



Multimodel ensemble predictions of river stages computed in real time: application of the HydroProg system in the upper Nysa Kłodzka basin (SW Poland)

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A novel system for computing predictions of river stages in real time, based on the concept of multimodelling, has been recently designed and built at the University of Wrocław, Poland. The system, known as HydroProg, has been launched in August 2013, and its first experimental basin is the upper Nysa Kłodzka basin (SW Poland) above the outlet in the town of Bardo, with the catchment area of 1744 square kilometres. The study area, which includes a large and flood-prone intramontane basin with the surrounding mountains, has been chosen in order to connect the HydroProg system to the existing real-time hydrometeorological observational network, namely the Local System for Flood Monitoring in Kłodzko County. This network offers a high temporal resolution of observations, as the length of the sampling interval is equal to 15 minutes. Multiple external hydrologic prediction models – those which enable rapid recalibration every quarter of an hour – can be plugged in to HydroProg, and the latter keeps calculating multimodel ensemble forecasts of river stages with weights updated along with the 15-minute update of the entire system. The initial results – based on a few data-based hydrologic models and the following two types of predictions: (1) 15 minute update and lead time of 3h and (2) 6 hour update and lead time of 2 days – clearly show that both normal and peak flow water levels can be successfully predicted. The paper discusses the maximal prediction horizons, at 11 hydrologic gauges under scrutiny, for which Nash-Sutcliffe efficiency judges the predictions as reasonable. Along with the discussion of scientific results, the dedicated real-time web map service, presenting both the current predictions and their statistics in the online mode, is shown.