Microplastic in the Terrestrial Environment

Dr. Moritz Bigalke
Institute of Geography, University of Bern, Switzerland

Microplastics in the environment are of great concern, mostly because of their ubiquity and their negative effects on marine ecosystems. Their sources are mainly terrestrial, however. Their concentrations and fates in terrestrial environments remain poorly understood. In terrestrial ecosystems, soils are probably the major sinks for microplastics. It has been estimated that the application of sewage sludge to arable land alone could add an annual microplastic load to soil greater than that entering the world's oceans. Additionally, the application of compost and the use of plastic foil in agriculture, industrial plastics, littering, road dust, and diffuse atmospheric deposition or irrigation with microplastic contaminated water are other important sources of microplastics in the environment. Microplastic concentrations up to 67 500 mg kg^{-1} have recently been found at an industrial site in Australia. Indeed, histopathological and molecular effects of microplastics on earthworms were already found at concentrations as low as 62.5 mg kg^{-1}. Environmental microplastics concentrations in soils are therefore likely to affect soil organisms and might thus decrease soil fertility, alter soil ecological functioning.
One reason why the knowledge about microplastics in soils is still very limited is that the methods developed for the analysis of microplastics in water are not working for soils. From the methods published all still have considerable limitations when it comes to fully characterize and quantify microplastics in soil samples. In my talk, I will give an overview about the current state of microplastic research in the soil, different methods for the analysis and their limitations as well as possible future trends in microplastic research in soils.