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Using of Hydrodynamic Model for the Support of Decision Making Process in Water Management and Flood Risk Assessment of Lower Kuban River, Russia

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Hydrological conditions of Lower Kuban River watershed are extremely variable. Frequently arising floods, alternated with the periods of water shortage. The catastrophic flood events occur promptly and, commonly, there is not enough time to manage flooding by normal operation of reservoirs. The management of water releases using standard rules during high waters is not effective. There is a need to use the imitation hydrodynamic model of the river network for the flood forecasting to check all possible variants of flood development and to take the efficient decision in short time.

The model of the water object, validated and calibrated on the data of observations, allows to determine the basic river parameters (discharges, levels, velocities etc.) in the operative mode and to solve the following tasks:
- Protection of the settlements and agricultural areas in the floodplain;
- Management of water resources during the period of water deficit.

The object of modeling is the basin of Lower Kuban River, including the following parts: Krasnodarskoe, Shapsugskoe, Krjukovskoe, Varnavinskoe reservoirs, Fedorovskij and Tikhovskij hydrounits, Lower Kuban River and it's branch Protoka from Krasnodar hydrosystem up to the Azov Sea, Krjukovsky connecting channel and Varnavinskij release channel, adjusted to left tributaries of Zakubanskij area together with Krjukovskoe and Varnavinskoe reservoirs.

The multipurpose hydrodynamic model of system of interconnected rivers and channels at Lower Kuban River was developed with MIKE 11 package (Danish Hydraulic Institute). On its basis the special technique of water system regulation to protect agricultural areas in floodplain zone was developed.

Developed approach along with authentic and regularly peer hour monitored data provide us with necessary tool for qualitative management of regulating hydraulic structures during the passage of high waters.

Keywords: Flood risk assessment, MIKE 11, hydrodynamic model