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Rewetted coastal peatlands have higher water-based exchange rates than diked and drained sites

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We tested the saturated hydraulic conductivity (K_s) and dissolved organic carbon (DOC) release at two adjacent fen peatlands situated on the Baltic Sea coast, one drained and diked while the other open to the sea and thus rewetted, hypothesizing that the regular flooding of the revitalized site impacts both the soil physical and geochemical properties. The peatland at both sites were comparable because of a common history. After rewetting the coastal wetland, vegetation distribution patterns changed to one dominant specie (*Agrostis stolonifera*). The macroporosity of the surface peat horizon (0–10 cm) of the rewetted peatland was significantly higher than that of the drained one, which became also evident from the extremely high K_s values of this site. The K_s values of the subsurface peat horizon (15–40 cm; highly degraded peat) at both sites are comparable. Switching from tap water to Baltic Sea water did not increase the K_s values (subsurface peat soils) confirming that the water salinity had low impact on the hydraulic properties of highly degraded peat soils. Leaching tests indicated that high electrical conductivity (EC) values of the percolating water strongly decrease DOC in the effluent (subsurface peat horizon). We assume that the heavily rooted surface peat horizon of the rewetted peatland is the major source of DOC release. We conclude that coastal wetlands that are subjected to sea water impact have a higher K_s in the surface horizon, allowing a more intensive exchange of water and compounds as compared to the diked site.