



Groundwater contribution to the water and salt balance of Lake Onega

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Lake Onega is the second largest European lake. The lake has 1152 tributaries and the groundwater flow in these rivers quantitative is taken into account in mean annual river runoff. For calculation of the direct groundwater flow to the Onega Lake the hydrodynamic method was used. The primary geological and hydrogeological data were collected on the whole territory around Lake Onega, including data more than 400 hydrogeological bore holes. The hydrodynamic maps (transmissivity, hydraulic gradient) for costal zone were constructed. Main aquifers having regional spreading on the area of the Onega Lake drainage basin were chosen as follows: aquifer of Quaternary deposits, aquifer of crystalline rocks of the Baltic shield and aquifer of sedimentary rocks of Russian platform. The general estimation of groundwater flow into the lake was derived from 11 separate sectors of the lake's shore zones that have similar hydrogeological conditions. The total groundwater flow into Lake Onega from its shore zones was calculated to be 0.14 km³/year. Direct groundwater flow into Lake Onega was determined at only 1% of total river runoff. The features of forming and distribution of groundwater flow into Lake Onega has now been determinated on the shore territory. The greatest volume of groundwater flow comes from the northwest shore zone of Lake Onega, where basic geological, geomorphologic and tectonic factors are in effect. The eastern shore zone of the lake provides the least groundwater flow. The part of the groundwater contribution to the chemical balance of Lake Onega reaches 10% of total river runoff. The total area with direct groundwater flow to the lake (bypassing the river network) is equal to about 3% of the whole area of the Onega Lake drainage basin. The value is small, but main sources of the contamination (urban and industrial) of surface water and groundwater are located at those areas.

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