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The influence of microplastic on soil hydraulic properties

Patrizia Hangele, **Katharina Luise Müller**, Hannes Laermanns, and Christina Bogner

Ecosystem Research Group, Institute of Geography, University of Cologne, Zùlpicher St. 45, 50674 Cologne, Germany

The need to study the occurrence and effects of microplastic (MP) in different ecosystems has become apparent by a variety of studies in the past years. Until recently, research regarding MP in the environment has mainly focused on marine systems. Within terrestrial systems, studies suggest soils to be the biggest sink for MP. Some studies now started to explore the presence of MP in soils. However, there is a substantial lack of the basic mechanistic understanding of the behaviour of MP particles within soils.

This study investigates how the presence of MP in soils affects their hydraulic properties. In order to understand these processes, experiments are set up under controlled laboratory conditions as to set unknown influencing variables to a minimum. Different substrates, from simple sands to undisturbed soils, are investigated in soil cylinders. MP particles of different sizes and forms of the most common plastic types are applied to the surface of the soil cylinders and undergo an irrigation for the MP particles to infiltrate. Soil-water retention curves and soil hydraulic conductivity are measured before and after the application of MP particles. It is hypothesised that the infiltrated MP particles clog a part of the pore space and should thus reduce soil hydraulic conductivity and change the soil-water retention curve of the sample. Knowledge about the influence of MP on soil hydraulic properties are crucial to understand transport and retention of MP in soils.