

TECTONIC WAVES OF REMOTE STRONG EARTHQUAKES AND THEIR RELATION TO HYDROGEODEFORMATION FIELD

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Abstract. The methods, which we have developed for urgent estimation of the geodynamic situation and forecast of earthquakes basing on energy parameters of the HydroGeoDeformation (HGD) Field, gave us the possibility to start studying a groundwater response to tectonic waves of strong remote earthquakes. For this purpose, we fulfilled a retrospective analysis of the HGD-field data obtained in the periods of nucleation and manifestation of strong earthquakes in different regions: near Simushir Islands of the Kuril Ridge (occurred on 13 January, 2007, Russia), Island Honshu (of 11 March, 2011, Japan) and in Sea of Okhotsk (of 24 May, 2013, Russia).

Running of a tectonic wave from the remote strong earthquake through the HGD-Field observation site is registered as a splash of kinetic energy in the underground hydrosphere, which was revealed by the analysis of the monitoring results. In this case, the more remote is the earthquake source from the observation site, the lesser is the amplitude of kinetic energy splash. With damping of the tectonic wave its influence on the groundwater considerably decreases.

The methods, based on the energy approach, have allowed us to obtain interesting data on the revealed HGD-Field sensitivity to very remote strong earthquakes. The response of the underground hydrosphere to these earthquakes has been registered in all seismically active Russian regions with the HGD-field monitoring network.

Keywords: earthquake, forecast, Hydrogeodeformation field, seismic hazard, prediction.