

Hydrological draughts in the basin of Lake Baikal and problems of reliable water resources management

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The report is devoted to one of the most urgent problems of a practical hydrology in Russia, such as scientific justification of runoff regulations in the basin of the Lake Baikal in the conditions of extremely low water which is observed in recent years. Since 1961 Lake Baikal as a water object, is a reservoir of the Irkutsk hydroelectric power station. The most significant consequences of runoff regulation are changes of the lake water level. The main goal of investigation is to select the optimum range of fluctuations of Lake water level, which on the one hand would reflect natural regularities of fluctuations, with another would satisfy requests of the hydropower industry.

Lake Baikal is the largest freshwater lake in the world by volume (23 000 km³). The lake is characterized by a very slow water exchange (water exchange time is about 400 years) and considerable scope of water level fluctuations caused by temporal variability of moisture of the catchment. This creates additional risks for hydropower engineering and environmental situation in the basin.

The probabilistic forecast of the water level in the lake in the form of the distribution function was obtained, using the equation of water balance and stochastic models of the total inflow fluctuations. Forecasts of this type are the cornerstone of water management of the Lake Baikal.

In this paper the regularities of fluctuations of the Lake Baikal water level in the natural conditions and under regulation are estimated, features of lake water management and drawdown of lake water level in draughts series are considered, consequences of water scarcity for power generation of hydropower plants are estimated, and the measures providing safety of water resources management in the Lake Baikal catchment are proposed.