



Release of stresses accumulated in rocks by high-power electric pulses

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An effect of high-power electromagnetic pulses of magneto-hydrodynamic (MHD) generator on the seismic regime over the Northern Tien Shan and Pamir regions has been studied. It was found that occurrence of local earthquakes after firing runs of MHD generator became higher than before them. An increased level of seismic activity was observed within 3 to 6 days after the firing runs. It was suggested that electromagnetic pulses result in discharge of energy accumulated by the Earth crust due to tectonic deformation processes. The energy discharges in the form of series of relatively slight earthquakes instead of one catastrophic event. Detailed analysis of seismicity of the Northern Tien Shan shows that the electromagnetic impact of MHD generator pulses results in deep and prolonged alteration of seismic process in the region under study and adjacent territories. During series of experiments with the pulsed MHD generator relative portion of more weak seismic events, seismic activity of the region, and its clustering increase. All results obtained by statistical analysis pointed to a possibility of application of high-power electromagnetic pulsed for earthquake control by regulation of seismic flow and release of energy accumulated in the Earth crust in the form of not dangerous seismic events. For verification of field results and to clear a possible mechanism of interaction of electromagnetic field with rocks under stressed conditions various laboratory experiments have been performed. The experiments were carried out under the biaxial compression in models composed of sand and cement. At different stages of loading of the models series of measurements of acoustic activity (AE) were conducted, each of them included repeated cycles of elec-

tric actions, applied to the model. The two modes of electrical action were realized: repetitive pulse train with pause between and single electrical pulse. It was established that electrical impact results in increase of AE in both cases. A possibility of application of discovered phenomenon for release of tectonic stresses accumulated in the Earth crust and prevention of strong earthquakes is discussed.