Geophysical Research Abstracts
Vol. 16, EGU2014-13313, 2014
EGU General Assembly 2014

Case study: purification efficiency of a treatment wetland used at a peat extraction area

Riku Eskelinen, Anna-Kaisa Ronkanen, Hannu Marttila, and Bjørn Kløve
University of Oulu, Water Resources and Environmental Engineering laboratory, Oulu, Finland (riku.eskelinen@oulu.fi)

ABSTRACT
The inflow and outflow of a treatment wetland was intensively monitored between March 2012 and October 2012. Sampling was done with automated sampling equipment bidaily during the snowmelt period and daily for the rest of the study period. The treatment wetland is located downstream of a peat extraction area with a surface area of 208 ha. Drainage network at the peat extraction area has been fitted with peak flow control structures and a sedimentation basin from which the water is pumped to the treatment wetland. The treatment wetland has a surface area of 11 ha of peatland soil and is covered by grassy vegetation during the summer season. After flowing through the wetland water is discharging to a small stream through a v-notch weir.

All samples were analysed for electric conductivity (EC), suspended solids (SS), Colour, Turbidity and pH. Additional analyses for various elements and nutrients were done for samples selected on the basis of hydrology. Results of the additional analyses represent the dissolved fraction of analysed elements as the samples were first filtrated with 0.45 μm filter for SS.

Our results show that the purification efficiency varies during the measurement period. For example, to SS the overall purification efficiency was 62 %. However during the spring flood the purification efficiency is negative which can be caused by snowmelt water flushing previous year's dead vegetation or particulate matter accumulated during the winter period. After midsummer we can observe drastic increase in the retention of SS. Similar pattern can be seen in the retention of phosphorous with overall retention of 11 % of the total phosphorous. In the case of nitrogen the overall performance for the wetland is poor. Some of this can be explained by poor retention of NO_2-3-N due to cold weather during spring melt season. However during the summer time denitrification process seems to be working as the retention of N improves. Retention of dissolved organic carbon (DOC) is poor until midsummer, and during fall, the wetland acts as a source of DOC.

The collected data set has given us a good insight for dominating processes in a treatment wetland during the spring, summer and autumn. However more research is needed for linking the water quality data we have collected with physical changes in the wetland (e.g. growth of vegetation, development of preferential flow paths) for better understanding of treatment wetland as a whole.