

Impact of the water salinity on the hydraulic conductivity of fen peat

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Coastal peatlands represent an interface between marine and terrestrial ecosystems; their hydrology is affected by salt and fresh water inflow alike. Previous studies on bog peat have shown that pore water salinity can have an impact on the saturated hydraulic conductivity (K_s) of peat because of chemical pore dilation effects. In this ongoing study, we are aiming at quantifying the impact of higher salinities (up to 3.5 %) on K_s of fen peat to get a better understanding of the water and solute exchange between coastal peatlands and the adjacent sea. Two approaches differing in measurement duration employing a constant-head upward-flow permeameter were conducted. At first, K_s was measured at an initial salinity for several hours before the salinity was abruptly increased and the measurement continued. In the second approach, K_s was measured for 15 min at the salt content observed during sampling. Then, samples were completely (de)salinized via diffusion for several days/weeks before a comparison measurement was carried out. The results for degraded fen peats show a decrease of K_s during long-term measurements which does not depend on the water salinity. A slow, diffusion-controlled change in salinity does not modify the overall outcome that the duration of measurements has a stronger impact on K_s than the salinity. Further experiments will show if fen peat soils differing in their state of degradation exhibit a different behavior. A preliminary conclusion is that salinity might have a less important effect on hydraulic properties of fen peat than it was observed for bog peat.