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New Researh Results

1. For the first time to assess possible changes in runoff from the Ladoga Lake catchment the scenarios of greenhouse gas emissions into the atmosphere RCP 2.6 and RCP 8.5 were used – the best and worst in terms of environmental impact, respectively. RCP 2.6 requires that carbon dioxide (CO2) emissions begin to decline and reach zero by 2100. In RCP 8.5, emissions continue to grow throughout the 21st century at the same rate as now. The values of meteorological parameters were calculated using the MPI-ESM-MR climate model (Max Planck Institute, Germany). The ILLM model developed at IL RAS was used as a model for forming the runoff from the Ladoga Lake and the Neva River catchment. It is shown that an increase in air temperature in the RCP8.5 scenario leads to a significant increase in the calculated values of evaporation, what largely compensates for the increase in river flow due to an increase in sedimentation parameters of bottom sediments. In a result, by the end of the 21st century, the runoff is expected to get increased by less than 35% relative to the period 2006-2015. The RCP2.6 scenario gives a decrease in runoff to 11%, since there is practically no increase in air temperature, and precipitation has a slight negative trend. Quantitative assessment of possible changes in runoff from the catchment area of Lake Ladoga and the Neva River create an information basis for planning measures to improve water supply systems in St. Petersburg, settlements of the Leningrad Region and Karelia, as well as planning the development of water transport in the region.

2. Verification of the 3D model of the hydrothermodynamics of Lake Ladoga was carried out according to the data of field and satellite observations. Using a 3D model, the features of the formation of upwelling and downwelling zones in the Lake were studied. The upwelling/downwelling can be caused by the wind impact, long-period waves, as well as long-shore density currents. The deep waters coming to the surface during upwelling differ from the surface ones by a lower temperature, as well as a higher content of nutrients. Areas with sustainable upwelling are biologically more productive and richer in fish as

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