

“Forever chemicals” in rivers

Simulation of PFAS emission, fate and transport with a georeferenced model

Department: Copernicus Institute of Sustainable Development

Research group: Environmental Sciences

Supervisor: Dr. Stefanie Lutz and Prof. Jasper Griffioen

Email address: s.r.lutz@uu.nl

Project description

Poly- and perfluorinated alkyl substances (PFAS) are organic compounds with a variety of uses such as lubricants, food packaging material, firefighting foam, non-stick coatings of pans and clothing. Many of these compounds are persistent in the environment and have been found in water, soil, food and drinking water. Model tools able to predict river concentrations of PFAS at the catchment scale (i.e., for entire river systems) are needed to better understand the sources of PFAS and how their emissions can be reduced.

This project aims at testing the applicability of the georeferenced simulation model [GREAT-ER](#) (Geography-referenced Regional Exposure Assessment Tool for European Rivers) for exposure assessment of PFAS for entire catchments. GREAT-ER has been established to simulate concentrations of daily-use chemicals such as pharmaceuticals (Fig. 1). Application of the model to PFAS compounds is scientifically novel and socially relevant.

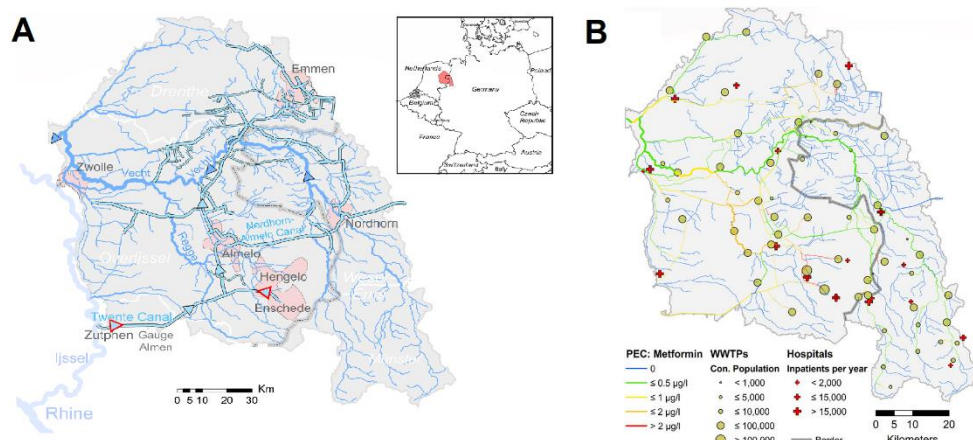


Figure 1: Overview of the Vecht Catchment (A) and concentrations of the pharmaceutical metformin in the Vecht Catchment simulated with GREAT-ER (B). Adapted from [Lämmchen et al. \(2021\)](#).

In this project, you will first delve into previous research on use, emission, fate and transport of PFAS. Secondly, you will modify an existing model setup in GREAT-ER for the simulation of PFAS and analyse the effect of different measures such as a reduction in PFAS use. You will collaborate closely with researchers from the University of Osnabrück (Germany) who have developed and maintain the GREAT-ER model. We also plan to involve PFAS experts from research institutes such as TNO and KWR Water Research Institute.

As you will mainly do literature research and computer work, restrictions related to Covid-19 will not majorly affect the outcome. Meetings with the supervisors might be shifted to online meetings.

Job requirements

The project requires basic skills of ArcGIS or the willingness to acquire those quickly. Knowledge of environmental chemistry and contaminant hydrology will be helpful.