

Sea wave characteristics in the port of Kholmsk (Sakhalin Island)

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Abstract. During construction and reconstruction of ports, they are guided by the calculated characteristics of wind waves, storm surges, low-frequency oscillations of water areas (seiches). However, the correct determination of characteristics is impossible without taking into account field observations of sea waves in a particular port under different conditions. This work supplements the existing data on wave characteristics in the main port of Sakhalin Island on the basis of sea level measurements carried out in 2007. The main characteristics of sea waves in the port area were estimated: amplitudes of sea surface oscillations, peak components of the wave energy spectrum and the corresponding periods of oscillations. In this case, the peak components were determined in the range of periods from wind waves to low-frequency seiche oscillations. Storm situations and calm sea conditions were analyzed. The resonant nature of oscillations is shown. It has been established that in calm weather the peak components in the energy spectrum are concentrated in the region of the zero mode of natural oscillations in the port corresponding to 500 s. In the most active phase of storms, the peak component manifests itself mainly near the period of 8 s, and at the beginning and end of the storm it is near the period of 182 s, corresponding to the first mode of natural oscillations. The analysis of peak spectral components in a wide range of periods allows us tracing the dynamics of sea waves in the port and the process of build-up of seiche oscillations.

Keywords

sea waves, energy spectrum, wave energy, peak wave period

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