

## **The ensemble scenarios projecting runoff changes in large Russian river basins in the 21st century**

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**Abstract** An approach is presented for carrying out a long-term projection of river runoff changes in large Russian river basins in the first three decades of the 21st century. These changes may be caused by climate warming and socio-economic factors. The approach utilizes a method for scenario estimation of runoff changes with a range of possible climate warming effects. This range is chosen by generalizing calculation results obtained by using an ensemble of global climate models for two contrasting scenarios (A2 and B1) of globally-averaged air temperature rises. The approach also utilizes a method for alternative scenario estimation for water consumption as related to socio-economic changes. The estimates show that the expected runoff changes in the first third of this century due to climate warming scenarios can compensate the runoff decrease caused by the realization of some of the scenarios for socio-economic changes in the Volga River basin. The same compensation does not occur in the Don River basin, where negative effects are expected for the regional ecology.

**Key words** scenarios of river runoff changes; global climate warming; large river basins