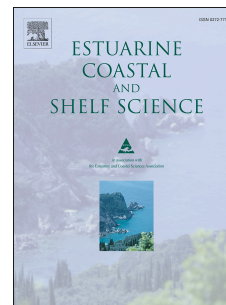


Accepted Manuscript

Biogeochemical impact of submarine ground water discharge on coastal surface sands of the southern Baltic Sea

Daphne Donis, Felix Janssen, Bo Liu, Frank Wenzhöfer, Olaf Dellwig, Peter Escher, Alejandro Spitzzy, Michael E. Böttcher



PII: S0272-7714(17)30240-8

DOI: [10.1016/j.ecss.2017.03.003](https://doi.org/10.1016/j.ecss.2017.03.003)

Reference: YECSS 5409

To appear in: *Estuarine, Coastal and Shelf Science*

Received Date: 23 August 2016

Revised Date: 27 January 2017

Accepted Date: 1 March 2017

Please cite this article as: Donis, D., Janssen, F., Liu, B., Wenzhöfer, F., Dellwig, O., Escher, P., Spitzzy, A., Böttcher, M.E., Biogeochemical impact of submarine ground water discharge on coastal surface sands of the southern Baltic Sea, *Estuarine, Coastal and Shelf Science* (2017), doi: 10.1016/j.ecss.2017.03.003.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1 **Biogeochemical impact of submarine ground water discharge on** 2 **coastal surface sands of the southern Baltic Sea**

3
4 Daphne Donis (1, 4), Felix Janssen (1), Bo Liu (2), Frank Wenzhöfer (1), Olaf Dellwig (2), Peter
5 Escher (2,5), Alejandro Spitzzy (3), Michael E. Böttcher (2)

6
7 1) HGF-MPG Joint Research Group for Deep Sea Ecology and Technology at Alfred Wegener
8 Institute Helmholtz Centre for Polar and Marine Research, Bremerhaven, Germany and Max
9 Planck Institute for Marine Microbiology, Bremen, Germany

10 2) Geochemistry and Isotope Biogeochemistry Group, Marine Geology Department, Leibniz
11 Institute for Baltic Sea Research (IOW), Warnemünde, Germany

12 3) Institute of Geology, University of Hamburg, Germany

13 4) Present address: Institute F-A. Forel, University of Geneva, Switzerland

14 5) Present address: Institute for Geography and Geoecology, KIT Karlsruhe, Germany

15
16 **Keywords:** groundwater discharge; permeable sediments; benthic chambers; benthic oxygen
17 fluxes; OM mineralization.

18 **Abstract**

19
20 This study evaluates the effect of submarine ground water discharge (SGD) on
21 biogeochemical processes of sandy sediments of Hel Bight (Poland) in the shallow southern
22 Baltic Sea, using stirred benthic chambers combined to seepage meters, deep pore water profiles
23 and a reactive transport model. The main impacts of fresh anoxic groundwater seepage are due to
24 (1) the efflux of methane; (2) the efflux of phosphate and silicate; (3) the efflux of dissolved
25 organic carbon (DOC) of aquifer origin. Methane from SGD is assumed to be only slightly
26 oxidized within the sediments and potentially reach the atmosphere at a maximum rate of 30
27 $\text{mmol CH}_4 \text{ m}^{-2} \text{ d}^{-1}$. Silicate and phosphate supplied by SGD promote a seep-site net community
28 production rate that is more than twice as compared to adjacent non seeping sites (70 and 30
29 $\text{mmol C m}^{-2} \text{ d}^{-1}$ respectively). However, oxygen uptake rates at the seep site during the night (30
30 $\text{mmol O}_2 \text{ m}^{-2} \text{ d}^{-1}$) are lower than those observed at the reference sites (50 $\text{mmol O}_2 \text{ m}^{-2} \text{ d}^{-1}$). We
31 hypothesize that autogenic, relatively labile DOC is available at the reference site, leading to

Download English Version:

<https://daneshyari.com/en/article/5765200>

Download Persian Version:

<https://daneshyari.com/article/5765200>

[Daneshyari.com](https://daneshyari.com)