

Study of effects caused by powerful seismic and electromagnetic influence on the Earth's crust

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In works related to earthquake prediction, the methods of electromagnetic monitoring are widely used for fixation of anomalous variations of electric and magnetic characteristics of the Earth's crust accompanying activation of stress-deformation fields which usually precede earthquakes. The theoretic suppositions, accumulated experience and results of laboratorial studies of rock samples are used herein. It should be noted that the results of laboratorial studies often differ from effects observed in field conditions which is due to different spatial scale of events and different energy properties of deformation processes in mediums. Electrodynamical phenomena related to deformation and destruction of substance are typical both for earthquakes and for underground explosions and are comprehensively described in books. At the same time, the effects related to powerful electromagnetic influence on the Earth's crust have not been described in the books probably due to the fact that researchers do not have powerful sources of electromagnetic field.

In given work we present the results of observing the effects in electromagnetic field during powerful industrial explosion (2.8 kT) in Kambarata site and the effects observed in seismic field during electromagnetic soundings using powerful electropulse system ERGU600-2 (300 kW) at the territory of Bishkek geodynamic test site.

During the industrial explosion we have surely detected seismoelectric and seismomagnetic effects which appear during propagation of seismic waves in the Earth's crust. These are the coseismic effects which appear after the arrival of seismic wave to observation site.

When a powerful electromagnetic field exerts influence on the Earth's crust, in the seismic field we have detected the appearance of a series of microseisms after the beginning of electromagnetic sounding sessions which are the consequence of emerging of induced seismic vibrations synchronized with a sequence of sounding electromagnetic pulses.