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Titel
Deriving soil hydraulic parameters in a high spatial resolution for a heterogeneous agricultural field-site

Abstract
Providing information about the structure of the subsurface plays an important role for setting up soil hydraulic models, which are in turn an important prerequisite for ecosystem modelling approaches. Because soils often show a high within-field heterogeneity in terms of texture, stone content, and bulk density, they may also exhibit a wide range of hydraulic properties in the field. During water stress periods and especially on agricultural fields, which are characterized by uniform vegetation, the occurrence of a within-field heterogeneity in terms of soil hydraulic properties can be observed as it affects the different water status of the plants. The patterns of visible plant water stress and areas of low apparent electrical conductivities measured by electromagnetic induction measurements (EMI) often coincide, for e.g. within sugar beet cropped fields. Such observations have also been made beforehand at the current study site; an agricultural field (2.7 ha) that is situated in an area developed by fluvial processes. To account for this, the current approach included a sampling campaign on a field with 70 drilling locations for texture and organic carbon analyses. Furthermore, soil water retention functions and saturated hydraulic conductivity were determined at 20 sampling locations. Our approach for ecosystem modelling is based on 4 m² grid cells over the whole study site. To consider within-field heterogeneity in the ecosystem model, soil hydraulic parameters were predicted for each grid cell, whereby different approaches such as spatial interpolation, Miller-Miller scaling, and the use of pedotransfer functions were taken into account to identify the most appropriate approach.