



Experience of satellite images application for two-dimensional hydrodynamic modeling of flooding territory during floods on rivers

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Basis for modeling of flooding territory during floods on the rivers are two-dimensional hydrodynamic models. Usually data on measured streamflow velocities and water levels are involved for calibration and verification of models. In this research, due to presence satellite images for different dates and the hydrological information for the same dates, the opportunity to lead additional verification of the model was used. For this purpose simulated on the model and the actual borders of flooding territory received from satellite images were compared.

Flooding in area of the ancient Russian town Velikii Ustug (Vologda region), situated at the confluence of the Suhona and the Jug river were investigated. During all history the town was flooded repeatedly. Last large flooding was observed in May 1998 when it was flooded more than half of town and nearby territories.

Simulations were carried out with use of the program complex *FLOOD* developed by V.V.Belikov with colleagues on the basis of two-dimensional Saint-Venant equations. Satellite images of the Meteor - 31 and the Resource - 01 satellites with the spatial resolution of 30 and 45 m were used.

Comparison of simulated and actually observed borders of flooding has shown, that, at a whole, the model adequately reflects a real picture of flooding. Use of satellite images has allowed to specify the initial data and to improve results of modeling. Simulations of flooding territory for different discharges of the Suhona and the Ug rivers were carried out further.