

Interannual variability of the lake levels in northwest Russia based on satellite altimetry

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Abstract Variability of the largest lakes levels in northwest Russia, a climatic change parameter, is characterized by alternating periods of rise and fall according to altimetric measurements of the TOPEX/Poseidon and Jason-1/2 satellites. Water level was calculated with the use of a regional adaptive retracking algorithm for the lakes Il'men, Ladoga, Onega and Peipus. Applications of this algorithm considerably increase the quantity of actual data records and significantly improve the accuracy of water level evaluation. According to the results, temporal variability of Lake Ilmen, Lake Ladoga and Lake Peipus levels is characterized by a wave with a period of 4–5 years, and that of Lake Onega level is characterized by a wave with a period of 15 years. During the period from 1993 to 2011, lake level rose at a rate of 1.17 ± 0.95 cm/year for Lake Il'men, 0.24 ± 0.10 cm/year for Lake Ladoga, 1.39 ± 0.18 cm/year for Lake Peipus and 0.18 ± 0.09 cm/year for Lake Onega.

Key words northwest Russian lakes; Lake Il'men; Lake Ladoga; Lake Onega; Lake Peipus; water lake level; remote sensing; satellite altimetry