WOMS2018 - Short Abstract

<u>Contribution:</u> Poster Session

Optical characterization of submarine groundwater discharge at a high-energy, meso-tidal beach system (Spiekeroog, North Sea)

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Abstract

Submarine groundwater discharge (SGD) has been shown to be of high relevance as a source of dissolved nutrients, trace elements, and organic and inorganic carbon to the coastal ocean (Beck et al. 2017). As part of the BIME (Barrier Island Mass Effect) project physical, chemical and microbiological interactions within meteoric fresh groundwater and recirculating seawater were investigated in a high-energy, meso-tidal beach system of the southern North Sea. This project investigates SGD and the influence on coastal systems at Spiekeroog Island (Germany). One focus is the input of nutrients into the coastal zone fueling primary production, potentially triggering harmful algal blooms and impacting benthic community structures. Porewater samples were taken at the north side of the island of Spiekeroog along cross-shore transects in different depths (down to 100 cm). Samples were analyzed regarding to their physical and chemical properties as well as CDOM and FDOM components. Sampling was conducted for four campaigns in different seasons and tidal conditions between October 2016 and February 2018. PARAFAC analyses were performed for the individual campaigns to characterize FDOM pore water components (Murphy et al., 2013). Results show three components in all samples. Two terrestrial protein-like peaks at Ex= 315-330nm and Em= 433nm and the second by Ex=280nm and Em= 355nm as well as one marine protein-like peak at Ex=365-385nm and Em= 473-480nm were consistently observed (Coble 1996). CDOM analyzes shows, that there are no seasonal trends or variations

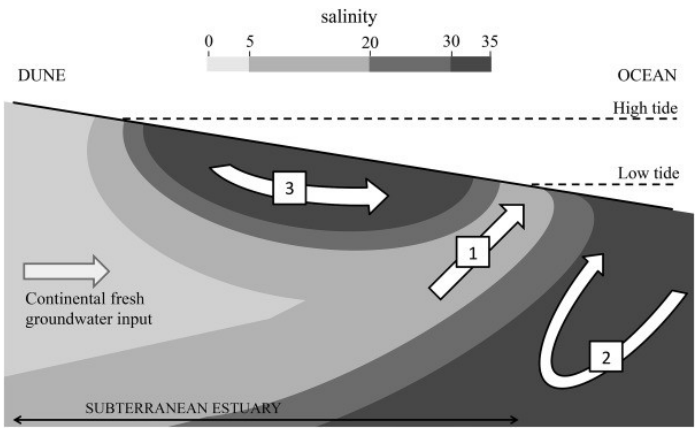

Figure 1: Example of SGD at coastal systems, 1=Fresh water discharge tube, 2=Salt water wedge, 3=Upper saline plume (C. Charbonnier et al., 2016)

between the campaigns in CDOM values. In total, optical characterization and physical-chemical properties exhibited an unexpected heterogeneity, which was linked to beach topography and seasonal effects. We suggest utilizing field applicable optical and physic-chemical sensing for three dimensional screening prior to in-depth investigations.

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