# HYDROLOGICAL MODELING OF THE HIGH FLOW IN MARITZA RIVER BASIN IN AUGUST 2005 - ANALYSIS OF THE INFLUENCE OF THE TOPOLNITZA RESERVOIR

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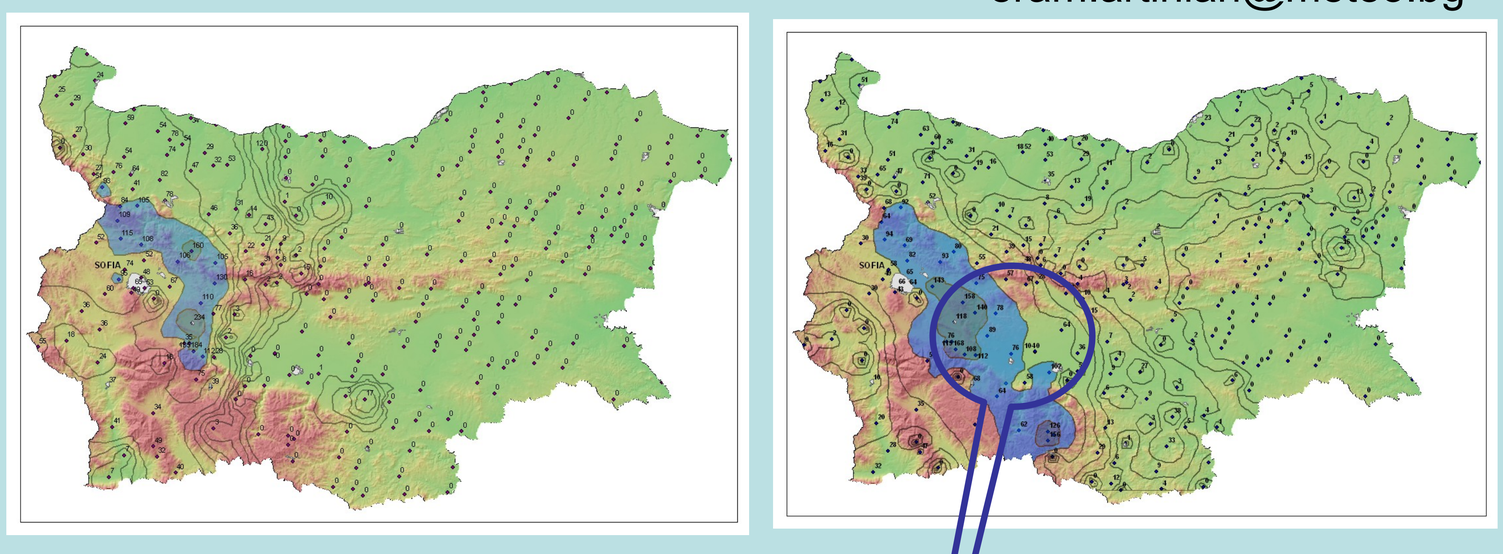
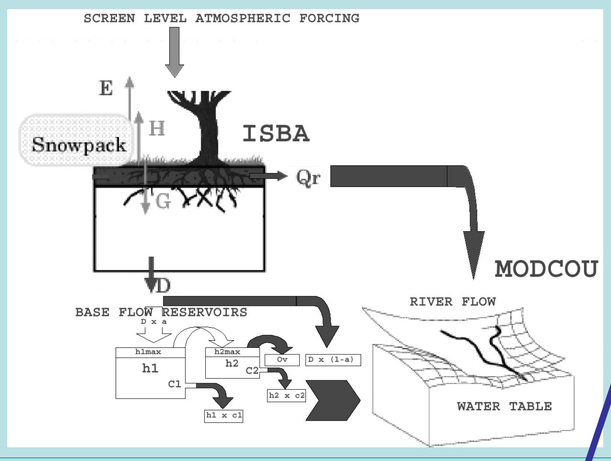


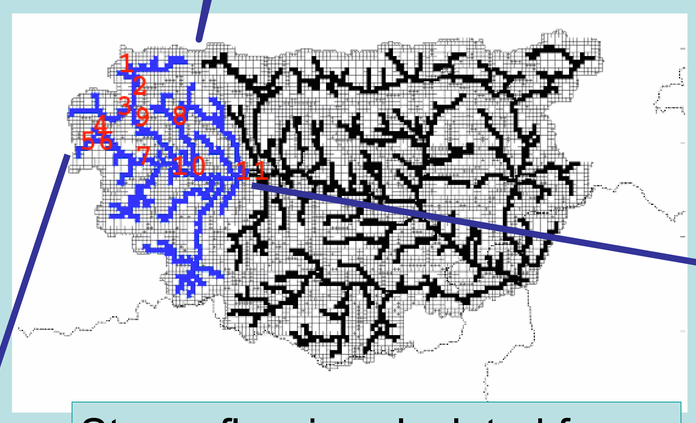

24h cumulative amount of precipitation, 07h30 local time, 05.08.2005 and 07h30 local time, 06.08.2005.

Extreme amount of rainfall in the areas of Ihtiman, Kostenets, Dolna Banya etc., in the North-West part of the river basin on August, 4th and 5th and in the Rhodopy and the Gornotrakiyska valley regions on the following days caused a 50 year return period high water wave (2% probability). The high water stream itself caused overflow of the rivers Mativir, Topolnitza and Maritza in a number of areas downstream and caused substantial material damages and even took away a human life.

**Three hypotheses for the flow downstream of the reservoir of Topolnitza were considered: A) natural flow down the whole basin with the exclusion of the Vacha cascade; B) Evaluation of the regulative influence of the artificial lake of Topolnitza by data given by "Irrigation systems"; C) option with closed valves of the artificial lake.**

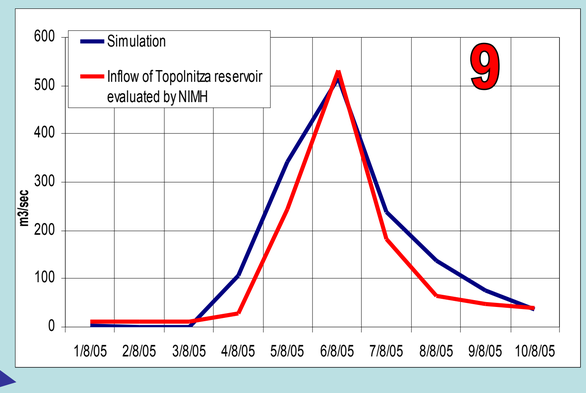


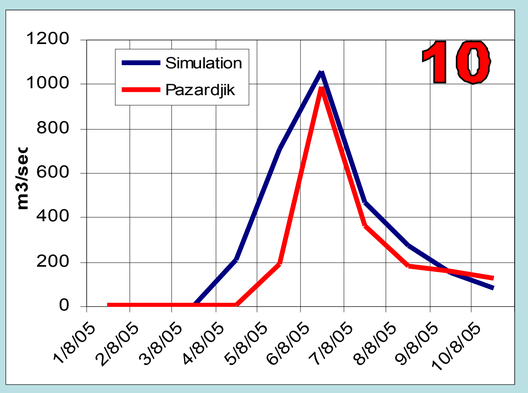

ISBA land surface scheme coupled with MODCOU macro scale distributed hydrological model. The modeling system is fed by measured precipitation field.

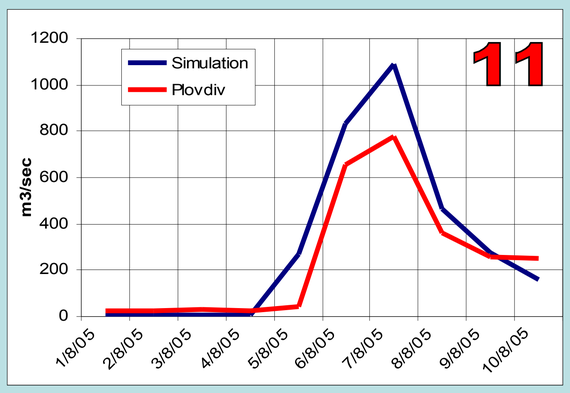


Streamflow is calculated for profiles with monitored river flow and in separate additional profiles like outlets of rivers to Maritza (Ochushnitza, Yadenitza, Luda Yana, Vacha).

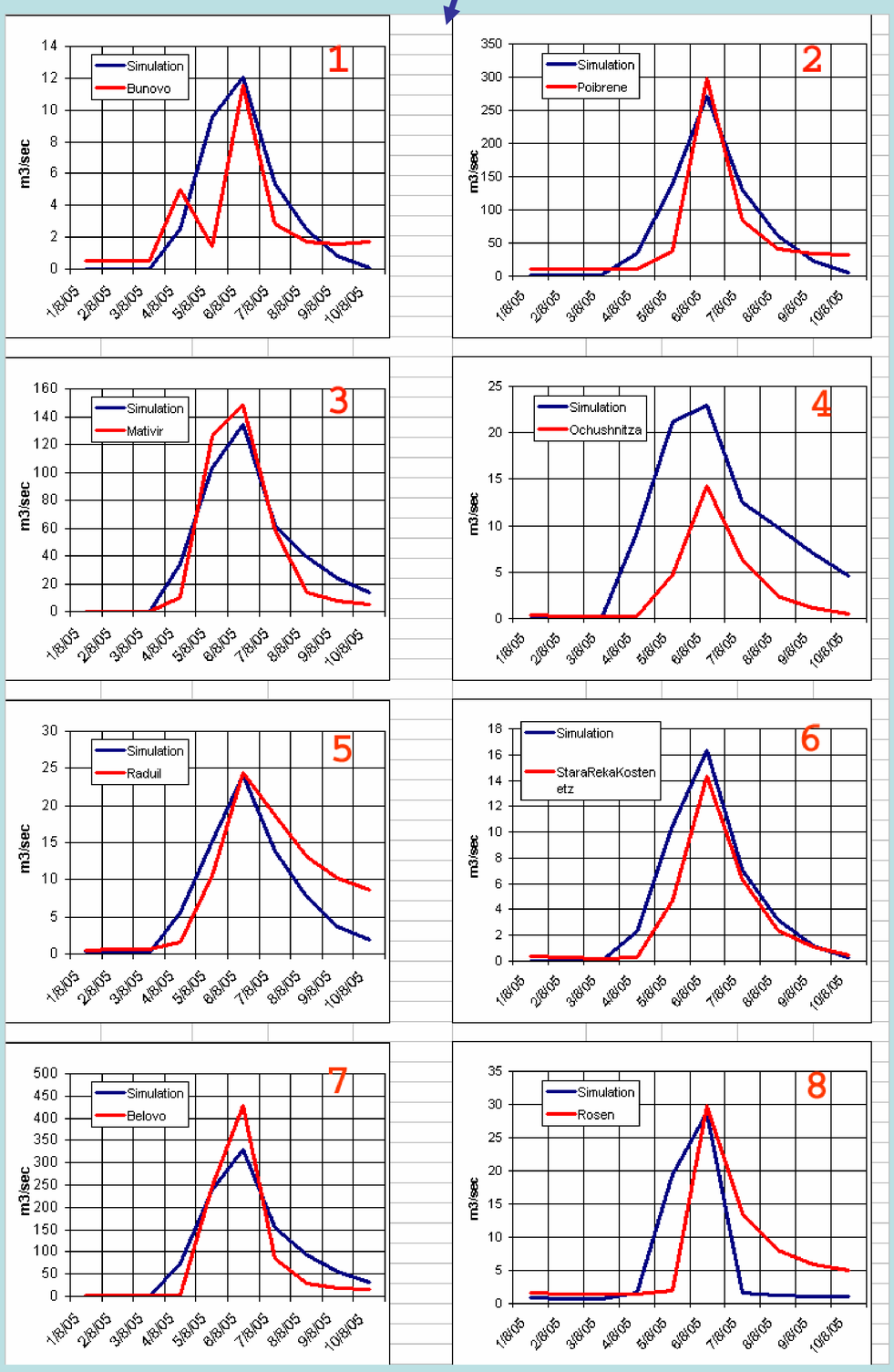
## A) Natural flow hypothesis



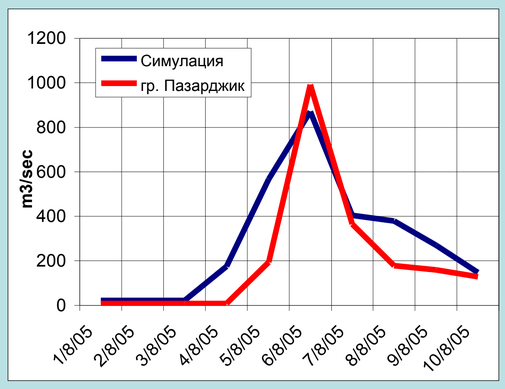



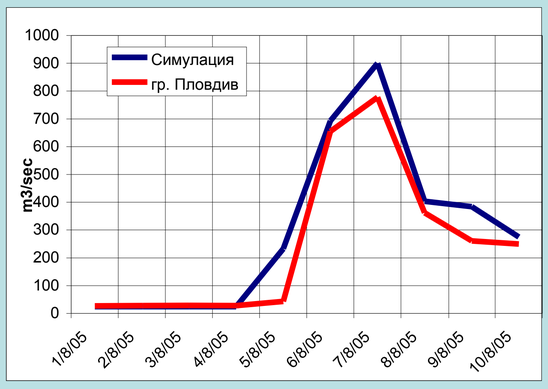




Simulated and measured runoff at the reservoir entrance (9) and at towns of Pazardjik (10) and Plovdiv (11)




## B) River flow taking into consideration Topolnitza reservoir retention capacity – data from dam management company




Simulated and measured runoff at the reservoir entrance (9) and at towns of Pazardjik (10) and Plovdiv (11) with influence of reservoir taken into consideration.

**Conclusion: 1. Distributed hydrological model has proved to give enough detailed picture of a flooding event over a large territory. 2. The dam's influence on the peak flow is positive (decreasing) even when less than 15% of reservoir's capacity is free.**