European Commission

Science for Environment Policy

29 August 2019
Issue 530

[Subscribe](#) to free weekly News Alert

Source: Zoboli, O. *et al.* (2019). Occurrence and levels of micropollutants across environmental and engineered compartments in Austria. *Journal of Environmental Management*, 232, 636–653. https://doi.org/10.1016/j.jenvman.2018.10.074.

Contact:
ozoboli@iwag.tuwien.ac.at

Read more about:
Chemicals, Emerging risks, Environment and health, Water

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

How the occurrence and concentration of micropollutants vary across Austria

The presence and accumulation of micropollutants[1] (anthropogenic trace contaminants) in aquatic environments is an area of policy concern for the EU. In order to better understand how these chemicals enter and are transported within water systems, this study investigated the occurrence and concentration of a broad spectrum of micropollutants across Austria's water system. Municipal waste-water effluents were found to be the emission pathway with the highest concentrations of some micropollutants. The study also demonstrated that levels of other micropollutants are higher in rivers, atmospheric deposition and groundwater than in waste-water effluents and that these sometimes exceeded environmental quality standards for surface waters.

Trace metals and organic micropollutants — chemicals of anthropogenic origin that occur in the environment at levels that, while trace, are well above the natural background level — are directly emitted and transported to and between different bodies of water across the EU. Many are persistent, ubiquitous, and accumulate within organisms, posing a risk to the health of both humans and wildlife.

These pollutants thus form an area of policy concern. Environmental Quality Standards (EQS) require EU Member States to reduce and, ultimately, eliminate emissions of compounds that have been identified as most critical for water resources in the EU. Achieving this goal and demonstrating compliance with EQS can, however, be challenging due to a scarcity of information on how trace pollutants occur and accumulate in different media within the aquatic system, including those that occur naturally (e.g. groundwater, deposition) and those that are engineered (e.g. municipal wastewater, industrial wastewater). To date, research on this topic has typically focused on one or few selected media, making it difficult to conduct robust, interdisciplinary research that investigates the relevance of different emission pathways.

This study identifies and quantifies the occurrence and concentration levels of a broad spectrum of micropollutant compounds using samples taken from across Austria's aquatic system. Samples of river water, suspended particulate matter, soil and atmospheric deposition were collected from nine river catchments (areas where water is drained into a single watercourse or water body). These catchments were selected as case studies because they cover a wide range of geographical, climatic and land-use related characteristics. To expand the study area, samples of river water, groundwater, atmospheric deposition, municipal wastewater effluents and industrial wastewater effluents were also collected from additional sites across Austria. In this way, the researchers sought to establish the potential importance of different routes that compounds may take to initially enter and subsequently move around within water systems.

The samples were analysed to investigate the concentration levels of a wide range of micropollutant compounds. These compounds were selected because they are omnipresent, and because previous monitoring outcomes have suggested that they are particularly significant for the compliance of Austrian water bodies with the objectives of the European Water Framework Directive. They included:

- Metals;
- organotin compounds (chemical compounds based on tin, used as stabilisers in plastics and as fungicides);
- polycyclic aromatic hydrocarbons (PAHs);
- polybrominated diphenyl ethers (PBDEs);
- perfluoroalkyl acids (PFAAs).

Continued on next page.

1.Human-made trace contaminants in the aquatic environment – for example from products that are used daily, such as industrial chemicals, pharmaceuticals and personal care products, pesticides and hormones.

European Commission

Science for Environment Policy

How the occurrence and concentration of micropollutants vary across Austria

(continued)

29 August 2019
Issue 530
[Subscribe](#) to free weekly News Alert

Source: Zoboli, O. *et al.* (2019). Occurrence and levels of micropollutants across environmental and engineered compartments in Austria. *Journal of Environmental Management*, 232, 636–653. https://doi.org/10.1016/j.jenvman.2018.10.074.

Contact:
ozoboli@iwag.tuwien.ac.at

Read more about:
Chemicals, Emerging risks, Environment and health, Water

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

This revealed a number of insights. Notably, it was found that some PAHs and organotins are present in rivers and groundwater at substantially higher concentrations than in municipal and sometimes even industrial waste-water effluents. Among PFAAs and metals, the highest concentrations were recorded either in atmospheric deposition or in discharges from waste-water treatment plants. Municipal waste-water effluents presented the highest pollution levels for some substances. For others, concentrations in rivers, atmospheric deposition, and groundwater were higher than in waste-water effluents and sometimes exceeded the environmental quality standards for surface waters — a finding with significant policy relevance.

Moreover, the study reveals some partially counterintuitive patterns. In rivers into which treated waste-water is discharged, increasing levels of dissolved compounds were measured at rising flow conditions — the opposite of what would be expected according to the effects of dilution. This may be due to the disruption and mobilisation of soil or suspended particulate matter, suggest the researchers, but further research is required to identify the mechanisms underlying this effect. They also advise further analysis of how regional or catchment-specific characteristics might alter the relative importance of different emission pathways, and further modelling of emission and river loads to assess how these contribute to river pollution.