

Precedent-extrapolation estimate of the seismic hazard in the Sakhalin and the Southern Kurils region

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Abstract. The paper describes the algorithm and the results of the seismic hazard estimate in the Sakhalin and Southern Kurils region based on the data of the Japan Regional Catalogue (JMA). A nonlinear differential equation of the second order is used as a mathematical model, and algorithms for optimization and predictability estimation are presented by the author's solutions. The forecasting algorithm is based on the search for seismic activity zones in which the current activity trends correspond to foreshock sequences recorded before strong earthquakes (precedents) that have already occurred. The earthquake time is calculated with extrapolating the detected trends to the level of activity that occurred at the time of the precedent earthquake. By the example of precedent foreshock sequences in Japan, it is shown that the lead time of such a forecast reaches 10–15 years and its implementation is due to the preservation and stability of the identified trends. A map of potentially dangerous zones for Sakhalin and the Kuril Islands and some examples of calculating the time of strong earthquakes according to the JMA catalogue as of August 31, 2018 are presented. Action sequence in identifying the potentially dangerous trends in seismic activity and the specifics of possible use of the technique in the Sakhalin region are considered.

Keywords:

earthquake, seismic energy, foreshock, precedent-extrapolation estimate of the seismic hazard

For citation: Malyshev A.I., Malysheva L.K. Precedent-extrapolation estimate of the seismic hazard in the Sakhalin and the Southern Kurils region. *Geosistemy peredodnykh zon = Geosystems of Transition Zones*, 2021, vol. 5, no. 2, pp. 84–112. (In Russ. & Engl.).

<https://doi.org/10.30730/gtr.2021.5.2.084-098.099-112>

Для цитирования: Малышев А.И., Малышева Л.К. Прецедентно-экстраполяционная оценка сейсмической опасности в районе Сахалина и Южных Курил. *Геосистемы переходных зон*, 2021, т. 5, № 2, с. 84–112.

<https://doi.org/10.30730/gtr.2021.5.2.084-098.099-112>

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