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Multi-Hydro: towards a hydrological and hydraulic modelling of peri-urban catchment.

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As the proportion of people living in cities increases (from 73% to 82% of population until 2050 in Europe) and climate changes, the urban flood risk became a significant concern in Europe. Thus, it becomes necessary to properly evaluate the hydrological behavior and the resilience to the floods of the peri-urban areas. This task is one the aims of several European projects as the recently closed FP7 SMARTeST project or the current Climate KIC BlueGreenDream and NWE Interreg RainGain projects.
In order to provide a tool to evaluate the water cycle and the effect of the resilience measures in the peri-urban areas, the Multi-Hydro model was developed and improved at the Ecole des Ponts ParisTech. This model consists in a modular and easily transportable framework which allow a physically-based fully distributed representation of the hydrological processes at stake in urban environment; i.e. the rainfall, drainage in sewer systems, surface runoff and infiltration in the soil. The input is a precise description of the studied area (land use, elevation, soil description and drainage system map). Different scenarios urban water management can be implemented, i.e the creation of swales. All the modules of Multi-Hydro are relying on open source software packages and the implementation of the model on several case studies gave an understanding of the hydrological response of these catchments through the scales. Indeed, the output of the model consists into series of map for the water level which allowed advanced statistical analysis and risk map analysis.
The abilities of the model will be illustrated through a small case study in Paris area (France) where some flood protection measures were virtually implemented to evaluate their effect on the local hydrology.