

Independent project/degree project

Subject: Soil Science, Environmental Science

Level: A2E

Credits: 30 hp

Title: Benchmarking a prediction scheme for preferential flow in soils.

Background and objectives

The number of anthropogenic substances introduced in agro-ecological systems has steadily increased during recent decades. Among these substances are pesticides, antibiotics, hormones, and nano-particles whose long term effects on human health are not clearly known. They pose a potential threat to human well-being. It is therefore mandatory to understand and control the fate of these substances in the environment. Here, a very important aspect is the transport time of substances moving with infiltrating water through the soil towards the groundwater. The longer the transport time, the more likely it is that potentially harmful substances are metabolized before they reach drinking water resources or surface water bodies like lakes and rivers. Solute transport through soil, however, often takes place rapidly through preferential flow paths, e.g. earthworm burrows or soil cracks. It is still a major challenge to detect land areas with increased susceptibility to preferential flow from easily measurable data, like e.g. soil texture, land use, or soil management. The goal of this project is to benchmark a 'decision tree' for prediction of preferential flow on a database containing data of approximately 1000 solute transport experiments in soils.

Working plan: The participant will apply the decision tree to the newly collected database and analyze and interpret the results. Basic knowledge on flow and transport processes in soil and programming languages (preferably *R*) and statistics are required. The thesis must be written in English.

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