



On the integration of HydroProg and FloodMap: towards real-time inundation predictions in the upper Nysa Klodzka basin (SW Poland)

Dapeng Yu (1), Bartłomiej Mizinski (2), Agnieszka Latocha (2), Krzysztof Parzoch (2), and Tomasz Niedzielski (2)

(1) Loughborough University, Loughborough, UK (D.Yu2@lboro.ac.uk), (2) University of Wrocław, Wrocław, Poland (tomasz.niedzielski@uni.wroc.pl)

The paper summarizes attempts to link the HydroProg system for issuing the real-time warnings against hydrologic hazards (research project no. 2011/01/D/ST10/04171 of the National Science Centre of Poland) with the hydrodynamic FloodMap model. HydroProg itself integrates hydrometeorological gauging networks with dissimilar hydrologic models in order to deliver multiple river stage prognoses and their multimodel ensemble prediction. FloodMap uses HydroProg-delivered forecasts and, along with data on topography and bed profiles, produces short-term (3-hour) prognoses of inundation.

The research is carried out in five test sites located in the upper Nysa Klodzka basin (SW Poland), where the HydroProg-Klodzko prototype is experimentally implemented, and is steadily providing the users with experimental prognoses of river stages (www.klodzko.hydroprog.uni.wroc.pl). The successful implementation of HydroProg in Klodzko County is due to the partnership with its authorities who developed and maintain the Local System for Flood Monitoring (Lokalny System Osłony Przeciwpowodziowej – LSOP). For the purpose of HydroProg-FloodMap integration we selected: (1) three hydrograph prediction approaches offered by HydroProg-Klodzko, (2) five specific peak flow events, and (3) five test sites along four mountainous rivers of the study area, focusing on 3-hour hydrograph predictions. The calibration of the FloodMap model is based on an overbank flow reconstruction, produced as a result of mapping geomorphological consequences of the flood that occurred in the Zelazno site on 26-28 June 2009. The discussion as to whether the calibrated model can be extrapolated and used in the remaining test sites is also provided. By utilizing FloodMap with observed water depth data we produce simulated inundation, which we verify against the orthophoto images acquired by the Unmanned Aerial Vehicle (UAV). Subsequently, we again run the FloodMap model with the HydroProg-delivered prognoses of hydrographs. This allows us to compare the simulated inundation (which we provisionally assume to be close-to-observed water extent) with the predicted inundation. This comparison enables us to evaluate how skillful the HydroProg-FloodMap approach is in the process of forecasting future overbank flow events. The results of the investigations are implemented in practice, and the 3-hour (15-minute updated) predictions of inundation for the five test sites are included in the real-time service.