



## **Carbon isotopes as tracers for anaerobic mineralization processes in intertidal surface sediments**

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Organic matter is mineralized in marine sediments by microbial activity using predominantly oxygen, sulfate, and metal oxides as electron acceptors. Sediments with reduced, black surfaces are locally formed, indicating a disturbance in the balance of the biogeochemical processes, and may act as windows for the liberation of reduced substances. The most important anaerobic mineralization process is bacterial sulfate reduction which is also accompanied by the liberation of carbon dioxide. Different carbon-bearing substrates act as carbon sources for sulfate reduction. Methane is involved in AOM. The C isotopic composition of dissolved inorganic carbon (DIC) is a useful tracer for the biogeochemical transformations of different carbon sources and may help to identify the key reactions in the C cycle of the intertidal surface sediments involved in sulfide production. Pore waters from intertidal sands of the back-barrier tidal area of Spiekeroog Island (southern North Sea) have been sampled down to 40 cmbsf, and water samples and sediments were analyzed for a number of (bio)geochemical parameters with a focus on the carbon isotopic composition of DIC, methane and acetate (GC, IC, ion-selective electrodes, extraction and titration methods, irmMS). The pore water composition and stable isotopic compositions of DIC, methane, acetate are investigated to characterize the different biogeochemical processes in sands below oxidized and reduced sediment surfaces. Below reduced surfaces, the isotopic composition of DIC down to -36 per mil indicates CH<sub>4</sub> as a dominant source for the oxidized carbon pool. Acknowledgements: The authors gratefully acknowledge financial support from Deutsche Forschungsgemeinschaft during DFG-

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