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# Linking slopes to the wetland: The relevance of interflow processes for water and nutrient input to an inland valley wetland in Uganda

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Due to their prolonged water availability wetlands are of increasing importance for small scale agriculture in East Africa. In the inundating landscape of central Uganda, inland valley wetlands are a common landscape unit with high potential for crop cultivation year-round. Yet little is known about the hydrological processes which bring out these favourable conditions. This study focusses on the relevance of interflow processes from the slopes into the wetland regarding water and nutrient delivery from different land use types. Hereby special attention is given to water pathways at the transition from upland geology to valley sediments and to nutrient relocation along the slopes.

Electrical Resistivity Tomography (ERT) was used as a non-invasive method to characterise interflow pathways in the highly variable saprolite geology and for subsurface delineation of the valley sediments. The measurements were complimented by a drilling campaign and infiltration experiments in different depths. Interflow collection pits were installed at the slope toe in order to quantify water and nutrient fluxes towards the wetland during two consecutive years. Additionally, soil moisture and nitrate content in the soil water were quantified at various positions along the slope.

ERT-imaging supports the hypothesis of a separation between a confined shallow aquifer and the soil water in the wetland sediments. Drilling results and hydrogeochemical analysis of the interflow and this shallow groundwater indicate a connection of the two components via macropores in the upper saprolite at the slope toe. At the same time interflow is transferred to the soil water of the wetland via a sandy loam layer which is found on top of the confining clay-loam layer of the wetland sediments. Both processes are active even during the dry season and therefore water from the interflow is relevant for water storage (shallow aquifer) and agricultural production (soil water) in the wetland.

Interflow volume and nitrate content both show a fast reaction to rainfall events, while the amount of water and nutrients delivered to the wetland is related to the land-use on the slope. Nitrate content in the soil water on the slopes suggests a relocation of nutrients in the upper soil horizons towards the slope toe. As infiltration capacity of the soil's A-horizon is higher compared to the B-horizon a second lateral flow component appears to be present close to the soil surface.

The results of this study emphasize the relevance of subsurface flow for wetland hydrology and give first explanations of wetland-upland connectivity in a complex saprolite geology.