



## Coupled Hydrological and Hydraulic Modeling for Flood Mapping

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The delineation of the flooded areas involves both hydrological and hydraulic modeling. Usually, the hydrological and hydraulic processes are separately treated. In the proposed methodology, the coupled modeling of the hydrological and hydraulic processes is used. The calibration and validation of the hydrological parameters is undertaken based on historical floods using the corresponding precipitations for the same period. The calibration process was more complicated in the presence of reservoirs, when not only the discharges downstream but also the water level in the reservoirs had to be accurately reproduced. The time step for precipitation is 1 hour, corresponding to the concentration time of the smallest catchments. The maximum annual precipitation for different time steps (1; 3; 6; 24 hours) were statistically processed and based on these results the cumulative rainfall curves and the synthetic hyetographs were derived. The rainfall duration is depending on the concentration time. Mike 11 with UHM module based on SCS model was used for coupled hydrological and hydraulic modeling. The coupled hydrological and hydraulic simulation for the scaled precipitation leads both at the computation of the components which contribute to the generation of the P% flood at the Hydrometric stations as well as to the determination of the discharge hydrograph along the main river. Based on these results the flood hazard maps were obtained using a DTM based on Lidar data. The methodology was applied for a river basin in Romania of 12500 km<sup>2</sup>.