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Short-term earthquake prediction on basis of seismic monitoring of fault areas

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The research deals with the problem of interpreting energy characteristics of seismic events with respect to their time series, be it foreshocks or aftershocks, with the aim of providing short-term prediction of the main shock (time and magnitude) in a certain fault area under observation by means of its active monitoring.
The fundament of the suggested approach to determining time and magnitude of the megathrust earthquake is establishing active monitoring of the fault area on every stage of seismic process development and obtaining precise seismic data non-stop in real-time mode for plotting and processing the time series.
The essence of the suggested method of short-term earthquake prediction is the technique of extracting certain "energy levels" by analyzing the incoming seismic data. The energy levels are straight lines in the "magnitude/time" diagram of the analyzed seismic event flow. The behavior of the seismic events contains the key information about the behavior of the future seismic process in the fëault area.
On basis of the detailed data analysis of the seismic process related to Altai earthquake (27.09.2003) and the study of a number of regional catalogs of Central Siberia, Kamchatka, South Kuriles, Japan, China, California, as well as Sumatra earthquake (26.12.2004) we found and described a range of prognostic signs thatallow determining the time of a strong earthquake 2-3 days before the actual shock with the time precision up to 6-12 hours.
The basic prognostic signs are "energy wedges" – intersections of corresponding extreme energy levels. The appearance of an "energy precursor" which is sharp descent of the lowest level a few hours before the expected earthquake is an additional prognostic sign.
The suggested approach to the interpretation of the indicated seismic data could be applicable as a specialized computational technique within the framework of the Global System of active monitoring of the most seismically dangerous areas. It could also be implemented in the seismic system of International Service of Early Tsunami Warning.

Keywords: Earthquake; fault areas; short-term prediction; active monitoring; energy wedges.