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Features of seishe initiation in the water area near Poronaisk (Sakhalin Island)

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Abstract. The results of studying potential sources of seiche excitation energy in the water area near Poronaisk (Sakhalin Island) using natural measurement data in 2008–2009 are presented. Time series data with a duration of about three months were collected by two autonomous sea-level recorders at one-second sample rate. Spectral analyses of time series made possible to conclude that wave processes with periods from 2 to 7 hours can be classified as seiches. Possible seiche periods calculated by numerical methods are very close to the periods of seiches detected in the Terpeniya Bay. The calculated envelopes of wave processes showed a good coincidence of the peaks of seiches with a period of 7 hours and wind waves, which confirms the transfer of energy from atmospheric disturbances to the seven-hour seiche. Seiche period of 3.5 hours is shown to be equal to the period of tidal harmonic $4M\sigma 7$. Thus, the resonance pass of energy transmission from tidal harmonic to seiche was revealed taking into account high for marine waters q-factor equal to 11.9 at the period of 3.5 hours. The highest seiches at a period of 2.7 hours are observed on the 6-8 day after maximum of daily tide with a period of 24.68 hours, which is close to the period of lunar tide harmonic M1. The analyses of excitation factors of seiches with 2-hour period showed that the excitation energy, or at least a part of it, is provided by atmospheric disturbances. Thus, the increasing of seiche height occurs during the winds of southern directions in the Terpeniya Bay.

Keywords:

seishes, atmospheric disturbances, tidal harmonics,

q-factor of waterbody, spectral density

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