



Identification of pollutant sources in a rapidly developing urban river catchment in China

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Rapid economic development and urbanization worldwide cause serious ecological and environmental problems. A typical region that is in transition and requires systemic research for effective intervention is the rapidly developing city of Hefei in central P. R. China. In order to investigate the sources of pollutants over a one-year period in Nanfei River catchment that drains the city of Hefei, discharges were measured and water samples were taken and measured along the 14km river section at 10 sites for 4 times from 2013 to 2014. Overflow concentrations of combined sewer and separate storm drains were also measured by selecting 15 rain events in 4 typical drainage systems. Loads and budgets of water and different pollutant sources i.e., wastewater treatment plant (WWTP) effluent, urban drainage overflow, unknown wastewater were calculated. The water balance demonstrated that >70% of the discharge originated from WWTP effluent. Lack of clean upstream inflow thereby is threatening ecological safety and water quality. Furthermore, mass fluxes calculations revealed that >40% of the COD (Chemical Oxygen Demand) loads were from urban drainage overflow because of a large amount of discharge of untreated wastewater in pumping stations during rain events. WWTP effluent was the predominant source of the total nitrogen loads (>60%) and ammonia loads (>45%). However, the total phosphorous loads from three different sources are similar (~1/3). Thus, our research provided a basis for appropriate and prior mitigation strategies (state-of-art of WWTP upgrade, sewer systems modification, storm water regulation and storage capacity improvement, etc.) for different precedence-controlled pollutants with the limited infrastructure investments in these rapidly developing urban regions.