Water resources management in St. Petersburg in the context of climate change

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In 2019 within the framework of the European Program for Cross-Border Cooperation between South-East Finland and Russia was launched a project «Towards higher adaptive capacity in urban water management» (RAINMAN). This project is being implemented by scientific organizations and government agency of St. Petersburg and South-East Finland.

The key element of the climate policy of St. Petersburg is the development of adaptation measures for the sectors of the municipal economy. Priority adaptation measures are focused on reducing and preventing the most probable climate risks, such as flooding of the urban territories.

During the implementation of the project, tailored climate indices for water management were identified and their changes were assessed. The impact of climate change on the state and functioning of water disposal system was also analyzed.

In the period from 1881 to 2019 the mean annual air temperature in St. Petersburg went up by about 2 °C, with maximum in spring - about 3 °C. The annual precipitation sums increased by 16% (in warm period – by 20%, in cold period – by 12%). The rise of maximum one-day rainfall was up to 98 mm (the previous one was 75 mm). The features of snow cover, wind regime, etc. were analyzed as well.

Future climate changes over north-western Russia including St. Petersburg area were projected by a large ensemble of regional climate simulations of the Voeikov Main Geophysical Observatory. Thirty experiments differing in the atmospheric and land surface initial conditions have been conducted spanning three decadal periods 1990–1999 (baseline), 2050–2059 and 2090–2099 using IPCC RCP8.5 scenario. The air temperature is expected to increase in the region by 2-4 °C by the middle of the 21st century. An increase in precipitation is also expected entire the region in all seasons of the year.

In 2019, the Action plan for the implementation of the strategy of social and economic development of St. Petersburg for the period until 2035 was approved, which includes climate change adaptation measures. Updating regulatory documents for water management is one of the main possible directions for adaptation of the water sector of St. Petersburg. The presented assessments of main climate indices changes confirm the need to update the regulatory documentation. As a result, a model of the modernized sewage system of St. Petersburg will be created, the risks of flooding the urban territory and financial costs for damages will decrease, and the environmental situation will improve.