

Conditions for amplification of infragravity oscillations in the Krasnoarmeysky Strait area (south-eastern Sakhalin)

Kirillov, Konstantin V., <https://orcid.org/0000-0002-0822-3060>, k.kirillov@imgg.ru

Institute of Marine Geology and Geophysics, FEB RAS, Yuzhno-Sakhalinsk, Russia

Abstract

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Abstract. The aim of the study is to determine the conditions for the amplification of infragravity oscillations and the most stable ranges of periods at which they occur in the Krasnoarmeysky Strait area. Synchronous one-second series of bottom pressure were used, obtained by three autonomous sensors from October 23, 2021, to January 10, 2022. A significant wave height, peak period, and spectral characteristics were calculated for the ranges of 2–20 and 20–300 s; local spectral energy maxima were identified within the periods of high infragravity activity. The highest frequency of spectral maxima at all three stations was observed in the 40–80 s period range. This range is wider than the previously established range of 68–82 s at the Izmenchivoye lake and includes its shorter-period part, whereas maxima of the 137–186 s range occurred only sporadically in the new dataset. Increased values of the energy of the infragravity oscillations were mainly observed during developed waves with peak periods of 8–12 s; the highest values were recorded at $H_s(2–20\text{ s})$ of more than 2.5–3.0 m. The results characterize the recurrence of the infragravity response during several storm events and can be used in further analysis of coastal hydrodynamics and conditions for the re-formation of the coastal zone near the Krasnoarmeysky Strait.

Keywords:

infragravity oscillations, wind waves, swell, spectral maxima, Krasnoarmeysky Strait

For citation: Kirillov K.V. Conditions for amplification of infragravity oscillations in the Krasnoarmeysky Strait area (south-eastern Sakhalin). *Geosistemy perehodnykh zon = Geosystems of Transition Zones*, 2026, vol. 10, No. 3, p. 299–308.

(In Russ.). <https://doi.org/10.30730/gtr.2026.10.3.299-308>; <https://www.elibrary.ru/tyidpy>

Для цитирования: Кириллов К.В. Условия усиления инфрагравитационных колебаний в районе пролива Красноармейский (юго-восточный Сахалин). *Геосистемы переходных зон*, 2026, т. 10, № 3, с. 299–308.

<https://doi.org/10.30730/gtr.2026.10.3.299-308>; <https://www.elibrary.ru/tyidpy>

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