Deep submarine groundwater discharge indicated by chloride anomalies in the sediment pore water in the Gulf of Gdańsk, southern Baltic Sea.

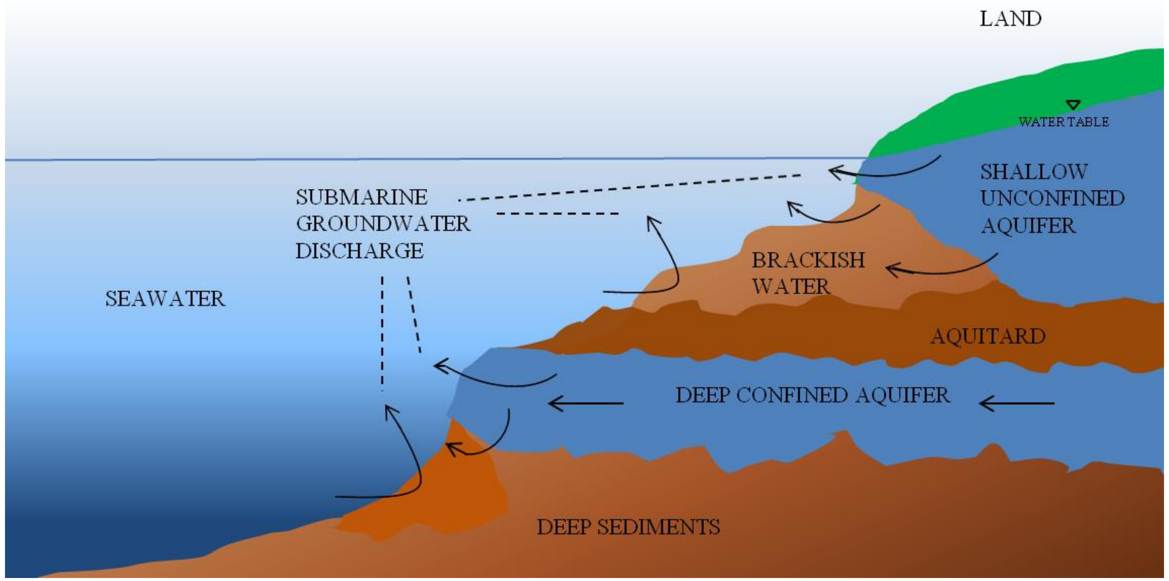
Beata Szymczycha, Żaneta Kłostowska, Karol Kuliński, Aleksandra Winogradow, Jaromir Jakacki,
Zygmunt Klusek, Aleksandra Brodecka-Goluch, Bożena Graca, Marcin Stokowski,
Katarzyna Koziorowska, Daniel Rak

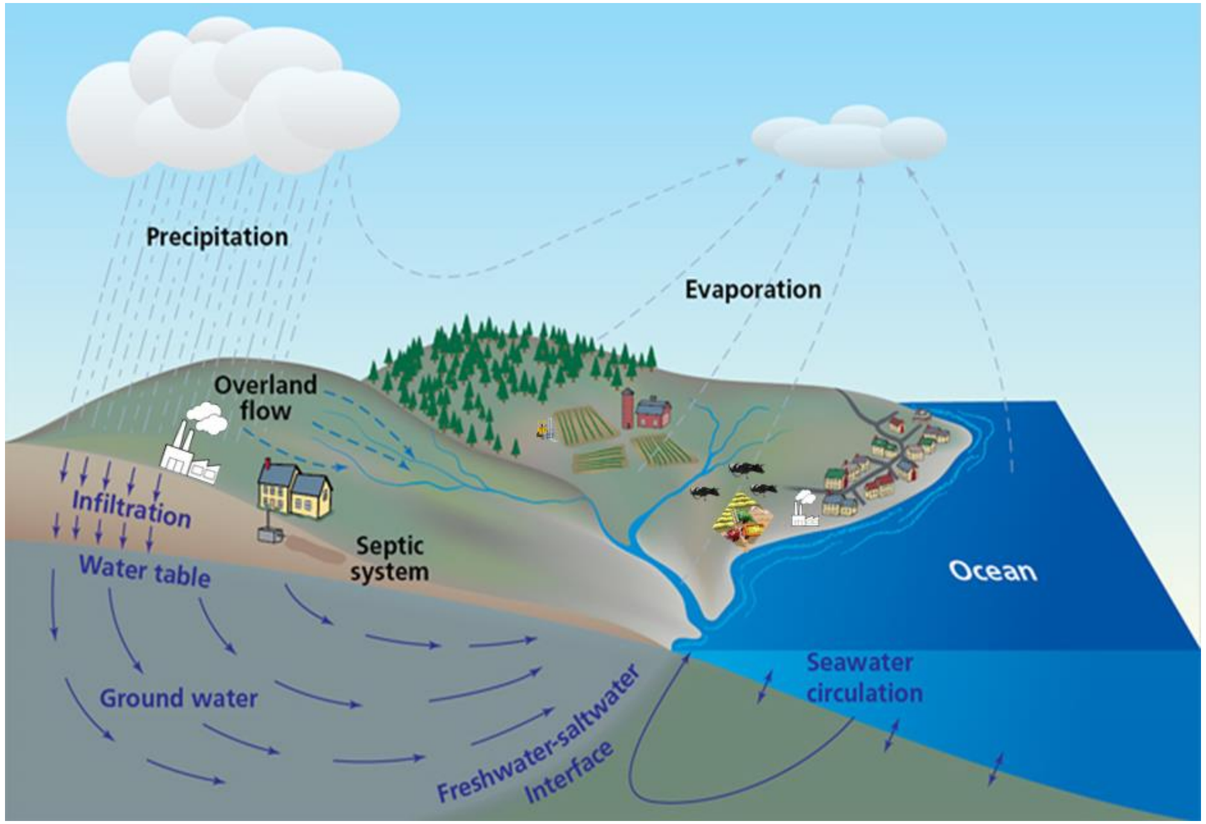
2nd Baltic Earth Conference

The Baltic Sea Region in Transition

Helsingor, Denmark, 11 to 15 June 2018

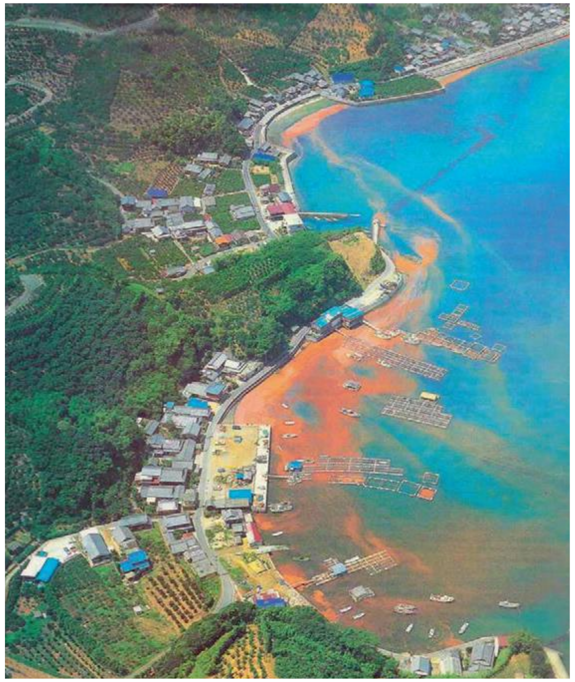
Submarine groundwater discharge (definition, sources, driving forces)



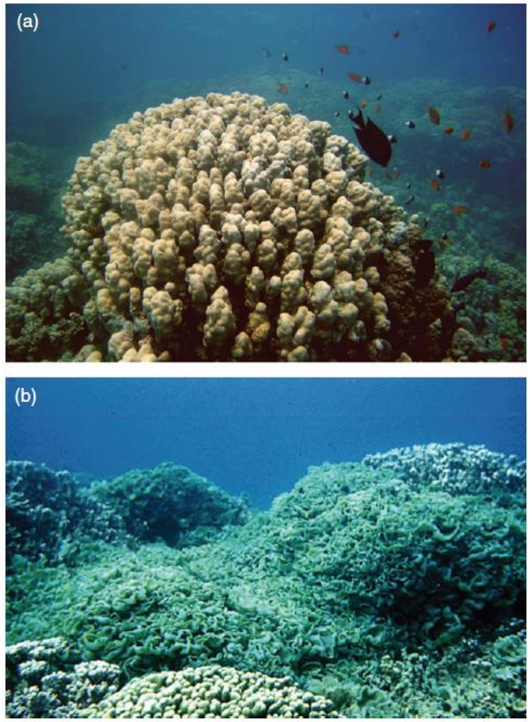


SGD source of:

1. Freshwater
2. Chemical substances (nutrients, dissolved caron, metals, isotopes)



Knee i Payton, 2011



Parsons i in. 2008

Moosdorf and Oehler 2017

Burnett i in. 2003

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SGD impact on coastal sites:

Journal of Environmental Monitoring c1em10039d

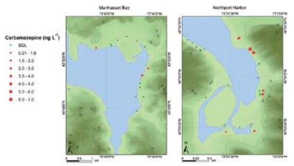
PAPER

1

Use of pharmaceuticals and pesticides to constrain nutrient sources in coastal groundwater of northwestern Long Island, New York, USA

Sherry Zhao, Pengfei Zhang,* John Crusius, Kevin Kroeger and John Bratton

We examine the potential of using organic tracers (pharmaceutical residuals and pesticides) to distinguish groundwater nitrogen derived from septic systems from nitrogen derived from lawn fertilizers.



The Effect of Submarine Groundwater Discharge on the Ocean

Willard S. Moore

Department of Earth and Ocean Sciences, University of South Carolina, Columbia, South Carolina 29208; email: moore@geol.sc.edu

Chapter 10: Nutrient and other environmental controls of harmful cyanobacterial blooms along the freshwater–marine continuum

Hans Paerl

University of North Carolina at Chapel Hill, Institute of Marine Sciences, Morehead City, NC 28557 (hpaerl@email.unc.edu)

Science of the Total Environment 512–513 (2015) 43–54

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Concentrations of hormones, pharmaceuticals and other micropollutants in groundwater affected by septic systems in New England and New York

P.J. Phillips [a,*], C. Schubert [b], D. Argue [c], I. Fisher [b], E.T. Furlong [d], W. Foreman [d], J. Gray [d], A. Chalmers [e]

[a] US Geological Survey, Troy, NY, USA
[b] US Geological Survey, Coram, NY, USA
[c] US Geological Survey, Pembroke, NH, USA
[d] US Geological Survey, Denver, CO, USA
[e] US Geological Survey, Montpelier, VT, USA

Science of the Total Environment 438 (2012) 260–270

Contents lists available at SciVerse ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Influence of fresh water, nutrients and DOC in two submarine-groundwater-fed estuaries on the west of Ireland

Aisling M. Smith *, Rachel R. Cave

National University of Ireland, Galway, Ireland

Applied Geochemistry 27 (2012) 37–43

Contents lists available at SciVerse ScienceDirect

Applied Geochemistry

journal homepage: www.elsevier.com/locate/apgeochem

Influence of trace element fluxes from submarine groundwater discharge (SGD) on their inventories in coastal waters off volcanic island, Jeju, Korea

Jiwon Jeong [a], Guebuem Kim [a,*], Seunghee Han [b]

[a] School of Earth and Environmental Sciences/RIO, Seoul National University, Seoul, Republic of Korea
[b] School of Environmental Science and Engineering, Gwangju Institute of Science and Technology, Gwangju, Republic of Korea

SGD impact on the Baltic Sea coastal sites:

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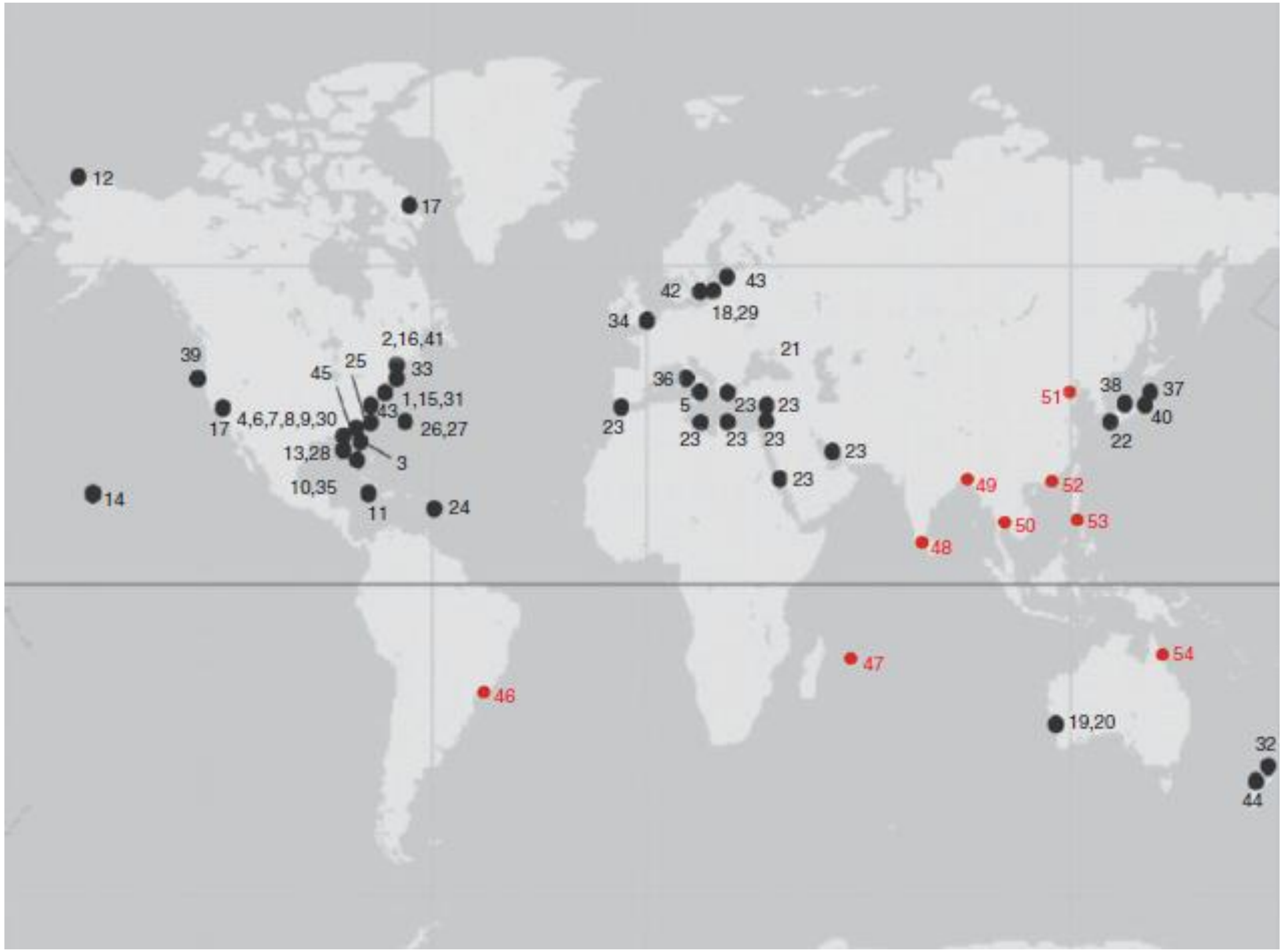
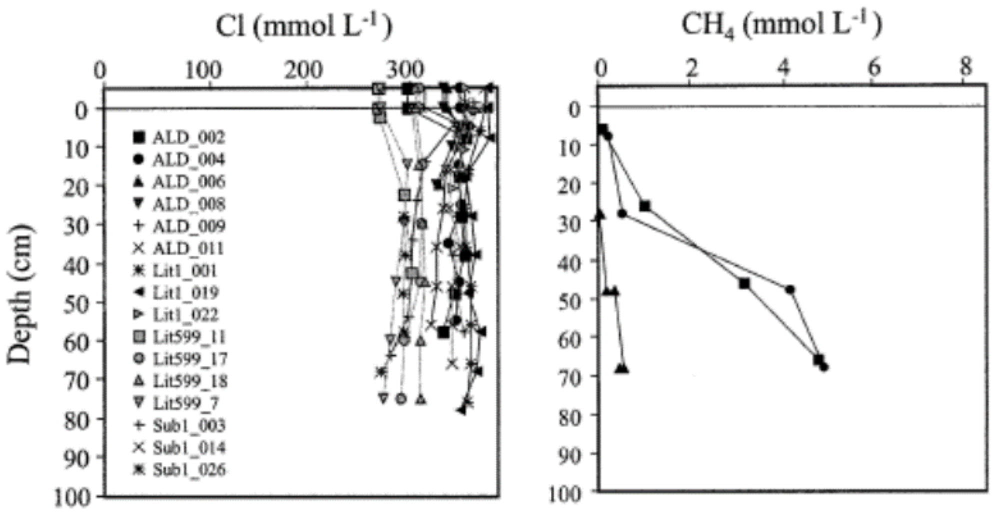
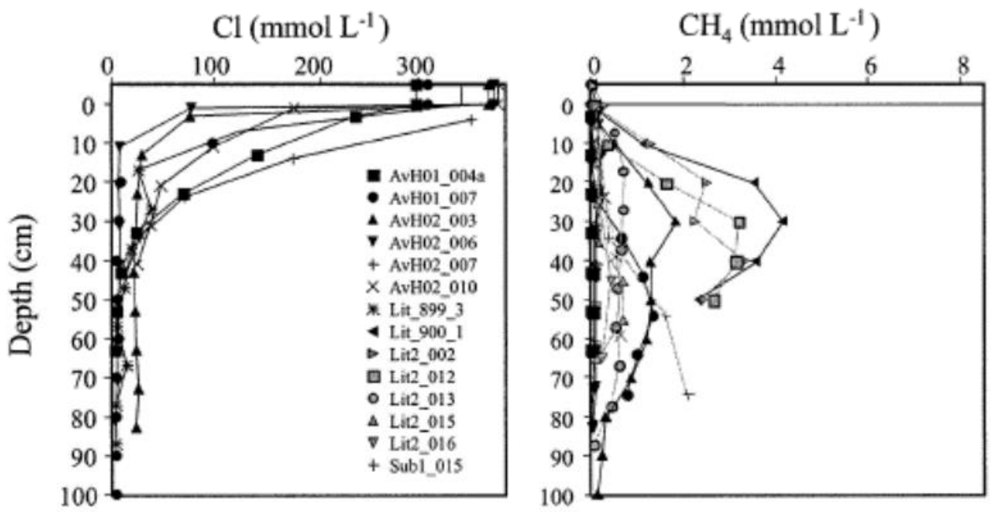
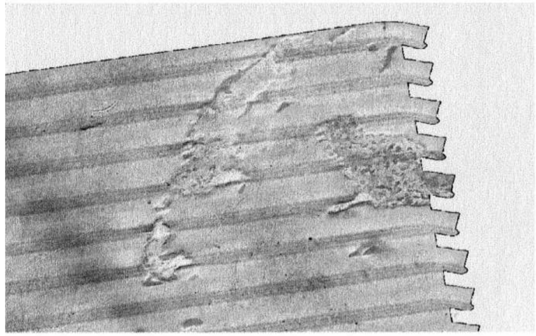


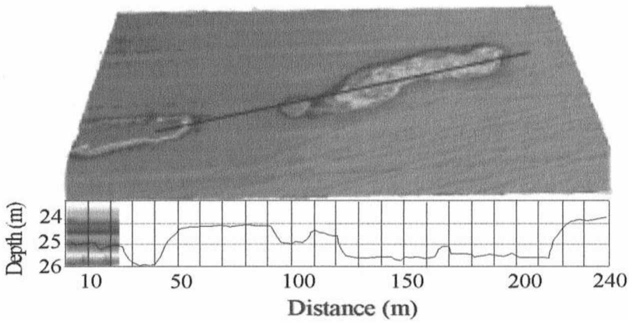
Taniguchi et al., 2002
Knee and Paytan, 2011

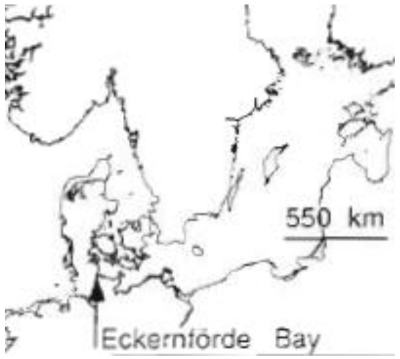
SGD impact on coastal sites:





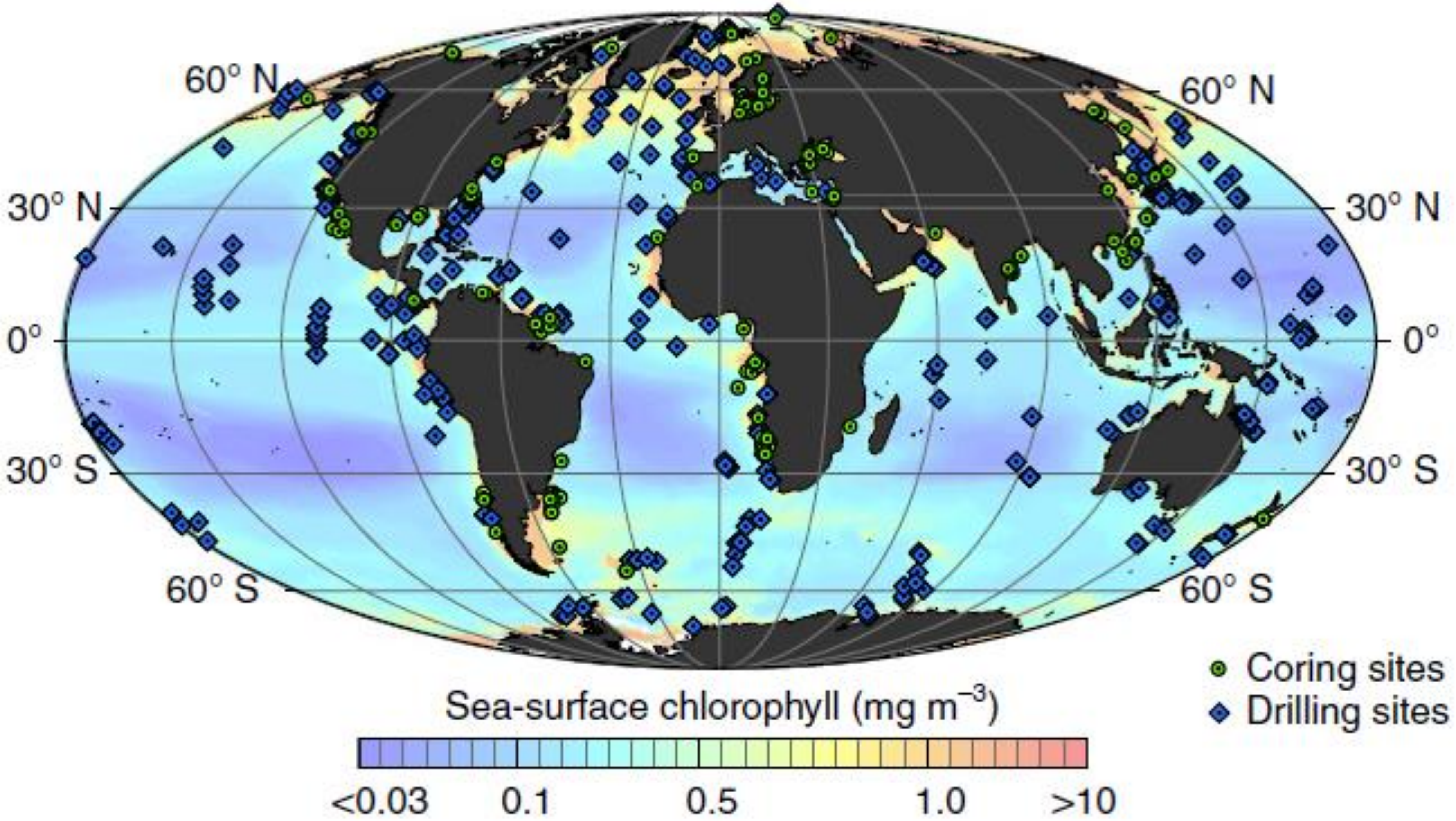






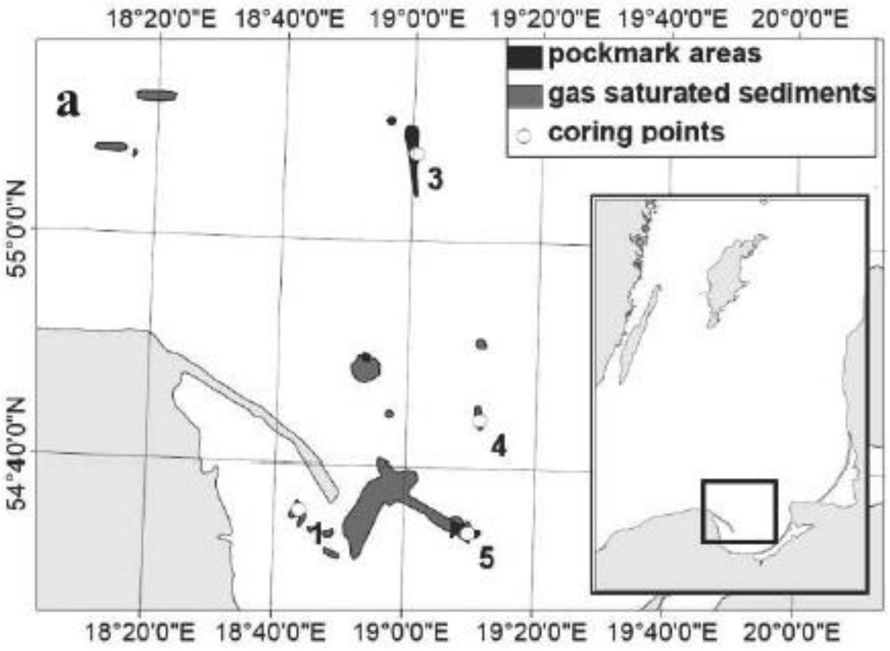
Schlüter et al. 2004

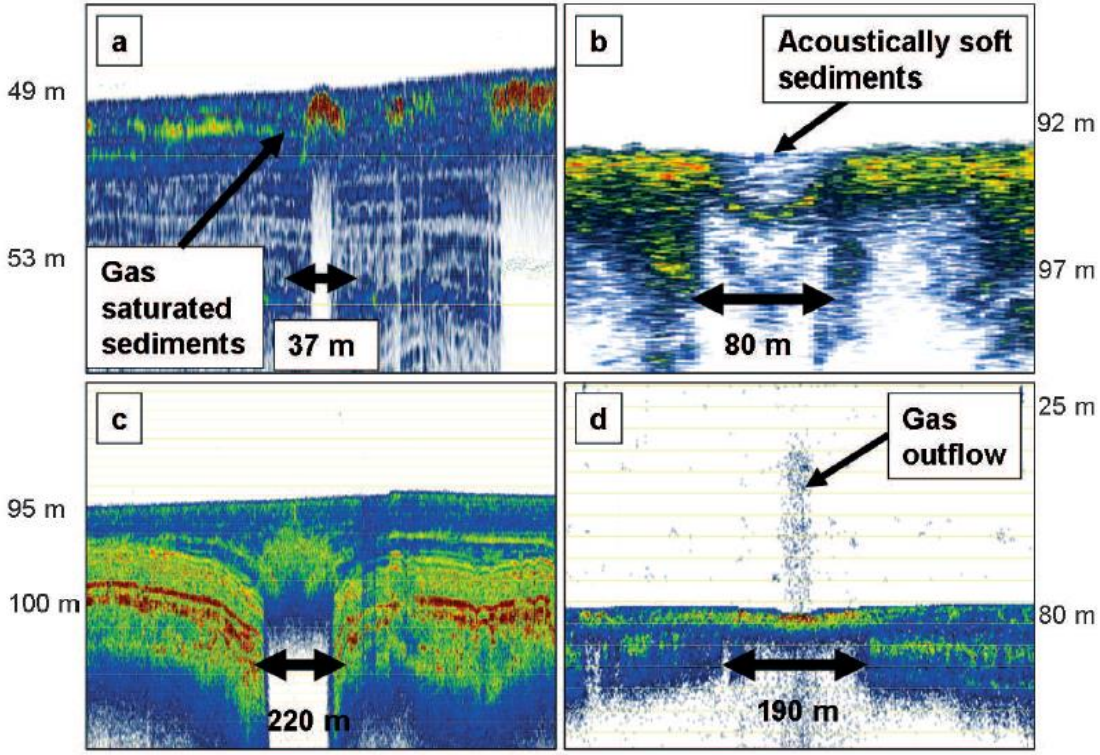
Methane occurence in marine sediments



Egger et al. 2018

Methane occurence in Baltic Sea Sediments





Brodecka et al. 2013

Characterization of the area

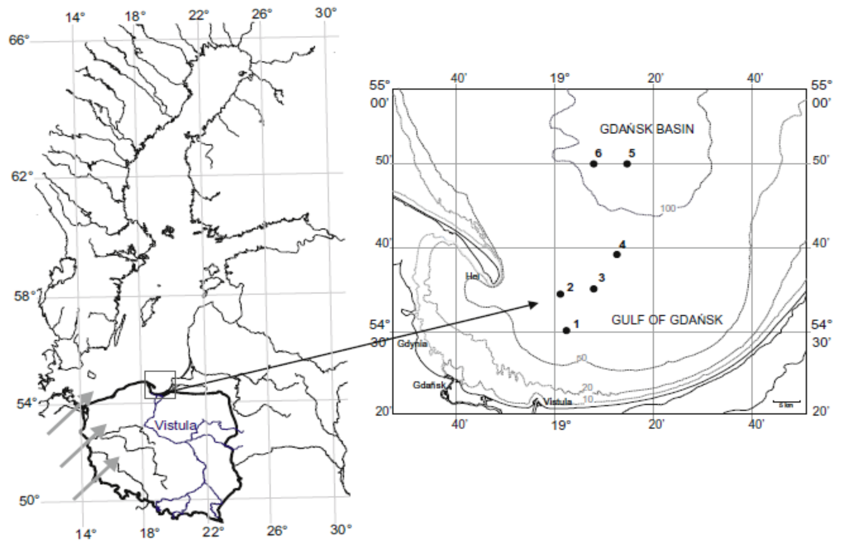


Table 1

Table contains data on the sampling station region, station coordinates, depth (m), oxygen concentration in the bottom overlying water (mg dm^{-3}) and sediment moisture (%), organic matter content (%), linear sediment accumulation rate: LAR (mm year^{-1}), mass sediment accumulation rate (gm^2 year^{-1}) and $^{210}Pb_{ex}$ inventory (Bq m^{-2}).

Station	Region	Coordinates	Depth (m)	Bottom water oxygen (mg dm^{-3})	Sediment moisture (%)	Organic matter (%)	LAR (mm year^{-1})	SAR (gm^2 year^{-1})	$^{210}Pb_{ex}$ inventory (Bq m^{-2})
1	Gulf of Gdańsk	54°30′ 19°03′	68	1.09	54.1–86.2	5.2–20.3	3.8 (r^2 = 0.81)	1424 (r^2 = 0.88)	1.03
2	Gulf of Gdańsk	54°36′ 19°01′	81	9.15	59.3–93.2	7.4–24.5	5.5 (r^2 = 0.96)	1502 (r^2 = 0.96)	2.31
3	Gulf of Gdańsk	54°37′ 19°08′	84	3.20	64.3–89.2	9.5–24.3	3.3 (r^2 = 0.92)	883 (r^2 = 0.94)	1.41
4	Gulf of Gdańsk	54°39′ 19°13′	92	1.36	71.5–89.1	12.2–21.9	3.1 (r^2 = 0.90)	536 (r^2 = 0.97)	0.64
5	Gdańsk Basin	54°50′ 19°15′	112	0.58	73.2–90.1	10.2–27.4	1.9 (r^2 = 0.94)	272 (r^2 = 0.96)	0.69
6	Gdańsk Basin	54°50′ 19°07′	110	0.62	65.1–81.7	10.1–18.1	0.72 ± 0.06 (r^2 = 0.98)	153 ± 14 (r^2 = 0.99)	0.46

Zaborska 2014

Why methane

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Marine Chemistry 122 (2010) 51–58

Contents lists available at ScienceDirect

Marine Chemistry

journal homepage: www.elsevier.com/locate/marchem

ELSEVIER

Deep submarine groundwater discharge indicated by tracers of oxygen, strontium isotopes and barium content in the Pingtung coastal zone, southern Taiwan

In-Tian Lin [a,*], Chung-Ho Wang [b], Chen-Feng You [c], Saulwood Lin [d], Kuo-Fang Huang [c], Yue-Gau Chen [a]

[a] Department of Geosciences, National Taiwan University, Taipei, Taiwan, ROC
[b] Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan, ROC
[c] Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan, ROC

GEOPHYSICAL RESEARCH LETTERS, VOL. 30, NO. 18, 1917, doi:10.1029/2003GL017924, 2003

Periodical changes of submarine fluid discharge from a deep seafloor, Suiyo Sea Mountain, Japan

Makoto Taniguchi[1], Shingo Uchida[2], and Masataka Kinoshita[3]

Received 9 June 2003; revised 21 July 2003; accepted 5 August 2003; published 16 September 2003.

WATER RESOURCES RESEARCH, VOL. 41, W02016, doi:10.1029/2004WR003399, 2005

Fresh and saline groundwater discharge to the ocean: A regional perspective

Alicia M. Wilson

Department of Geological Sciences, University of South Carolina, Columbia, South Carolina, USA

Received 7 June 2004; revised 2 November 2004; accepted 13 December 2004; published 16 February 2005.

[1] Studies of groundwater flow in coastal aquifers often focus strongly on freshwater and investigate flow in a narrow (<5 km) zone surrounding the coastline. This work was designed to place coastal flow in a regional context and to compare fresh and saline submarine groundwater discharge (SGD) for regional flow systems. Numerical flow and transport models were developed to estimate SGD associated with topography-driven flow, seawater recirculation, and geothermal convection in a passive margin setting. Simulations were based on two cross sections of North Carolina, and sensitivity studies were used to explore the impact of varying hydraulic and transport parameters. Results suggest that saline flow associated with seawater recirculation and geothermal convection should be considered in studies of SGD. Studies limited to shallow topography-driven flow may be justified in using small study areas, but flow systems contributing to
t least 20 km surrounding the coast and continental slope.

. M. (2005), Fresh and saline groundwater discharge to the ocean: A regional perspective, *Water Resour. Res.*, *41*,
9/2004WR003399.

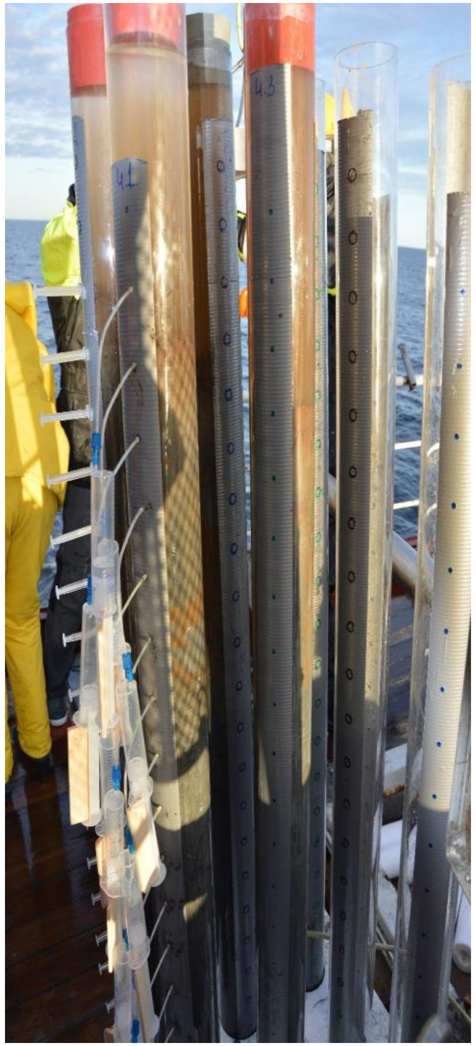
Geophysical Research Abstracts
Vol. 19, EGU2017-2992, 2017
EGU General Assembly 2017

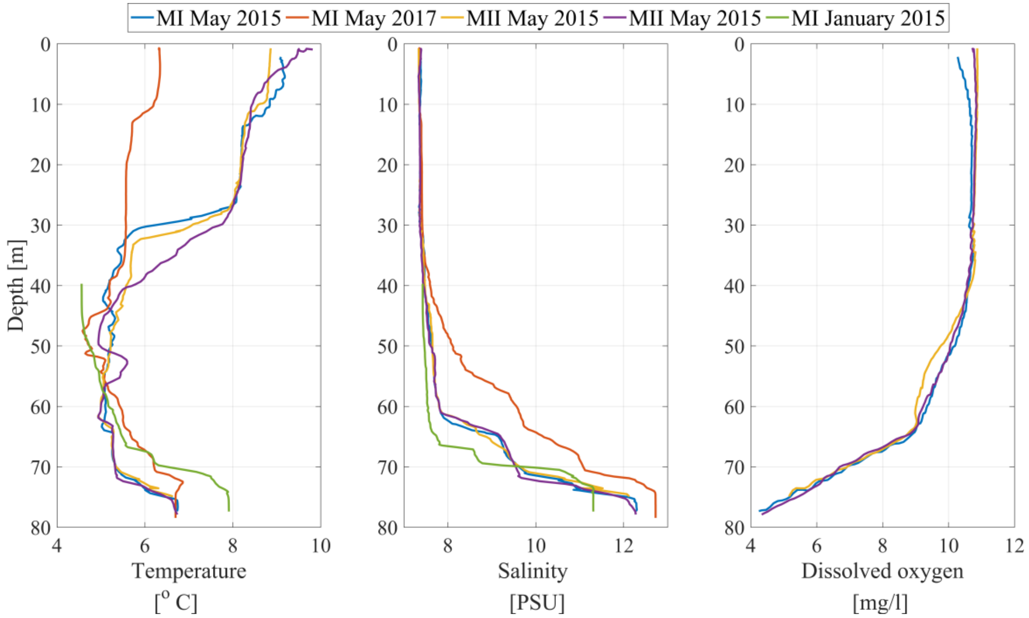
EGU

Understanding steady-state Deep Submarine Groundwater Discharge: a case study in Northern Israel

Anner Paldor (1,2), Einat Aharonov (1), and Oded Katz (2)
(1) Hebrew University, Jerusalem, Israel., (2) Geological Survey of Israel.

Sampling





MI May 2015
MI May 2017
MII May 2015
MII May 2015
MI January 2015
Depth [m]
Temperature
[° C]
Salinity
[PSU]
Dissolved oxygen
[mg/l]

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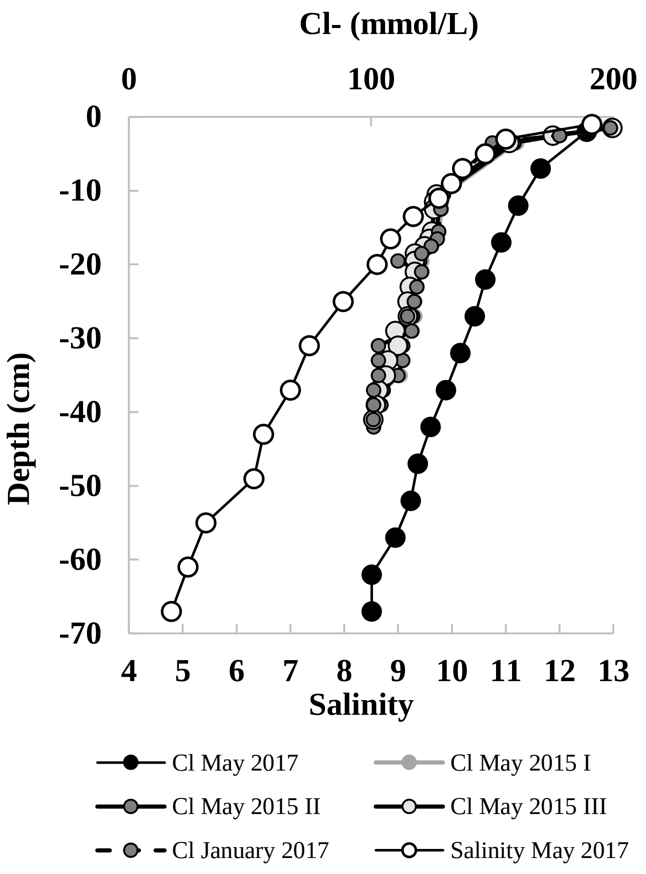

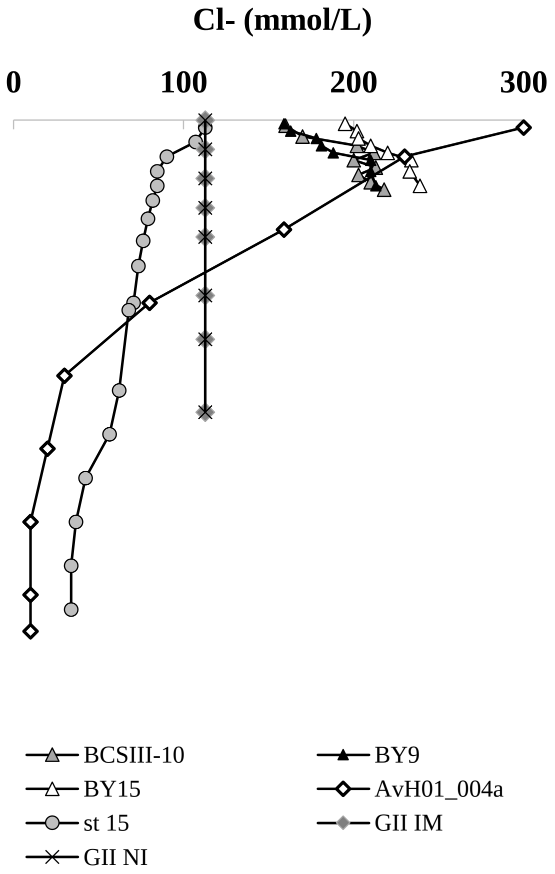

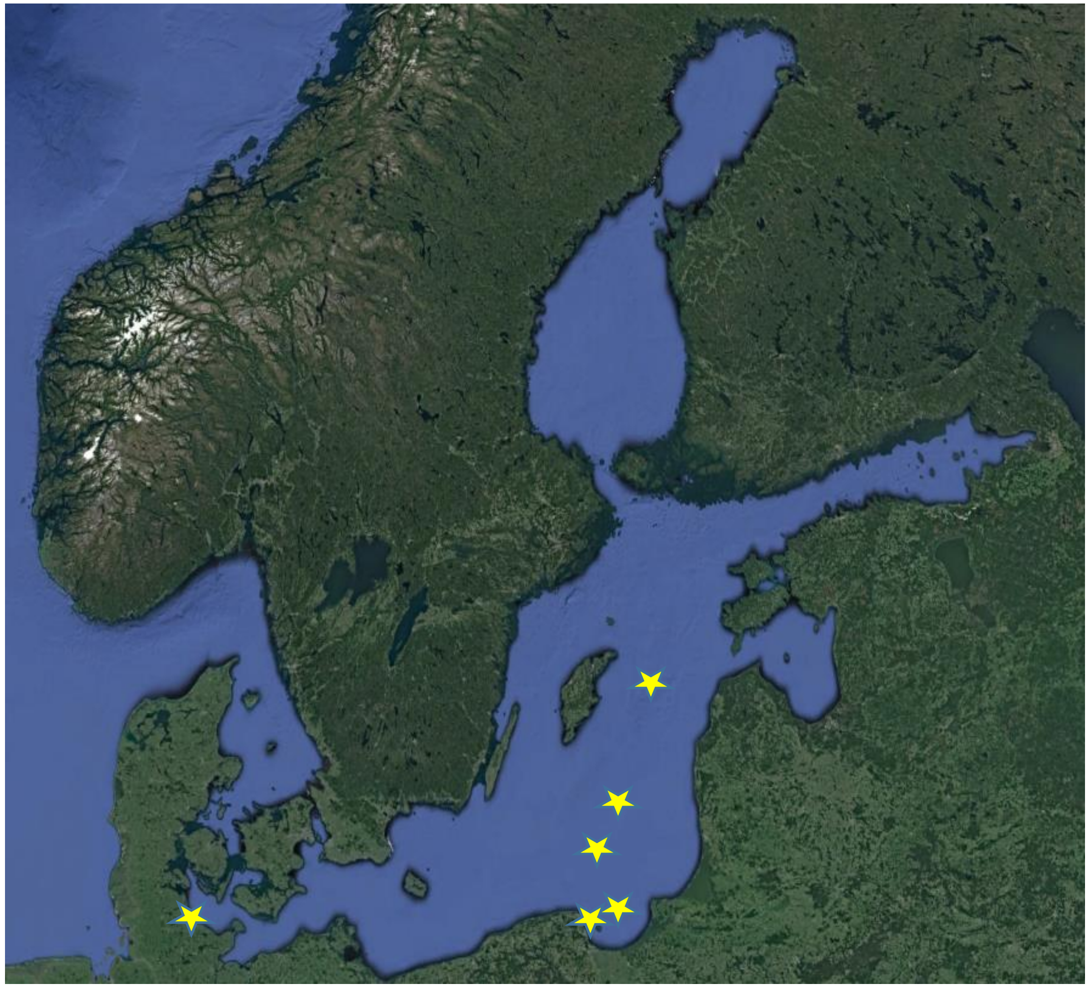

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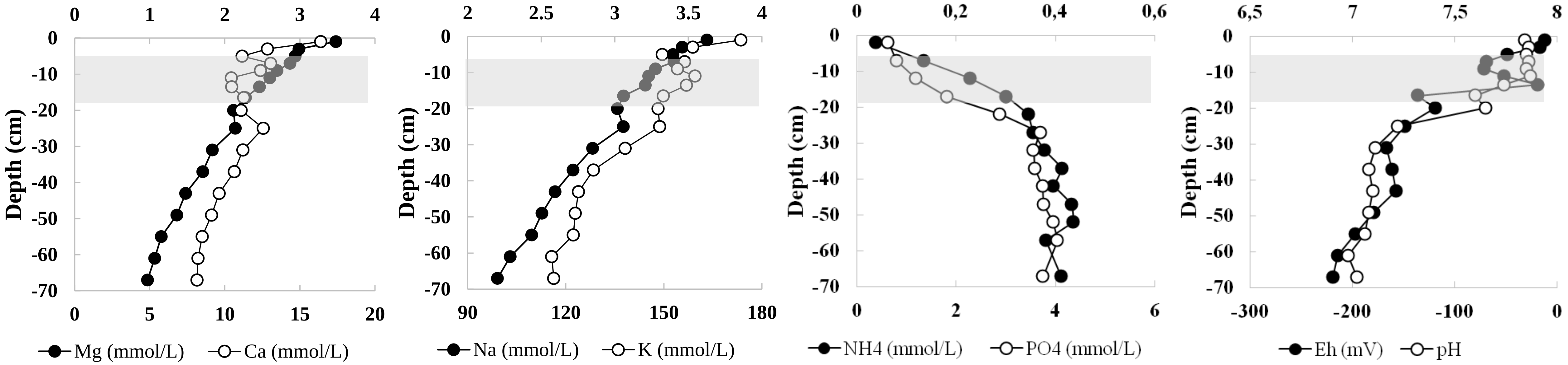

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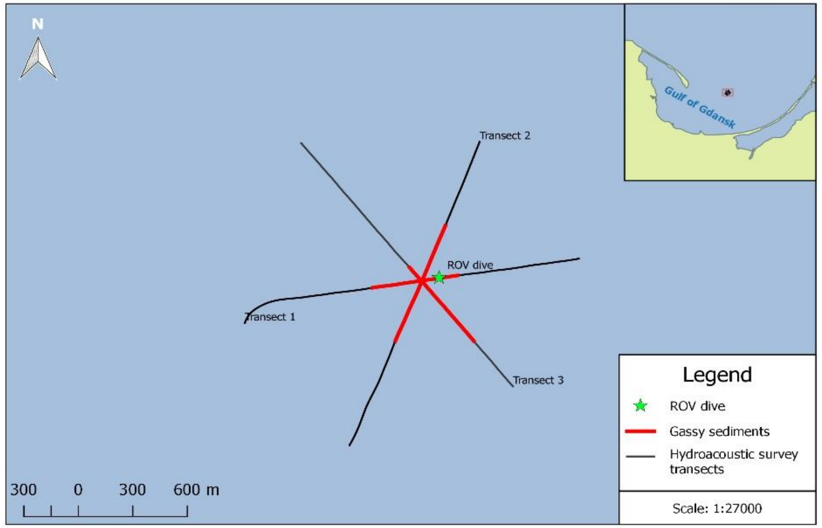

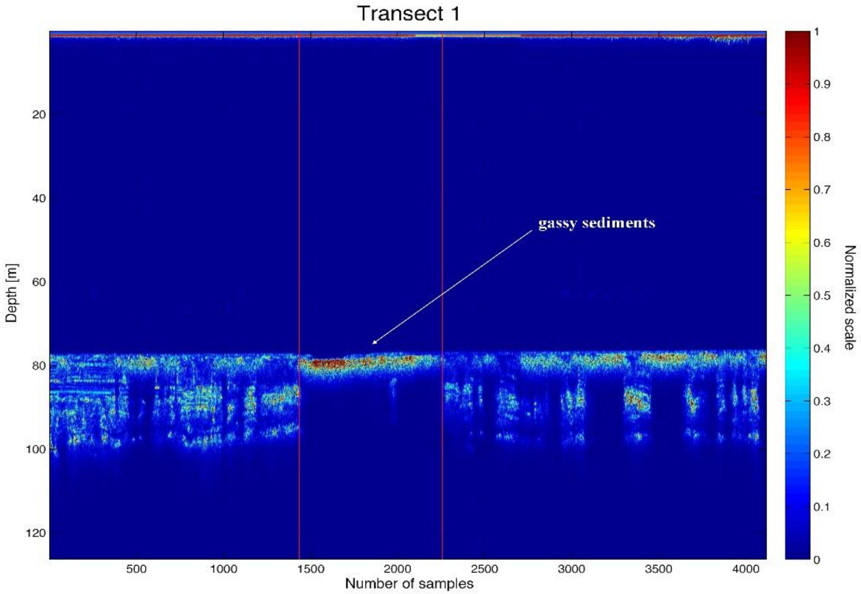

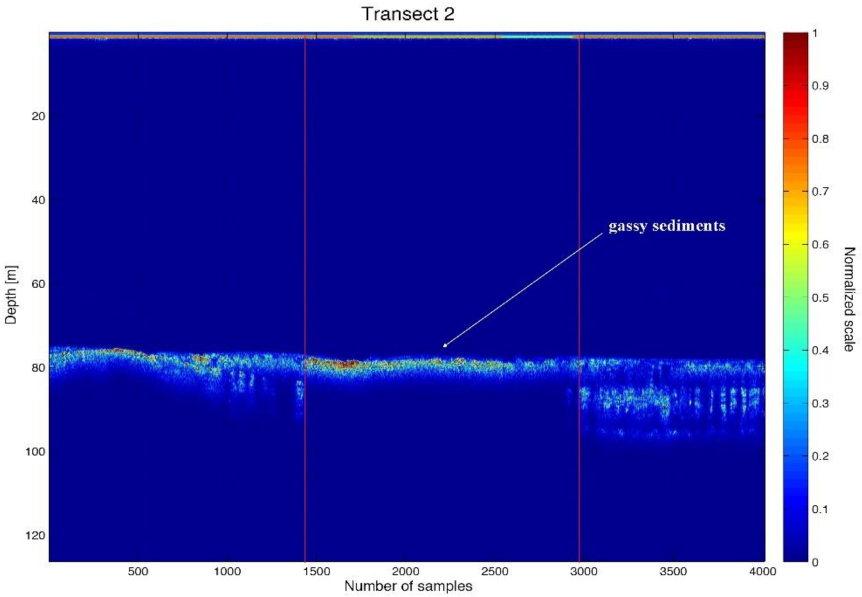

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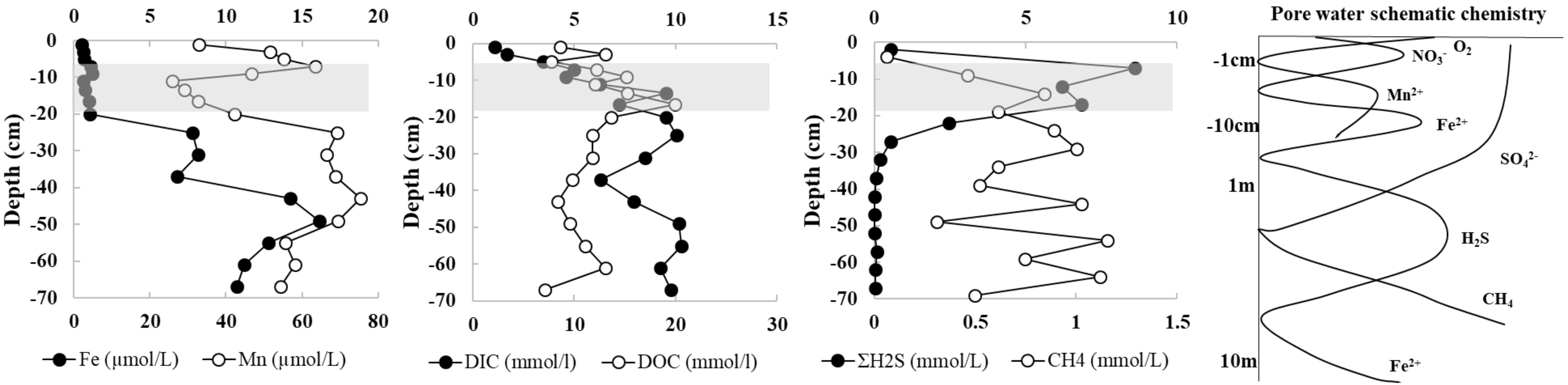

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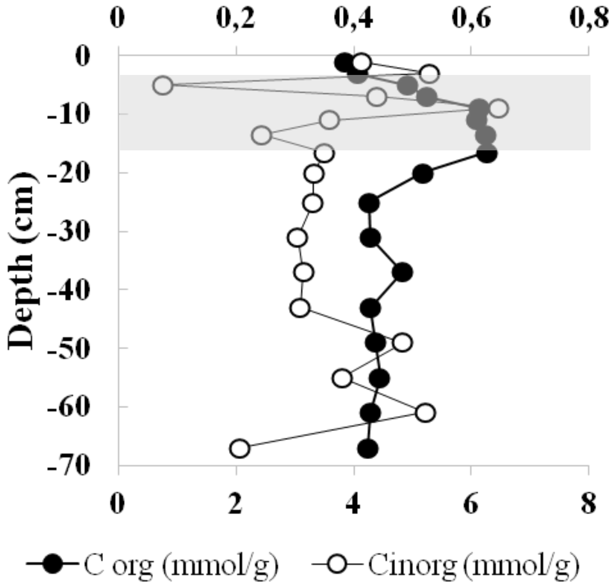
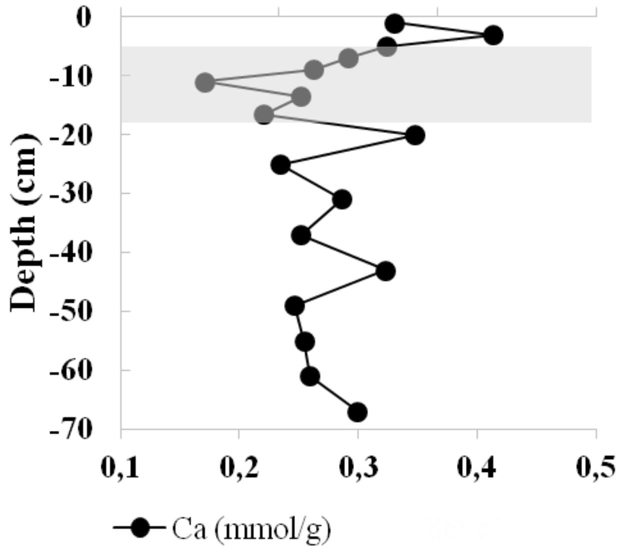
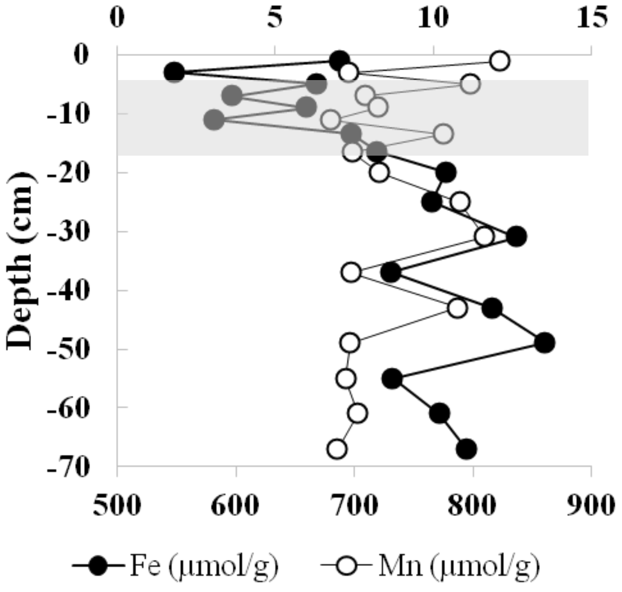
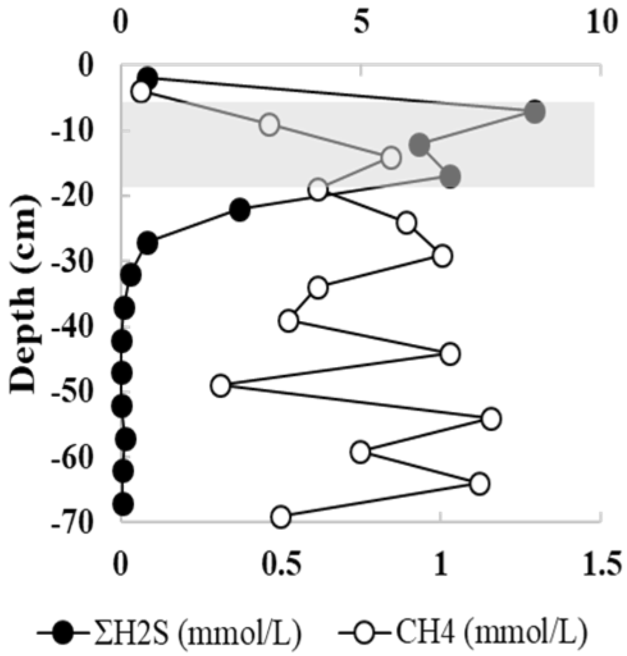
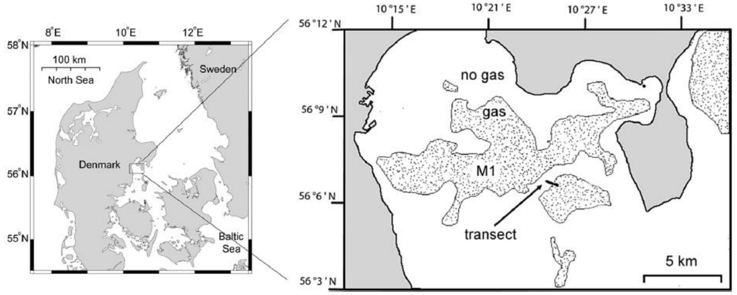
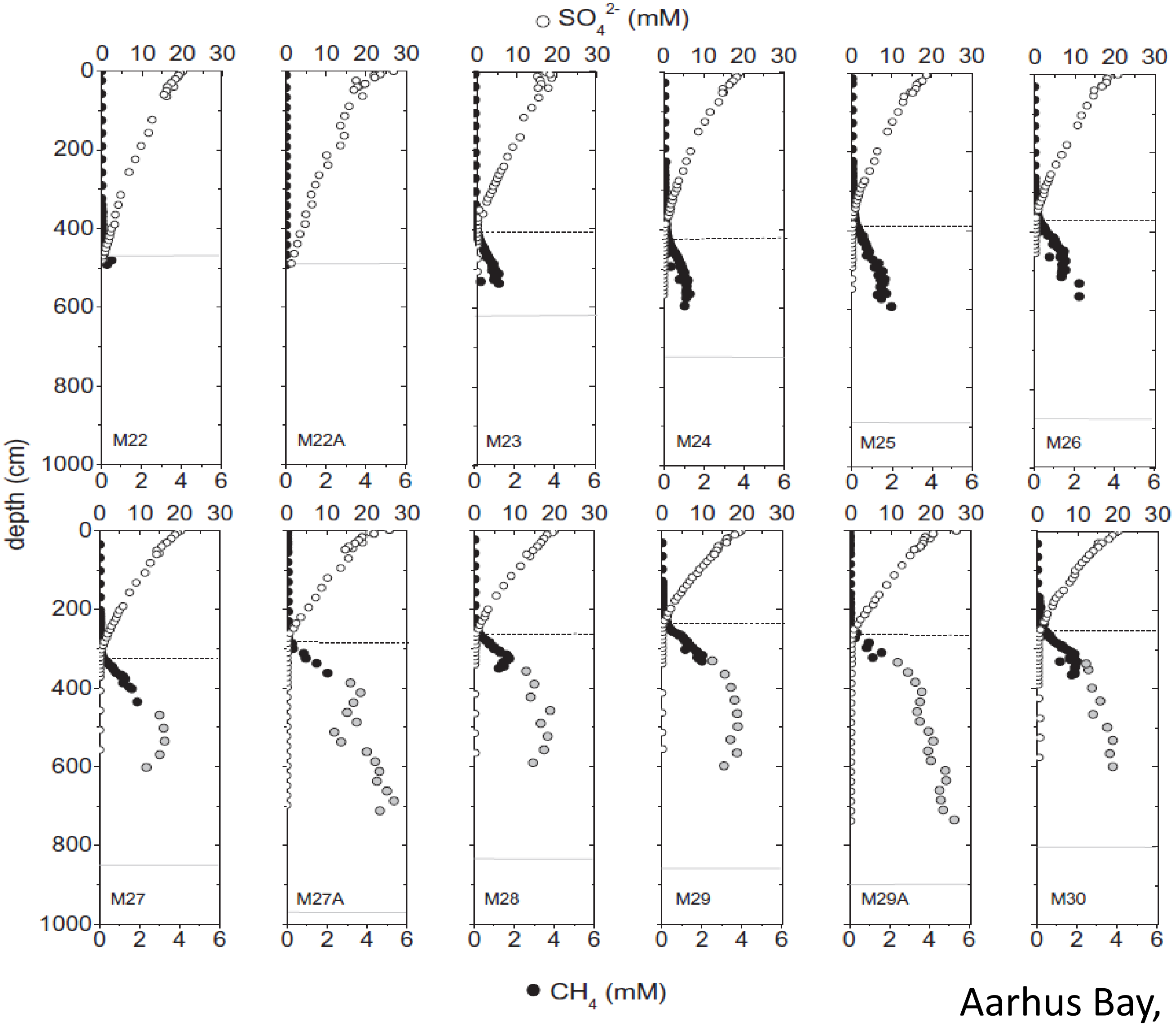




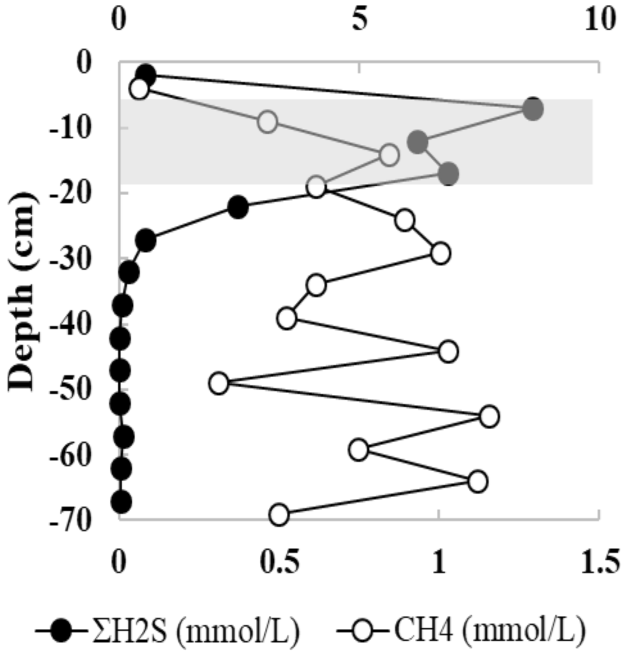


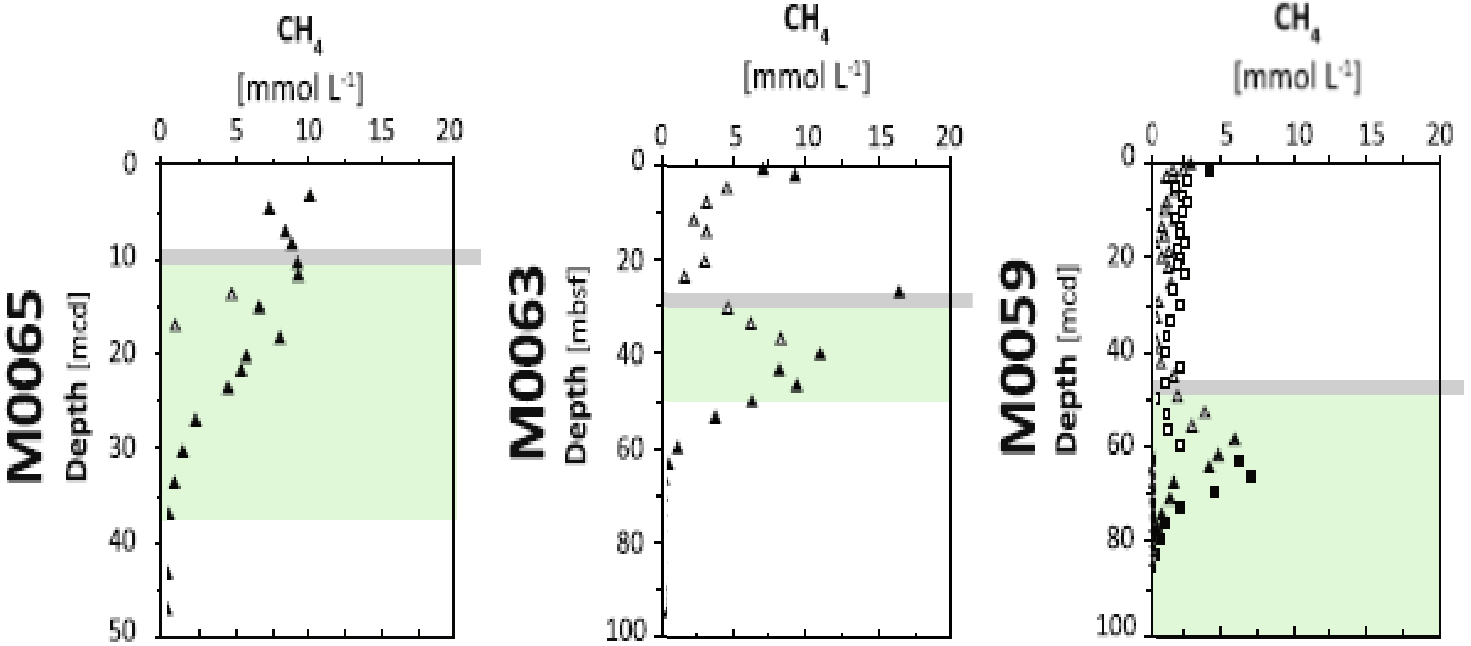


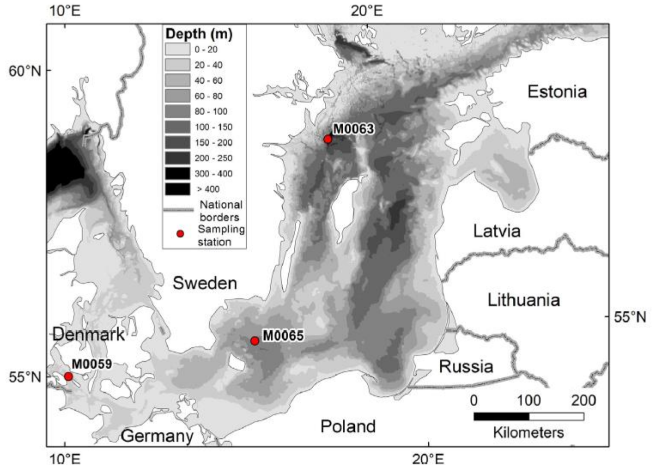




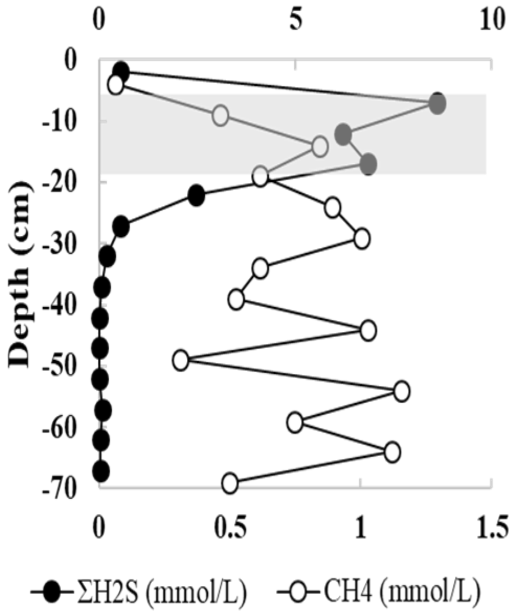
Aarhus Bay, Baltic Sea
Flury et al.2016

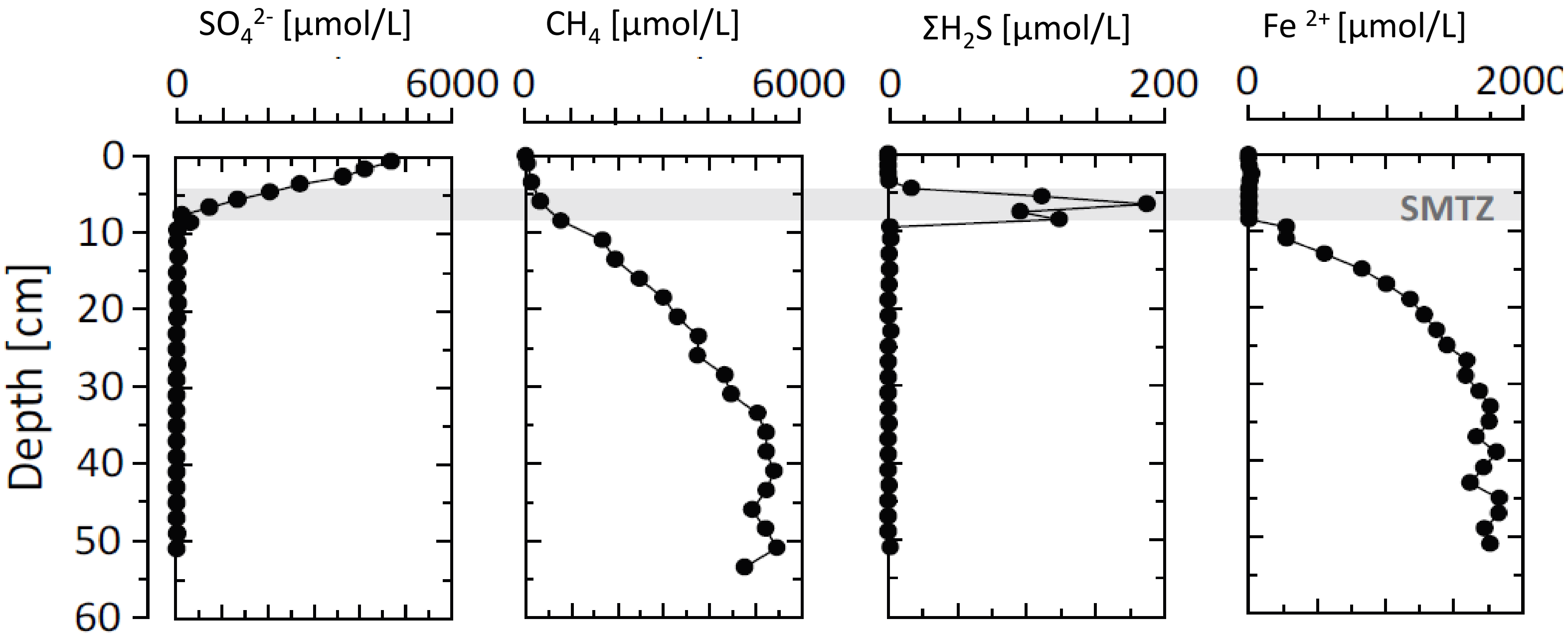




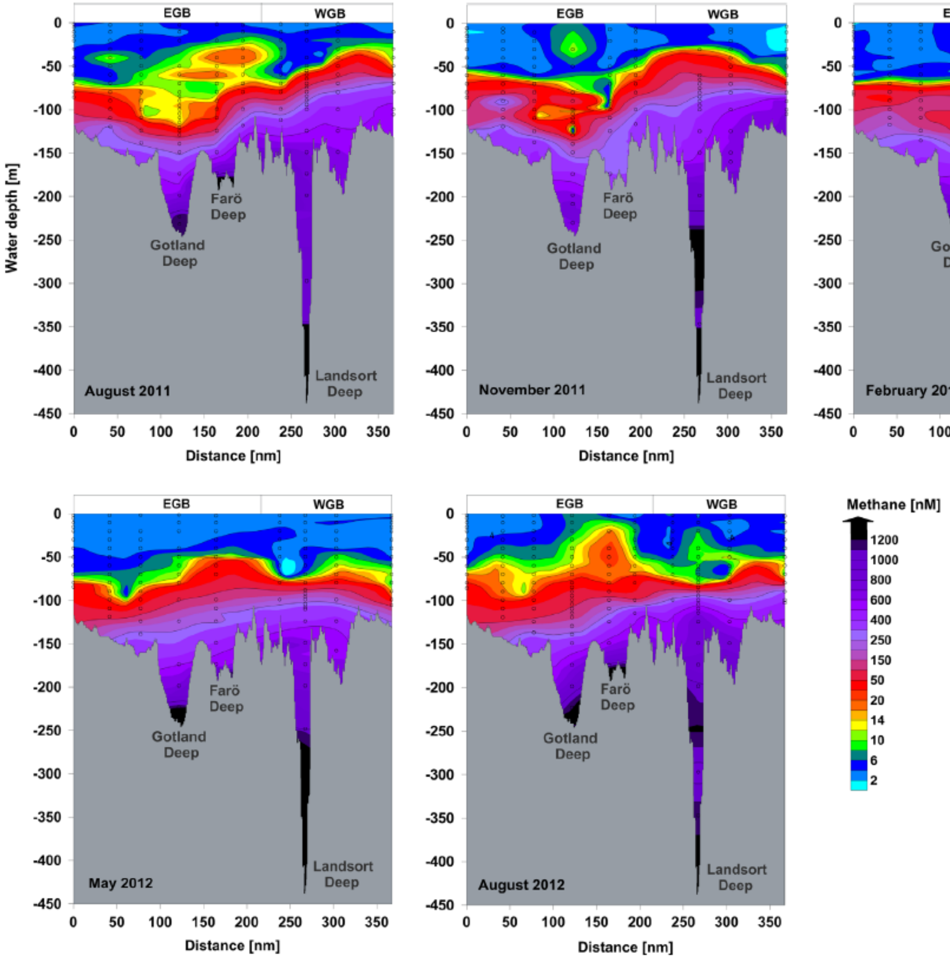


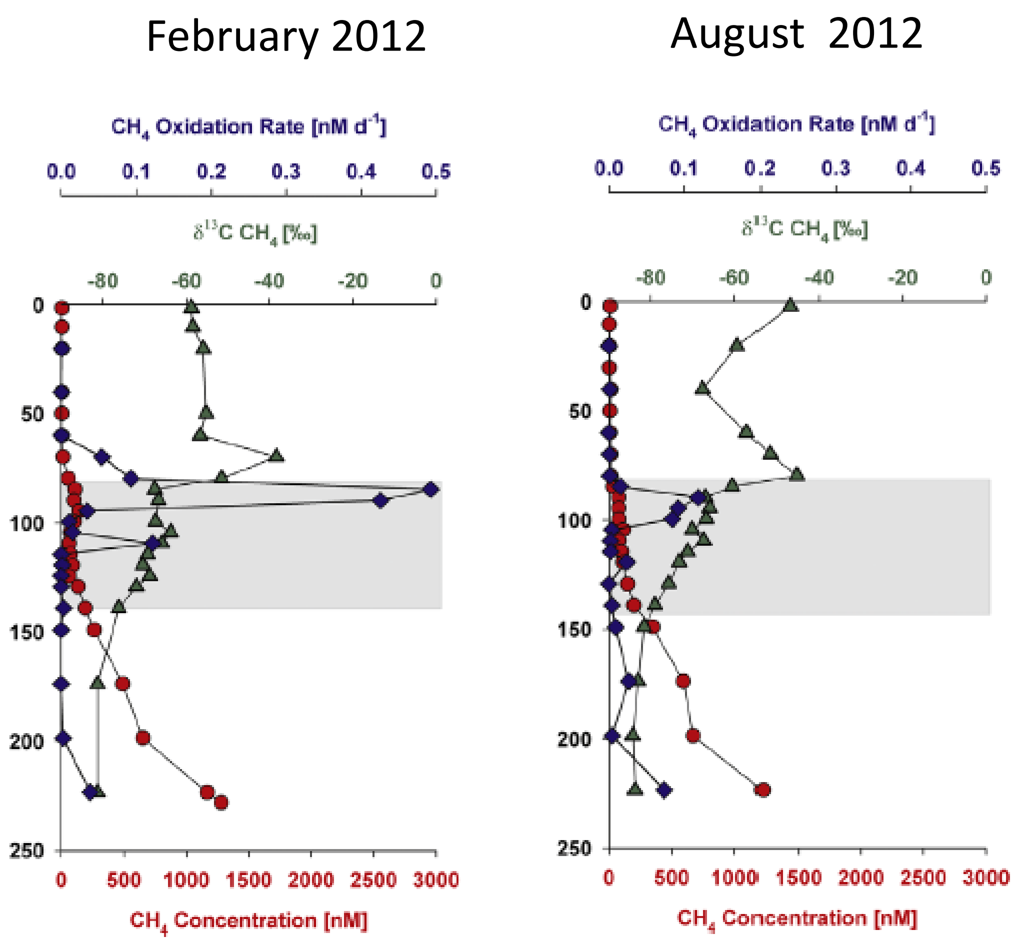
Aarhus Bay, Baltic Sea
Egger et al.2017





US5B, Bothnian Sea at 214 m
Egger et al.2014





This study: bottom water 18000 [nM] CH_4

Jakobs et al.2014


Thank you for your attention ☺