



Influence of soil surface macroporosity on infiltration patterns

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Soil macroporosity of biogenic origin is a common cause for preferential flow in the topsoil. The occurrence of macropores allows for catchments to switch the internal processes from slow matrix flow to rapid preferential flow depending on catchment state and driving forces. Sidle et al. (2001) described macroporous networks as self-organising systems. Individual macropores are generally short, but they are often connected through nodes of loose soil or buried material. The connectivity of macropores at larger spatial scale determines their effectiveness from plot to hillslope scale.

In case for example short stretches of vertical earthworm channels are connected to a larger lateral burrow in the soil profile, rapid lateral flow of water may occur, leading to subsurface stormflow. This was observed in different experiments.

During a field campaign in March 2012 in the meso-scale Attert catchment in Luxemburg a clustered pattern of rodent burrow openings was seen at the soil surface in different meadows. In these fields high intensity rainfall experiments with brilliant blue as dye-tracer and subsequent excavation of soil profiles had also shown a large degree of preferential flow.

Therefore in September 2012 on two different meadows three plots with and three plots without rodent burrows at the soil surface were chosen, making a total of six plots in each meadow. On these plots we performed rainfall experiments with high intensity rainfall and brilliant blue tracer. The soil was then excavated and three vertical and three horizontal soil profiles were prepared under the rainfall experiment to study the influence of the presence of rodent burrows at the soil surface on the infiltration patterns.