutrons and the absence of similarity between variations during these periods. We suppose that the cause of this phenomenon is the additional thermal neutron flux of the lithospheric origin, which appears under these conditions. Method of separating of thermal neutron intensity variations of the lithospheric origin from neutrons variations generated in the atmosphere is proposed. We used this method for analysis of variations of thermal neutrons intensity during earthquakes (with intensity $\geq$ 3b) in the vicinity of Almaty which took place in 2006-2015.
The increase of thermal neutrons flux of the lithospheric origin during of seismic processes activation was observed for $\sim$ 60% of events. However, before the earthquake the increase of thermal neutron flux is only observed for $\sim$ 25-30% of events. It is shown that the amplitude of the additional thermal neutron flux from the Earth's crust is equal to 5-7% of the background level.