GROUNDWATER RECHARGE WITHIN THE MIRE-WATERSHED WILDENHAINER BRUCH - A RETROSPECTIVE AND PROGNOSTIC MODELLING WITH THE AKWA-M®-WATER BALANCE MODEL

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The Naturschutzgroßprojekt Presseler Heidewald- und Moorgebiet is located in the north-western part of Saxony and has an area of 57 km2; the project area comprises some mires. The region was formed by glacial processes and is actually covered by intensive pine forest cultivation. The mire Wildenhainer Bruch is situated on the top of the groundwater divide between the river systems Mulde and Elbe.

The ancient development and the further existence of this mire depends on the quantity of ground water flowing to the mire. The groundwater flow is determined by the spatial and long time distribution of the groundwater recharge which in turn is affected by vegetation and climate within the watershed surrounding the mire. To approximate the changes in groundwater recharge since the beginning of mire expansion we tried to reconstruct the watershed vegetation by means of pollen analysis from peat bore holes and additional C14-dates. Together with climate proxies we put this information into our water balance model AKWA-M®. The water balance results reflect the long term groundwater level measurements since 1938. As a result we found approximate time series of evapotranspiration und ground water recharge.

According to the hydromorphogenetic theory we suppose that the quantity and quality of groundwater determines the type and extension of peat forming vegetation within the mire. Thus the different peat layers reflect mire water supply variable in time. On the other hand the increasing peat hight itself influences the geohydraulic conditions of groundwater flow.

We can demonstrate quantitatively how much the groundwater recharge changes in the past. Also we show the increase of groundwater recharge during a controlled and stepwise change of the watershed vegetation from the actual pine forest to a more deciduous forest. If one consider the often cited climate change as a possible future scenario, we can deduce the response of vegetation management within mire watersheds to keep the groundwater recharge at least constant under climate changes.