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The 1983 and 1993 tsunamis on the coast of the Sea of Japan: observations and numerical modelling

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The last major events in the Sea of Japan were in 1983 and 1993. There were the 1983 Nihonkai-Chubu Earthquake (M_w 7.8) and the 1993 Hokkaido Nansei-Oki Earthquake (M_w 7.7). These earthquakes caused tsunamis, which we are studying in this research. I use numerical modelling to reproduce and study effects for the Russian coast. The tsunami waves were stimulated by the TUNAMI numerical model. The bottom topography was created using GEBCO database (30 arc seconds), SRTM data, digitized Russian navigational charts and NOAA Center data. The tsunami source was calculated using Okada's formulas. To better resolve local resonant properties arising from local topography and tsunami run-up, calculations were carried out with nested grids. Using nested grids made it possible to obtain significant agreement with the observational data. Since the seismic source of the 1993 earthquake has a complex structure, three different models were analyzed: USGS, Harvard-model and Takahashi et al. 1995. This study focuses on an examination of the Russian coast. Vladivostok, Posyet and Nakhodka were considered in the most detail. Comparison of the model with the observations was done for both the tsunami waveforms and their spectra. Also, a tsunami wave height map was built for the entire Russian coast of the Sea of Japan. The maximum tsunami wave height on the Russian coast in 1993 was more than 5 m.