

## **Modelling wetland-groundwater interactions in the boreal Kälväsvaara esker, Northern Finland**

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Many types of boreal peatland ecosystems such as alkaline fens, aapa mires and Fennoscandia spring fens rely on the presence of groundwater. In these ecosystems groundwater creates unique conditions for flora and fauna by providing water, nutrients and constant water temperature enriching local biodiversity. The groundwater-peatland interactions and their dynamics are not, however, in many cases fully understood and their measurement and quantification is difficult due to highly heterogeneous structure of peatlands and large spatial extend of these ecosystems. Understanding of these interactions and their changes due to anthropogenic impact on groundwater resources would benefit the protection of the groundwater dependent peatlands.

The groundwater-peatland interactions were investigated using the fully-integrated physically-based groundwater-surface water code HydroGeoSphere in a case study of the Kälväsvaara esker aquifer, Northern Finland. The Kälväsvaara is a geologically complex esker and it is surrounded by vast aapa mire system including alkaline and springs fens. In order to quantify groundwater-peatland interactions a simple steady-state model was built and results were evaluated using expected trends and field measurements. The good consistency between simulations and observations demonstrates that fully-integrated physically-based groundwater-surface water modelling is a promising approach to study large-scale wetland-groundwater interactions.