



## **FLOOD FORECASTING FOR THE UKRAINIAN PART OF THE TISZA BASIN: LINKING WITH THE NUMERICAL WEATHER FORECASTS, COMPARATIVE TESTING OF DISTRIBUTED AND LUMPED MODELS**

S. Belov (1), G. Donchytz (1), S. Kivva (2), A. Kuschan (2), **M. Zheleznyak** (1,2)

(1) Ukrainian Center of Environmental and Water Projects, (2) Institute of Mathematical Machines and System Problems, Kiev (mark@immssp.kiev.ua/Fax: +380-44-2663615)

The implementation of new flood forecasting systems for the Ukrainian part of the Tisza basin has started last years by the customisation of Mike-11 model for the Uzh River and Latoritsa River (part of the Bodrog Catchment) in the frame of the joint project with the 'DHI Water& Environment'. The calibration and testing of the lumped parameter model NAM was provided in collaboration with the Ukrainian Hydrometcenter and the Uzhgorod Hydrometcenter for the period 1998-2000, which includes two hazardous floods of years 1998 and 2000. The tuning of hydrodynamical module of Mike-11 is provided in collaboration with the Transcarpathian Branch of State Committee of Water Management (SCWM), Uzhgorod. The information about existing and designed hydraulic structures in the river channels, -bridges, polders, dikes, pump stations is used for the model tuning. The flood forecasting system for Uzh River and Latoritsa River based on Mike -11 is in pre-operational use in Uzhgorod Hydromet and SCUWM offices. The advance time of the flood forecasts can be increased by the real-time assimilation of the precipitation forecasts of a Numerical Weather Predictions (NWP) model. The Penn State University /UCAR NWP model MM5 was customized for the Ukrainian territory in resolution 30\*30 km on the basis of the rare gridded forecasting data from the German meteorological center Offenbach, assimilating the data from the Ukrainian meteorological stations, processed by the Ukrainian Hydrometcenter. The region of the Uzh and Latoritsa watersheds was simulated by MM5 in the resolution 10\*10 km for the linking with

the Mike -11 (NAM). The preliminary results of flood forecasting on the basis of the meteorological forecasts are analyzed.

For further improvement of the flood forecasting systems the implementations of GIS based distributed models are planned. Two types of distributed models based upon physically meaningful parameters are comparatively studied- 2-D finite- difference model RUNTOX (Kivva, Zheleznyak, 2001) based on Saint Venant equations and TOPographic Kinematic Approximation and Integration - TOPKAPI model (Todini, 1995,2000). The new computer code was developed, based on the TOPKAPI equations.

Both models was initially tested for the small watersheds ( from 0.085 km<sup>2</sup> to 0.40 km<sup>2</sup> ) of the Boguslav Field Experimental Laboratory of the Ukrainian Hydrometeorological Institute. The comparison with the experimental data shows that TOPKAPI produces the reasonable results for the different floods without special tuning of the model parameters. The study of the applicability of TOPKAPI for the sub-watersheds of Uzh and Latoritsa rivers is going on.