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Modelling of Micropollutant Emissions from Combined Sewer Systems

ABSTRACT

Combined sewer overflows release significant amounts of micropollutants into the environment in the event of heavy rain events. Micropollutants are found both in stormwater and in wastewater, varying according to their source. The full impact of these overflow events is not adequately known because of the high analytical costs and difficulty in obtaining measurements during flood events. The ability to simulate a sewer system and a river provides valuable insight into the distribution of pollutant concentrations and loads within receiving waters in the event of CSO discharges. The use of mixing ratios, the ratio of rainwater to wastewater, can be modelled and used to calculate corresponding micropollutant concentrations. In this paper, a SWMM model created for the Körsch river catchment in Stuttgart is paired with real rain and river flow data from Nord Rhine Westfallen in order to generate time series of concentration and flow during combined sewer overflows. Mixing ratios are taken from SWMM outputs in order to acquire knowledge about micropollutants within CSO tanks, coming out of a treatment plant, and overflowing into a river. This ability to approximate the flow of micropollutants during not only dry weather flow but also wet weather flow within 15 minute intervals over a span of ten years (from 2000 to 2010) provides valuable information that can be used to assess the effect of CSO discharges on wildlife and hopefully lead to both an economical and environmentally-advantageous solution.