Geophysical Research Abstracts
Vol. 20, EGU2018-8814, 2018
EGU General Assembly 2018

Antimony retention in northern peatlands - process exploration based on analysis of long term data for treatment of mining influenced water

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Antimony (Sb) is one of the most common contaminants in metal mining influenced water which is released particularly as a result of extraction and processing of sulphide ores. Sb is a contaminant of concern due to its severe health effects and well documented eco-toxicity in aquatic and terrestrial environments. Removal of Sb from mining influenced water is most commonly done by treatment methods such as ion exchange, sorption, sedimentation, co-precipitation and membrane filtration etc. However, wetlands are also widely used as a final treatment step for removal of metals and metalloids including Sb. Much work has been done in recent years to understand the retention processes in wetlands. However, the understanding concerning these retention processes is far from complete. Of special concern are e.g. the effects of cold climate (e.g. in arctic region) on retention processes, the risk of contaminant leaching from the wetlands, the parameters that influence leaching/retention and ultimately to optimize performance of wetlands to remove/retain Sb. This study strives to explore these aspects by looking at nearly 10 years data collected from peatlands treating mining influenced water from a gold mine in Finnish Lapland. The data includes physico-chemical water quality parameters of influent and effluent as well as the characteristics of porewater and soil. Changes taking place in treatment wetlands on temporal and spatial scale are of special interest as they will provide valuable information about the possibilities and risks in the long-term use of treatment wetlands.