

Online monitoring and analyses of seismic activity

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The technology of monitoring and analysis of seismic activity is implemented on a platform consisting of two web-GIS: SeismoMap and GeoTime 3. GIS SeismoMap operates automatically and provides facilitated and intuitive analysis of the seismic process. In-depth analysis is carried out by experts with the help of GIS GeoTime 3. The platform has been installed on the sites IITP RAS <http://dcs.isa.ru/geo/2/> and the Kamchatka branch of the Geophysical Service of RAS <http://saltlab.emsd.ru/server2/>.

GIS SeismoMap is realized in thin-client-server architecture. It demonstrably shows the results of easy analysis of seismic process in geographical contexts of Google Maps API. SeismoMap daily loads regional earthquake catalogs from one of the sites <http://earthquake.usgs.gov/earthquakes/feed/>, www.isc.ac.uk, <http://geonet.org.nz>, <http://www.emsd.ru/ts/alldemo.php>. It processes earthquake catalogs of 10 years duration to assess (1) spatial (2D) fields of the b-values, (2) spatio-temporal (3D) fields of the background seismic activity, and (3) spatial fields of the background seismic activity quantiles. The earthquake catalogues of duration of 2 months are used to evaluate the 3D test seismic activity fields and 3D fields of their changes (change point) in comparison with the background. The change point indicators are the fields of Student statistics, the fields of quantiles, and the fields of ratio of average values of seismic activities in the test and background windows. The present version visualizes the maps of 24 temporal slices with 7 day intervals for each of the test fields.

The user can run GIS GeoTime 3 from Seismo Map. It is loaded with 10-year catalog of earthquakes of the region under study. GeoTime 3 is realized in thick Java-based client-server architecture. It is a multi-functional analytic system focused on analysis of spatio-temporal environmental processes and earthquake prediction research. GIS GeoTime 3 provides analytic techniques to explore the dynamics of the process, based not only on time series, but also on spatio-temporal fields.

Thus the described technology is based on the idea of a two-level data analysis. The first level allows one to generate hypotheses about preparing the earthquake. The second level enables an expert to analyze these hypotheses in detail. The technology could be a basis of the platform for the automatic prediction of earthquakes.

The research is supported by RFBR projects 14-07-00035 and 16-07-0326.