



Processes and controls of ditch erosion and suspended sediment transport in drained peatland forests

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Drainage and periodic ditch cleaning are needed in peatland forests to allow adequate tree growth. The downside is that these practices usually increase erosion and transport of organic and inorganic matter to downstream waterbodies. In this study, our aim was to assess the role of hydrological factors and ditch-level bed and bank erosion processes in controlling suspended sediment (SS) transport in peatland forests after ditch cleaning. To do this, a 113 ha catchment and a nested sub-catchment (5.2 ha) in eastern Finland were instrumented for continuous hydrological and SS concentration (turbidity) measurements and for the detection of ditch bed and bank erosion with erosion pins. The impacts of ditch cleaning on instantaneous unit hydrographs were also assessed against two reference catchments. The results suggested that, in small intensively drained catchments, SS transport is likely to be limited by the availability of easily erodible sediment in the ditch network, and that ditch cleaning operations as well as preparatory bank erosion processes such as peat desiccation and frost action can be important in producing erodible sediment for transport. Detachment of soil particle from ditch banks by raindrop impact can also be an important factor explaining variations in SS concentrations in small catchments. In larger drainage areas, peak runoff characteristics may play a more dominant role in SS transport. The results give new insights into the dynamics of sediment transport in drained peatland catchments, which can be useful, for example, for planning and implementation of water conservation measures.