



UFZ-Seminar „Water and Environment“



25 March 2019, 3 p.m.

Seminar Room 1, Brückstr. 3a, Magdeburg

Anders Wörman, Professor of River Engineering

KTH – Royal Institute of Technology Stockholm, Sweden

will give a talk on:

Effects of drainage work and water regulations on floods and nutrient export

Drainage work in agricultural land and hydropower regulation have been major engineering drivers the last one or two centuries for changing the hydrological response. Historical monitoring data shows that these drivers have had counteracting effects on the magnitude of short-term floods and they have generally a tremendous effect on nutrient retention and solute transport to the Sea. Stream restorations can restore previous retention and reduction capacity for nitrogen and phosphorus, but need predictable, engineered outcome in terms of treatment targets to be economically feasible at large scale. Also, hydropower regulation can be used to provide environmental services, e.g. in the form of phosphorus retention in reservoirs, but the required regulation practice comes at a cost of lost energy production. Stream restoration actions, on the other hand, are best implemented in the most upstream (first-order) water courses, which thereby contribute to decreased spread of eutrophication to downstream inland waters. A proposed quantitative design method utilizes removal of nutrients in the hyporheic zone of streams – a hotspot for biochemical reactions. Hence, by designing restoration features it is possible to achieve specific removal targets and to optimize the treatment effect at a regional or national scale. In Sweden, the potential for removal of nitrogen in the hyporheic zone of local agricultural streams could be as high as 30-40%, but this estimate is highly uncertain due to the lack of spatially distributed data on hydrologic and biochemical characteristics of streams.