

Seminar

Old and new challenges in managing the quality of combined and separate sewer discharges during rainfall events

Vecchie e nuove sfide nella gestione della qualità degli scarichi da fognature miste e separate in tempo di pioggia

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When rain falls from clouds and lands on urban areas, it is usually collected and conveyed away by sewer systems, which can be either combined (where the same infrastructure is used for waste- and stormwater) or separate (where dedicated pipe systems collect stormwater and convey it directly into natural waterbodies). During this process, water accumulates a wide range of pollutants from various sources, including traffic and related infrastructure, the atmosphere, building materials and other human activities spread across urban areas. Also, during medium-big rain events, combined systems get overloaded, and untreated wastewater is released into the natural environment (the so-called Combined Sewer Overflows).

Wet-weather discharges from urban areas are thus an important contributor to pollution in urban rivers, and their impacts have been known for decades. Further, urban water infrastructures across the globe are transitioning towards new paradigms that deliver not only drainage functions but - potentially - multiple benefits in relation to broader sustainability challenges. Conceptualised as Water-Wise, water smart or water sensitive Cities, this new urban water management paradigm sees stormwater becoming a resource. However, the complex and heterogeneous mixture of pollutants in stormwater can limit its (re)use and can pose a risk both to human health and to the environment.

Despite the importance of these water quality aspects, the main focus of the last decade has been the quantitative management of stormwater (climate change adaptation and flood risk reduction, rainwater harvesting, etc.), and several issues linked to the management of stormwater quality still remain open. These are linked to (i) the high spatial and temporal variability in stormwater pollution levels, (ii) the limited knowledge on pollution control options, and (iii) the need to integrate risks posed by stormwater pollution within a holistic strategy for the management of water in urban areas.

LUCA VEZZARO is Associate Professor at the Department of Environmental and Resource Engineering Water Systems of the Technical University of Denmark. His research interests are related to the assessment of both water quality and quantity in urban water systems through modelling techniques, on the development of tools for the identification and quantification of the related uncertainty, including real-time monitoring and data validation of water quality in both combined and separated sewers, and the sustainable management of water in the urban context.

