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System of automatic estimation of tsunamigenic earthquakes parameters: algorithms, backgrounds, preliminary results and real practice

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For the last several years in Far East of Russia new Tsunami Warning System (TWS) is developed and introduced. This work represents fundamental remaking of System, which had existed before. It concerns both means of observations, and methods of processing and operator instructions.

One of the main requirements to the Seismic subsystem of Tsunami Warning System (SS TWS), developed in Kamchatka Branch of Geophysical Survey since 2006 is a presence of the automatic system of estimation of tsunamigenic earthquake parameters in real time. This system should have an opportunity to form the conclusion about probability of occurrence of a tsunami caused by the registered event. At the present time, it is supposed, that a key part of a seismological subsystem there is an operator of station of the tsunami, also making processing of earthquake in the interactive mode almost in real time. Nevertheless, the situation when the operator for whatever reasons is unable generate in time the message on earthquake is possible. In this case presence of the automatic earthquake parameters estimation is extremely necessary. With this purpose the program complex has been developed, received the name “Fast Tsunami Source Localization”, in abbreviated form - the FTSL.

According to distribution of strong seismicity and a tsunamies, the zone of especial attention for Seismic subsystem of Tsunami Warning System in Far East Russia can be defined as follows: Kuril-Kamchatka, Japanese and Aleutian deep-water tranches and Sea of Japanese, Sea of Okhotsk and Bering Sea.

In this paper results of development Automatic SS TWS are presented. Technical and natural backgrounds in a basis of System, structure of program complex and algorithms are discussed. Also results of approbation of System on archive earthquake records (events from specified zone of the responsibility) and information on a real practice of use of System in a experimental mode at the seismic station “Petropavlovsk” are presented.