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Hydro-ecological studies in cascading, riparian wetland systems in the Thuringian Forest, Germany

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A specific type of riparian wetlands can be found in many headwaters of the northern mountainous Thuringian Forest (central Germany). These wetland systems are hydrologically characterized by cascading wetland patches and ponds. Since endangered vegetation (e.g. Trollius europaeus) was identified by ecological studies in the 1990s, these areas are considered as natural reserves according to the EU-Flora-Fauna-Habitate Directive. However, little attention was given regarding the hydrological function and dynamics of these cascading system and its interactions with vegetation pattern. Hence an interdisciplinary project was initiated to address this deficit and to study the dynamics of a representative cascading system at the catchment "Wipfragrund". Based on intensive field investigation, the wetland site "Paulinzella" (2 ha) was chosen for detail studies integrating methods and concepts from hydrology, soil sciences and bio-ecology. Initially, a fully automatic climate station, 4 v-notched weirs for in- and outflow measurements and 4 groundwater observation wells were installed in order to provide a reasonable hydro-meteorological data base. Further, soil and vegetation analysis (e.g. LAI measurements) were carried out at 60 plots (1 m^2) each 10 meter along four transects representing both permanent and temporal saturated as well as upland areas. Completing the vegetation studies, 12 additional plots (r = 1.5 m) were established to identify vegetation communities throughout the growth period of 2006.

As a first result, the wetland boundary was delineated based on wetland vegetation (cyperaceae), water table level and soil characteristics. Analyzing in- and outflow data, it is shown that the hydrograph responds relatively rapid to rainfall events. The analysis of runoff records also indicates that the hydrology of the wetland is mainly driven

by inflowing water, less by direct rainfall input. Furthermore, a wetness gradient was identified along transect T1. The groundwater table measurements indicate rising water levels and lower fluctuations after rainfall events along the gradient from upland to permanent saturated areas. This corresponds to the occurrence and characteristics of hydromorphic features in the soil profiles. The indicator value for moisture conditions of plants after Ellenberg verifies the wetness gradient. The poster will give details on the conceptual and methodological approach and will illustrate first results.