Geovisualization in the HydroProg web map service

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The HydroProg system, built at the University of Wroclaw (Poland) in frame of the research project no. 2011/01/D/ST10/04171 financed by the National Science Centre of Poland, has been designed for computing predictions of river stages in real time on a basis of multimodelling. This experimental system works on the upper Nysa Klodzka basin (SW Poland) above the gauge in the town of Bardo, with the catchment area of 1744 square kilometres. The system operates in association with the Local System for Flood Monitoring of Klodzko County (LSOP), and produces hydrograph prognoses as well as inundation predictions. For presenting the up-to-date predictions and their statistics in the online mode, the dedicated real-time web map service has been designed. Geovisualisation in the HydroProg map service concerns: interactive maps of study area, interactive spaghetti hydrograms of water level forecasts along with observed river stages, animated images of inundation. The LSOP network offers a high spatial and temporal resolution of observations, as the length of the sampling interval is equal to 15 minutes.

The main environmental elements related to hydrological modelling are shown on the main map. This includes elevation data (hillshading and hypsometric tints), rivers and reservoirs as well as catchment boundaries. Furthermore, we added main towns, roads as well as political and administrative boundaries for better map understanding. The web map was designed as a multi-scale representation, with levels of detail and zooming according to scales: 1:100 000, 1:250 000 and 1:500 000. Observations of water level in LSOP are shown on interactive hydrographs for each gauge. Additionally, predictions and some of their statistical characteristics (like prediction errors and Nash-Sutcliffe efficiency) are shown for selected gauges. Finally, predictions of inundation are presented on animated maps which have been added for four experimental sites. The HydroProg system is a strictly scientific project, but the web map service has been designed for all web users. The main objective of the paper is to present the design process of the web map service, following the cartographic and graphic principles.