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OpenMI based integrated water quality modelling of river Zenne using IWA RWQM1 principles

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In 2000, the EU launched the Water Framework Directive - EU WFD (EU, 2000) - which calls to achieve a good ecological status of all water bodies by 2015. Despite large investments made for the management of the Brussels' sewer systems, the Zenne river (Belgium) still receives high loads of pollutants. Hence a project, GESZ was launched to evaluate the effects of the wastewater management plans in the river basin on the ecological functioning of the river. To consider different water quantity and quality processes, we used Soil and Water Assessment Tool - SWAT, Storm Water Management Model - SWMM (Rossman, 2009), a new water quality simulator based on River Water Quality Model N°1 - RWQM1 (Reichert et al., 2001), and a new temperature model and integrated in OpenMI (Moore and Tindall, 2005) platform. Both Dry Weather Flow (DWF) and long term simulations are performed. Results showed that the model simulates the water quality variables with reasonable accuracy. The long term simulation revealed that a near anoxic condition prevails in river reaches when substantial volume of combined sewer overflow (CSO) is discharged. Hence, we demonstrated the usefulness and the feasibility of using the OpenMI to perform an integrated water quality simulation. We believe that this approach - that uses the best suitable modules to build an integrated river basin model - can be very useful to support integrated river basin management. However, we also found that the calculation time overhead of the OpenMI based integration approach.

Biography

Narayan Kumar Shrestha is pursuing his Ph.D. in Vrije Universiteit Brussel, Belgium and is in his final year under supervision of Prof. Willy Bauwens. His research interests are but not limited to, on urban hydrology & hydraulics, water quality modelling, OpenMI based integrated modelling of river catchment processes, climate change impacts on water resources, use of radar technology in hydrology, sensitivity and uncertainty analysis, and model optimization.

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