



Influence of soil characteristics and earthworm activity on the hydrologic response of Alpine pasture sites to precipitation events

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The presented study aims at a better understanding of the influence of soil characteristics and the biological activity on the hydrologic response of Alpine pasture sites to precipitation events. The study area is a typical small Alpine catchment of medium altitude (Brixenbachtal in the Kitzbüheler Alps, Tyrol, Austria, 9 km², 800-2000 m a.s.l.) where the following investigations were conducted:

- pedological analysis of 31 soil profile pits and auger drillings on approximately 70 sites,
- determination of the most important pedological characteristics of 31 soil profiles in the laboratory,
- collecting of earthworms by soil sampling and heat extraction after Kempson, Thielemann's electrical octet method and hand sorting, determination to species level, estimation of abundance and biomass on 15 sites,
- field mapping of vegetation and land use with special consideration of plants indicating moist areas,
- determination of infiltration rates using a double ring infiltrometer on 19 sites, on eight sites among them at different soil moisture conditions,
- sprinkling experiments with a small rainfall simulator on four sites,
- continuous soil moisture and soil temperature measurements on eight sites,
- mapping of all sources within the catchment, regular temperature, conductivity and discharge measurements of selected sources,
- discharge measurements with salt tracers in seven subcatchments,
- analysis of discharge data gauged at the drainage point of the catchment and of precipitation records from two sites within the catchment.

First results show that high surface flow rates may result from a combination of different interacting factors such as the soil characteristics and soil formation processes (e.g. gleyisation, podsolisation), vegetation type and dead organic matter imbricatively arranged, a dense root felt on some pastures as well as low earthworm populations consisting of epigeic life-forms which don't influence the structure of the mineral soil.