Goldschmidt 2021 Abstract
https://doi.org/10.7185/gold2021.7702

# Biogeochemical controls of carbon transformation in a drained coastal peatland of the southern Baltic Sea: An isotope and trace element perspective

**ANNA-KATHRINA JENNER**[1], IRIS SCHMIEDINGER[1], JENS KALLMEYER[2], CORDULA NINA GUTEKUNST[3], GERALD JURASINSKI[3] AND PROF. MICHAEL E. BÖTTCHER, DR.RER.NAT.HABIL.[1,3,4]

[1]Leibniz Institute for Baltic Sea Research (IOW), Geochemistry & Isotope Biogeochemistry Group, Department Marine Geology
[2]GFZ German Research Centre for Geosciences, Section 3.7 Geomicrobiology
[3]University of Rostock
[4]Marine Geochemistry, University of Greifswald
Presenting Author: anna.jenner@io-warnemuende.de

Peatlands serve as important ecosystems since they store a substantial fraction of global soil carbon. Through drainage the peat is degrading and the internal biogeochemical processes may be changed impacting the transformation of stored carbon and plant material. Pristine peatlands are primarily associated with methanogenic and iron-cycling conditions, however, minor sulfur-cycling may also contribute to carbon mineralization in these ecosystems depending on the amount of atmospheric sulfur deposition and accumulation as well as the connection to marine waters. In near-coastal peatlands the element budget may be altered through natural or artificial flooding by brackish/marine waters. When introducing sulfate-bearing solutions, the concentrations of electron acceptors for anaerobic mineralization or organic matter increase when compared to freshwater conditions. The investigated area is planned to be flooded by Baltic Sea coastal waters in the near future.

The study was carried out at a drained peatland, managed in the past as agricultural grassland, located at the southern Baltic Sea. Soil cores were retrieved along a transect perpendicular to the coast line and porewater and soil samples were taken. Porewater samples were analysed for dissolved major elements, nutrients, sulphide, trace metals, dissolved inorganic carbon and stable isotopes. The soil CNS compositions together with the HCl extractions of metals were assessed in order to identify zones of dissolution and formation of authigenic phases. In addition, the quantification of microbial sulphate-reduction-rates (SRR) were measured in whole-core incubations.

The preliminary results show that the porewater isotopic composition is close to the local meteoric water line at the German Baltic Seas coast line. Concentration and stable isotope composition of DIC indicate mineralization of C3 type organic matter. Porewater trace-metals content indicates the importance of anaerobic mineralization for release of metals into the pore- and surfacewaters.

The overall isotope-hydrochemistry investigation characterised different processes taking place at this near-coastal peatland in the drained state. The planned flooding event together with the impact of sulfur-bearing solutions will be investigated in much more details in order to improve our understanding on the importance/impact of rewetting coastal peatlands.

Acknowledgement: This study is supported by the DFG research training group BALTIC TRANSCOAST and Leibniz IOW.