Geophysical Research Abstracts
Vol. 18, EGU2016-16713, 2016
EGU General Assembly 2016

Verification of the two-dimensional hydrodynamic model based on remote sensing

Alexey Sazonov, Polina Mikhailukova, Inna Krylenko, Natalya Frolova, and Mariya Kireeva
Russia, Moscow, GSP-1, 119991, Leninskie Gory, MSU

Mathematical modeling methods are used more and more actively to evaluate possible damage, identify potential flood zone and the influence of individual factors affecting the river during the passage of the flood.
Calculations were performed by means of domestic software complex «STREAM-2D» which is based on the numerical solution of two-dimensional St. Venant equations. One of the major challenges in mathematical modeling is the verification of the model. This is usually made using data on water levels from hydrological stations: the smaller the difference of the actual level and the simulated one, the better the quality of the model used.
Data from hydrological stations are not always available, so alternative sources of verification, such as remote sensing, are increasingly used. The aim of this work is to develop a method of verification of hydrodynamic model based on a comparison of actual flood zone area, which in turn is determined on the basis of the automated satellite image interpretation methods for different imaging systems and flooded area obtained in the course of the model.
The study areas are Lena River, The North Dvina River, Amur River near Blagoveshchensk. We used satellite images made by optical and radar sensors: SPOT-5/HRG, Resurs-F, Radarsat-2. Flooded area were calculated using unsupervised classification (ISODATA and K-mean) for optical images and segmentation for Radarsat-2.
Knowing the flow rate and the water level at a given date for the upper and lower limits of the model, respectively, it is possible to calculate flooded area by means of program STREAM-2D and GIS technology. All the existing vector layers with the boundaries of flooding are included in a GIS project for flood area calculation.
This study was supported by the Russian Science Foundation, project no. 14-17-00155.