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Session abstract

Title: Fate of emerging contaminants in the water cycle: occurrence, transformation, accumulation and removal

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Introduction

So called “emerging contaminants” are recently detected in wastewater and environmental matrices up to several µg/L, although they might already be present for decades. Innovative analytical instrumentation enables the identification and quantification of organic contaminants down to the lower nanogram per litre and nanogram per kg range. Prominent examples of emerging contaminants are pharmaceuticals, estrogens, ingredients of personal care products, biocides, flame retardants, benzothiazoles, benzotriazoles or perfluorinated tensides (PFT). In wastewater treatment plants (WWTPs), during soil passage and in surface waters many of these emerging contaminants are converted to appreciable portions into transformation products (TPs). Thus, surface water and groundwater contain a very complex mixture of contaminants and their TPs at the sub-mg/L range comprising an extreme high variety of different properties such as polarity, sorption affinity, biodegradability, chemical reactivity or UV-stability. It is even known that drinking water in some locations might contain an appreciable number of emerging contaminants and TPs. Neither the ecotoxicological impact nor the human health impacts of those mixtures are currently well understood.

Aim of the session

In this session those processes are highlighted and evaluated which are responsible for the fate and the removal of emerging contaminants in the water cycle which includes biological wastewater treatment, surface water, groundwater, passage through soil and hyporheic zones, bank filtrates and disinfection in waterworks. The session will be focused on all kind of emerging contaminants as well as on processes leading to their conversion such as microbial transformation, abiotic transformation (e.g. photo-chemical and redox reactions), metabolism as well as accumulation in aquatic organisms and sediments and oxidation during disinfection. Another challenge of the session will be to discuss those methodologies which enable an overall (eco)toxicological assessment of complex mixtures of emerging contaminants and their TPs occurring in surface waters and groundwater.