



The change in the minimum runoff of the rivers of European Russia for 1945-2015

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Low flow is the limiting factor of development for many regions of European Russia. This is really acute problem in the south part of the country, which often suffers from drought, especially in recent 10 years. In spite of this, according to previous studies [Kireeva et al, 2016, Dzhamalov R.G. 2013, 2014], there was an increase in the characteristics of low flow, both for summer and for the winter period of the year. The main purpose of this study is to analyze the rates of the minimum runoff, taking into account the observation data for the last 5 years.

More than two hundred basins of representative river basins with catchment areas of 1,000-40,000 km², having a long-term and continuous time-series and a conditionally natural runoff regime (with the absence of reservoirs), were selected. As the initial information, monthly water discharges basically were used, for a few gauges daily water discharge values were additionally analyzed.

According to the results, the last 5 years in Russia were relatively low in terms of water resources at all and in terms of low flow as well. Due to this, the growth trends of the minimum water discharge have slowed down somewhat - the next phase of the runoff cycling, possible, began. Nevertheless, a statistically significant trend towards an increase in the minimum runoff is observed throughout the region, both in summer and in winter. The increase in the water content during winter is most pronounced. The changes in the minimum runoff in general reflect trends in climate change, the least of all in the northeast of the region. Most clearly, these growth trends are observed in the central part and in the north-west of the region.

There is also a noticeable shift in the number of months with minimum monthly discharge: if earlier it was mainly December, now for many regions - January, February. An interesting feature is that for the center and south of the region, a minimum monthly runoff was observed in winter - now the water content during the summer low period is noticeably lower than the winter discharges almost everywhere.

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