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Low-flow risk assessment for water management

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Abstract Risk assessments related to increasing aridity of climate are important, particularly for stable operation of water systems and optimization of water resources management. For this purpose several approaches for regionalization and evaluation of parameters of long-term river flow fluctuations are considered and the method of simulation of synthetic time series of inflow to reservoirs is proposed. To validate the applicability of the Markov stochastic model to describe the of probability of cycling of dry and wet years, the characteristics of distribution of excursions below thresholds (duration and frequency of events) and the minima in the time series of fluvial discharge smoothed regarding *N*-years were calculated. This approach has been used for assessment of reliability of the complex water system in the Volga River basin under drought conditions and can be applied to evaluation of probability of long periods of low flows on the rivers in Siberia and in the Far East (Russian Federation).

Key words river–runoff; low flow; stochastic modelling; parameters of distribution