

EGU22-13015

<https://doi.org/10.5194/egusphere-egu22-13015>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Assessing interactions between preferential flow and antibiotic transport in soils

Ryan Stewart<sup>1</sup> and Jesse Radolinski<sup>1,2</sup>

<sup>1</sup>Virginia Tech, School of Plant and Environmental Sciences, Blacksburg, United States of America (sryan3@vt.edu)

<sup>2</sup>University of Innsbruck, Department of Ecology, Innsbruck, Austria

Organic contaminants such as antibiotics are being applied to soils in increasing loads. These chemicals can be rapidly transported via preferential flow, making it important to understand and quantify soil-solute interactions under bypass flow conditions. In this study we applied deuterium-labeled rainfall to field plots containing manure spiked with eight common antibiotics, and collected pore water samples from 48 suction cups spread along a hillslope. In total we collected more than 700 measurements across the eight antibiotics. Our results indicated that solute transport to lysimeters was similar between antibiotics when preferential flow was less than 15%. When preferential flow exceeded 15%, however, compounds with relatively low affinity for soil were sampled in higher concentrations, suggesting that preferential flow mobilizes compounds that are more easily released from the soil matrix. Our findings show that extensive preferential flow can enhance, rather than reduce, the influence of chemical properties. These data provide new insight into how flow heterogeneity affects pollutant mobility in soils and can be used to build more accurate process-based transport models.