

EGU21-5910

<https://doi.org/10.5194/egusphere-egu21-5910>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Surface manifestations of short-period internal waves of the Kuril-Kamchatka region and the Bering Sea according to satellite observations

Egor Svergun^{1,2} and Alexey Zimin^{1,2}

¹St. Petersburg State University, Institute of Earth Sciences, Department of oceanology, Russian Federation (st080934@student.spbu.ru)

²Shirshov Institute of Oceanology of RAS, St. Petersburg branch, Russian Federation (st080934@student.spbu.ru)

In the Bering Sea, as in the Kuril-Kamchatka region, which includes the waters near the Kuril Islands and the Pacific waters of the Kamchatka Peninsula, previously performed satellite radar observations show numerous scattered surface manifestations of short-period internal waves (SIW's). However, the summative study of the characteristics of surface manifestations of SIW's are currently not available in this region.

In this study, radar images from the Sentinel-1A and B satellites from July 1, 2019 to September 30, 2019 were used to record the surface manifestations of SIW's. For each surface manifestation of SIW's, such characteristics as the position of the manifestation, the wavelength, the arc length of the leading ridge in the packet, the direction of propagation, and the number of waves in the packet are determined. Wave detection on the radar images is performed using ESA SNAP and Matlab software.

In the study region, 1,540 SIW's. manifestations with a wavelength of 80 to 1,900 meters and a leading crest length of 1 to 70 km were registered on 772 radar images. The ranges of variability of the main geometric characteristics of the manifestations in the Kuril-Kamchatka region and in the Bering Sea are very similar. The maximum number of manifestations in the Kuril-Kamchatka region was recorded in the first half of September, and in the Bering Sea – in the second half of July. This difference seems to be related to regional features of pycnocline formation.

Manifestations of internal waves are mainly recorded in the shelf zone. The constant occurrence of manifestations of internal waves located in the southern part of the Kuril Islands, around the Pacific coast of the Kamchatka Peninsula, East of the Litke Strait, and the Straits of the Aleutian chain. It was found that the areas of constant occurrence of the manifestations of SIW's coincide with the areas of intense dissipation of the internal tide. In the Kuril-Kamchatka region, in contrast to the Bering Sea, manifestations of internal waves are recorded over significant depths at a great distance from the shelf zone, which is associated with the collapse of the internal tide reflected from the edge of the continental slope.

The information obtained in this study will allow us to improve our understanding of the field of

short-period internal waves of the north-eastern Pacific Ocean.

The study of surface manifestations of internal waves in the Kuril-Kamchatka region was supported by RFBR grant No. 20-35-90054. The study of surface manifestations of internal waves in the Bering Sea was supported by RFBR grant No. 18-35-20078.