WATER FLOW PATTERNS WITHIN WETLANDS

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Wetlands are ecotones between terrestrial and aquatic systems. They control the water and nutrient exchange between these two systems and therefore affect the nutrient retention potential of wetlands. For an assessment of their cumulative effects on water quality, groundwater flow, and stream flow it is essential to understand the exchange pattern between terrestrial and aquatic systems. The lateral water exchange pattern is determinded by the geological condition in the cross section, the climate, the basin position of the cross section and the water management in the cross section itself. In this study the effect of different geological conditions and variable water management activities are analysed with a 2D groundwater model (HYDRUS2D). The aim is to investigate the water flow pattern inside the wetland for assessing effects of drainage, restoration measures and future management. Wetlands receive water in different ways such as precipitation, groundwater input, and flooding. In the simulation approach in this study lateral flow in wetlands is examined by variation of geohydrologic parameters. Simplified geohydrologic models representing the wetland boundary conditions in northern Germany are applied as a base for modelling.

In northern Germany, wetlands occur under three geohydrological conditions: (I) a thick peat layer above an impermeable layer, (II) an often thin peat layer above a permeable layer or (III) a peat layer above a thin intermediate layer. The results of different geohydrologic settings on water flow pattern are shown on the poster. Reversal in flow direction due to transient change in climate conditions and the interaction between groundwater and stream flow are further findings of the parameter variation. The effeciency of an impermeable layer under the peat is pictured by a comparison of two scenarios. Furthermore upwelling groundwater on base of the hillslope and subsurface flow in the peat are hydraulic phenomenon which are evaluated with the simulation approach. Drainage and other water management activities in the wetland result in modified water flow pattern, which are presented in a case study.