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Modeling of intensive internal wave generation over the critical latitude in the Barents Sea: effects of bottom slopes

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When the processes in natural basins are modeled numerically, the important problem is to specify the topography in the domain of computations. Appropriate data from in situ measurements are rarely available; therefore model topographies approximated analytically can be used as well as gridded bathymetry data from international atlases. Choosing the former approach, the researcher confronts with the problem of interpolation of these data, because their resolution is not usually very high (generally 1 minute or 30 arc-seconds). That's why it is important to understand how the way of interpolation of bathymetry affects the results of simulation.
In the present study we examine the influence of shape of underwater banks on the generation of intensive internal waves by the barotropic tide in the Barents Sea at latitudes over 77o N using the IGW numerical model of K. Lamb. The considered area is situated between the Spitsbergen Island and the Franz-Josef Land as cross-section of 350 km length. There are two banks of heights about 100 - 150 m on the background depth about 300 m. Bottom profile for modeling is interpolated by Fourier series of 4-th and 8-th order. It is shown that intensive nonlinear internal waves with amplitudes from 10 to 50 m and lengths about 5 km are generated in this zone. But the wave regime is very sensitive to the bottom profile shape. The modeled wave amplitudes are twice more when the bottom profile is presented by its 8 Fourier harmonics in contrast to 4 harmonics. Nonlinear waves propagating out of the generation area have noticeable amplitudes of about 5m.