

Baltic Earth

Earth System Science and Outreach for the Baltic Sea Region



Baltic Earth
Earth System Science for the Baltic Sea Region

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International Baltic Earth Secretariat
Helmholtz-Zentrum Geesthacht, Germany

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Warnemünde, Germany and Swedish
Meteorological and Hydrological Institute,
Sweden, and BESSG Chair

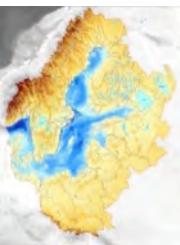
and the

Baltic Earth Science Steering Group

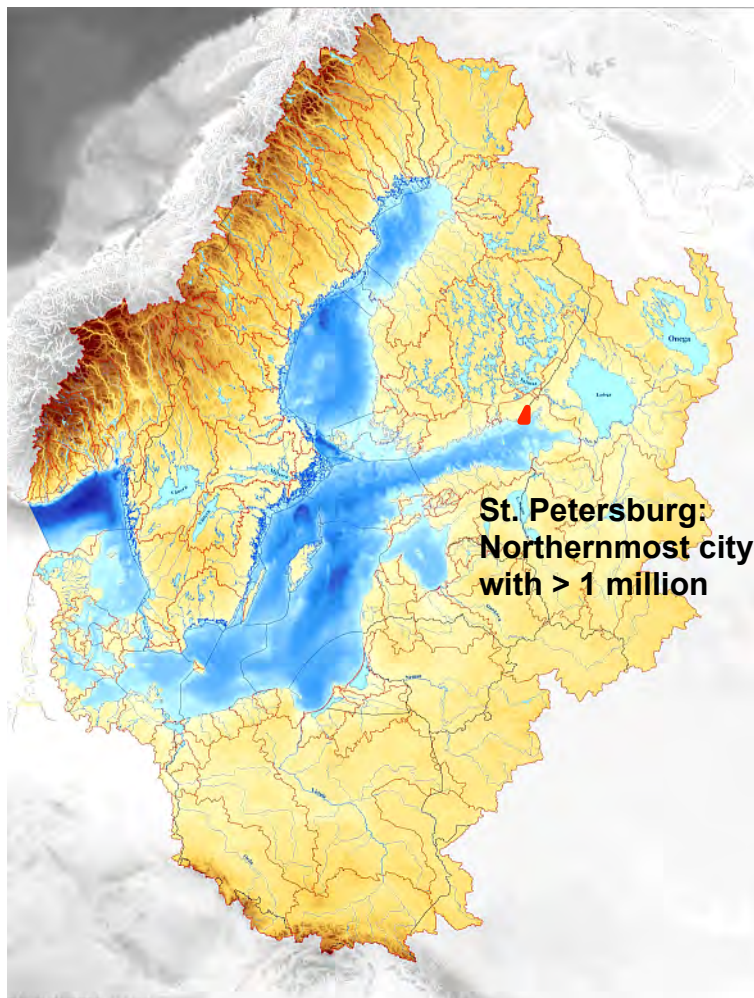
**Status Report 2018 for GEWEX GHP Meeting, 22-26 Oct 2018
Santiago de Chile**

The Baltic Sea region

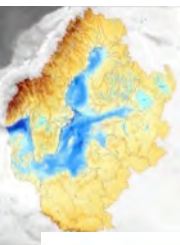




The Baltic Sea region



- Drainage Basin: 2.13 Mill. km²
(20% of the European continent)
- 85 million people in 14 countries
- Baltic Sea: 380 000 km²



The Baltic Sea region



The North ...

- extensive forests, mostly coniferous
- sparsely populated
- mostly rocky coasts
- subarctic climate in winter

The South...

- intense agriculture
- densely populated
- mostly sandy coasts
- moderate climate in winter



Baltic Earth - Earth system science for the Baltic Sea region



Vision of the programme

To achieve an improved Earth System understanding of the Baltic Sea region

- **Interdisciplinary** and **international** collaboration (conferences, workshops, joint projects etc.)
- **Holistic view** on the Earth system of the Baltic Sea region, encompassing processes in the **atmosphere**, on **land** and in the **sea** and also in the **anthroposphere**
- “**Service to society**” in the respect that **thematic assessments** provide an overview over knowledge gaps which need to be filled (e.g. by funded projects)
- **Education** (summer schools)
- Inherits the BALTEX network of scientists and infrastructures
- Succeeds BALTEX since the 7th Study Conference on BALTEX, Borgholm, Öland, Sweden, 10-14 June 2013

Baltic Earth

Earth System Science for the Baltic Sea Region

Baltic Earth SSG members

as of Oct 2018



Anna Rutgersson
Sweden



Jari Haapala
Finland



Kai Myrberg
Finland



Sergey Zhuravlev
Russia



Matthias Gröger
Sweden



Piia Post
Estonia



Tarmo Soomere
Estonia



Martin Stendel
Denmark



Juris Aigars
Latvia



Inga Dailidienė
Lithuania



Irina Partasenok
Belarus



Corinna Schrum
Germany



Andreas Lehmann
Germany



Markus Meier
Germany



Gregor Rehder
Germany



Marcus Reckermann
Germany



Ralf Weisse
Germany

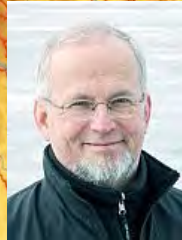


Franz Berger
Germany



Karol Kulinski
Poland

Baltic Earth Advisory Board



Anders Omstedt
Sweden



Andris Andrusaitis
BONUS



Jannica Haldin
HELCOM



Valery Vuglinsky
Russia



Fritz Köster
Denmark



Jüri Elken
Estonia



Sirje Keevallik
Estonia



Hans von Storch
Germany



Kay Emeis
Germany



Hans-Jörg Isemer
Germany



Joan Cuxart Rodamilans
GEWEX-GHP





Baltic Earth

Earth System Science for the Baltic Sea Region

Secretariat

International Baltic Earth Secretariat (IBES)

Address:

International Baltic Earth Secretariat
Helmholtz-Zentrum Geesthacht
Max-Planck-Straße 1
D-21502 Geesthacht
Tel: +49-4152-87-1693
Germany
E-mail: [balticearth\(at\)hzg.de](mailto:balticearth(at)hzg.de) (replace "(at)" with "@")



For details on IBES staff, [click here](#)

The International Baltic Earth Secretariat (IBES) as a focal support point for Baltic Earth is located at the [Helmholtz-Zentrum Geesthacht](#) (until 1 November 2010: GKSS Research Centre) in Geesthacht, Germany. The Baltic Earth Secretariat's tasks cover in particular:

- to support the Baltic Earth Science Steering Group, Working Groups and Panels in their activities, and to provide preliminary reviews of their work,
- to maintain connections with all participating research groups and with all operational data and numerical modelling centres for Baltic Earth,
- to prepare for international Baltic Earth meetings, workshops, seminars and conferences, and to provide assistance for reports by Baltic Earth scientists and to international research groups and the research and public community at large, and
- to inform participants about ongoing activities which may be of relevance to their work.

Since January 2002, GKSS (Helmholtz-Zentrum Geesthacht as of 1 November 2010) has been the only sponsor of the International BALTEX (now: Baltic Earth) Secretariat, covering salaries for the staff members, infrastructure and travel support.



Baltic Earth

Earth System Science for the Baltic Sea Region



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- [International Baltic Earth Secretariat](#)
- [Events](#)
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2nd Baltic Earth Conference
The Baltic Sea Region in Transition
 Helsingør, Denmark
 11 - 15 June 2018

[BACC II](#)

Helmholtz-Zentrum Geesthacht
 Centre for Materials and Coastal Research

Announcements

HZG Current Employment Opportunities [More](#)



Extending the knowledge of the regional Earth system in the Baltic Sea region

Baltic Earth strives to achieve an improved Earth System understanding of the Baltic Sea region as the basis for science-based management in the face of climatic, environmental and human impact in the region. Baltic Earth brings together a broad international research community around core scientific issues identified as fundamental to informing societal efforts to achieve sustainability in the region. These "Grand Challenges" are tackled through joint research efforts, workshops, conferences and capacity building events accompanied by a continuous process of synthesis of the current state of knowledge. Communication with stakeholders and research funders aims to ensure impact and relevance of the research. Baltic Earth targets the atmosphere, land and marine environment of the Baltic Sea, its drainage basin and nearby areas with relevance for the Baltic Sea region. [More...](#)

NEWS



1st Baltic Earth Winter School on Analysis of Climate Variability
 Warnemünde, Germany
 22 - 29 March 2019
 Application Deadline: 15 December 2018
[More...](#)



Call for Posters and Registration OPEN
 Baltic Earth Workshop on Multiple drivers for Earth system changes in the Baltic sea region
 Tallinn, 26-27 November 2018, in collaboration with BONUS, HELCOM, ICES.
 Registration and Poster Abstract Deadline: 29 October
[More...](#)

2nd Baltic Earth Conference

[Aftermath page now updated with photos, session summaries and more...](#)



Thank you to the 130 participants (of which about a third were Young Scientists) for a great conference!

Upcoming Events

Coastal Summer School 2018 on Coastal dynamics - consequences for coastal protection and ecology, 15 - 29 September 2018, Hiddensee Island, Germany and on board of the RV "Elisabeth Mann Borgesen" [More...](#)

EUMETSAT Meteorological Satellite Conference 2018, 17-21 September 2018, Tallinn, Estonia. [More...](#)

ICES Annual Science Conference 2018, 24-27 September 2018, Hamburg, Germany. [More...](#)

Trilateral Estonian-Finnish-Russian Gulf of Finland Forum "Gulf of Finland - natural dynamics and anthropogenic impact", devoted to 60th Anniversary of trilateral Gulf of Finland Cooperation, 17-18 October 2018, St. Petersburg, Russia.

Baltic Earth Workshop on Multiple drivers for Earth system changes in the Baltic Sea region
 Tallinn, 26-27 November 2018 in collaboration with BONUS, HELCOM, ICES
[More...](#)

1st Baltic Earth Winter School on Analysis of Climate Variability
 Warnemünde, Germany
 22 - 29 March 2019
[More...](#)

For past events look [here](#).

Baltic Earth Newsletter

The BACC Blog



Infrastructure



Secretariat

Website Social





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[1st Baltic Earth Conference: Multiple drivers for a changing climate system changes in the Baltic Sea region Nida, Curonian Spit, Lithuania 13 - 17 June 2016](#)

[BACC II](#)

 **Helmholtz-Zentrum Geesthacht**
Centre for Materials and Coastal Research

The BALTEX/Baltic Earth Publication Series

Compilation of BALTEX/Baltic Earth Publications

- 14 books
- 722 peer-reviewed journal articles
- 65 reports
- 876 BALTEX/Baltic Earth Conference presentations
- 55 International BALTEX Secretariat Publication Series issues
- 13 International Baltic Earth Secretariat Publication Series issues

Publication title:

Author(s): (name, initial/co-authors: initial, family name also)

Journal name:

Year of publication:

Keywords:

Abstract:

Attention: Please, send an e-mail as well, if you wish to edit or delete an existing publication entry.

For any questions or suggestions, you may have, contact [Silke Köppen at the Baltic Earth Secretariat](#).

- [Enter the BALTEX/Baltic Earth Publication Library](#)
Login with user ID 'baltex' and password 'baltex'

- Publications**
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programmes
objectives of
programme are
continuously
LTEX" or

Baltic Earth

server of the Helmholtz-Zentrum Geesthacht. For security reasons visitors are not allowed to access the server by [Silke Köppen at the Baltic Earth Secretariat](#).

Publication to the [International Baltic Earth Secretariat](#) and provide the following information:

Research Topic
The Baltic Sea Region in Transition

Baltic Earth

Overview Articles Authors Impact Comments

829

About this Research Topic

The Baltic Sea is a semi-enclosed sea in Northern Europe, draining about 20% of Europe in its catchment area. The region and the Baltic Sea itself have been subject of interdisciplinary Earth system research for many decades, and especially so since the barriers between the Eastern and Western Researcher (E) in the early 1990s. Baltic Earth, and its precursor programme BALTEX, have fostered the collaboration of Earth system research across the countries and scientific disciplines for 20 years now.

Baltic Earth strives to achieve an improved Earth system understanding of the Baltic Sea region as the basis for science-based management in the face of climate, environmental and human impact in the region. Baltic Earth targets the atmosphere, land and marine environment of the Baltic Sea, its drainage basin and nearby areas with relevance for the Baltic Sea region.

This Research Topic in Frontiers is grounded in the 2nd Baltic Earth Conference in Helsinki, 11-13 June 2016, and will cover the themes of Baltic Earth, in particular highlighting the Baltic Earth Grand Challenges as defined by the Baltic Earth Science Plan. The grand topic of the conference, "The Baltic Sea region in transition" refers both to transition processes in the transition area between the North and Baltic Seas, and to temporal transition processes in the environment and regional climate and socio-economic system of the Baltic Sea and its catchment basin.

We welcome manuscripts from interdisciplinary Earth system research in the Baltic Sea region and its catchment basin, related to:

1. its processes and spatial focus of climate, energy, momentum and matter in the transition area between the Baltic Sea North Sea regions, e.g. oceanographic in- and outflow events and associated processes in the Baltic Sea, HELSINKI 2016, HELSINKI 2016, HELSINKI 2016.

Topic Editors

Marcus Reckermann
Helmholtz-Zentrum Geesthacht
Zentrum für Meeres- und Küstenforschung
Helmholtz-Geesthacht
Deutscher Forschungsbereich
OZE
Geesthacht, Germany
16 publications

Markus Meier
Laboratoire pour la Baltique
Baltic Sea Research (LGI)
Helmholtz-Geesthacht
Germany
1 publications

Martin Stendel
Danish Meteorological Institute
Denmark
24 publications

Earth System Dynamics

An interactive open-access journal of the European Geosciences Union



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Overview of special issues

Multiple drivers for Earth system changes in the Baltic Sea region

Editor(s): M. Meier, A. Rutgersson, B. Smith, M. Reckermann, and I. Didenkulova

More information

The goal of Baltic Earth (www.baltic.earth) is to achieve an improved Earth system understanding of the Baltic Sea region, encompassing processes in the atmosphere, on land, and in the sea, as well as processes and impacts related to the anthroposphere; i.e. the human impact is to be assessed at all levels wherever possible and reasonable. Recent research has shown that the observed environmental changes are often caused by a mixture of interwoven factors such as climate change and its associated impacts, eutrophication, pollution, fisheries, land cover change, and others. Each of these factors has a scientific and a societal dimension, which are often interdependent, and make the identification of a single or even dominant factor responsible for the change difficult.

The scope of this special issue is to attempt to describe the different factors for change, their impacts on the Earth system of the Baltic Sea region, and to demonstrate the capacity to model any of these factors in a single or a coupled approach. Are we able to simulate the observed changes in a realistic way? Are we able to produce credible scenarios for the future? Ultimately, this analysis should help to identify knowledge gaps and research needs for the coming years, to help find solutions for the challenges we face in the future.

The special issue refers to the 1st Baltic Earth Conference, held in Nida, Lithuania, 13-17 June 2016, which brought together the Baltic Earth research community to share and discuss issues related to the general conference topic "Multiple drivers for Earth System changes in the Baltic Sea region".

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CLIMATE SCIENCE

Browse by Subject

Climate of the Baltic Sea Region

You are looking at 1-6 of 9 articles for: Climate of the Baltic Sea Region

Climate, History and Social Change in Sweden and the Baltic Sea Area from About 1700

Open Life
Online publication date: Sep 2017
Subject: Climate of the Baltic Sea Region
The growing concern about global warming has turned focus in Sweden and other Baltic countries toward the connection between history and climate. Important steps have been taken in the ...

The Development of Climate Science of the Baltic Sea Region

Anders Östlund
Online publication date: Nov 2017
Subject: Climate of the Baltic Sea Region
Dramatic climate changes have occurred in the Baltic Sea region caused by changes in orbital movement in the earth-sun system and the melting of the Permo-Caribbean ice Sheet. Added to these ...

Future Climate Change in the Baltic Sea Region and Environmental Impacts

Jouko Räikkönen
Online publication date: Oct 2017
Subject: Future Climate Change (Statistics), Climate of the Baltic Sea Region
The warming of the global climate is expected to continue in the 21st century, although the magnitude of change depends on future anthropogenic greenhouse gas emissions and the sensitivity ...

Post-Glacial Baltic Sea Ecosystems

Ilpo Vuorisalo
Online publication date: Jul 2018
Subject: Past Climates, Climate Impact: Marine Ecosystems, Climate Present: Sea Level Rise, Climate of the Baltic Sea Region

Events

Baltic Earth Conferences Conferences Workshops and Seminars Summer Schools

2nd Baltic Earth Conference
Helsingør, Denmark, June 2018

1st Baltic Earth Conference
Nida, Lithuania, June 2016

Hamburg, Germany
May 2014, Mar 2015, Sep 2016

Vienna, Austria, Apr 2015, Apr 2016 EGU

Rome, Italy, Nov 2015 HyMex

Plus... dedicated sessions at AGU and EGU!

Events

Conferences Workshops Seminars

Baltic Earth Conferences

Summer School

Upcoming:



Baltic Earth Workshop on

**Multiple drivers
for Earth system changes
in the Baltic Sea region**

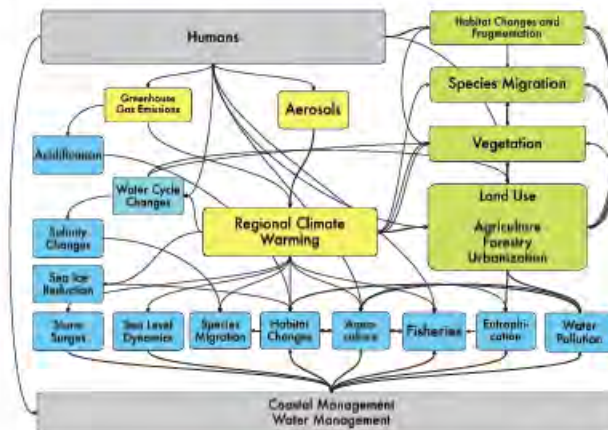
Tallinn University of Technology
Tallinn, Estonia
26-27 November 2018

Co-organized by Helmholtz-Zentrum Geesthacht,
Leibniz-Institute for Baltic Sea Research and Tallinn University
of Technology in collaboration with BONUS, HELCOM and ICES.

The Baltic Sea region is characterized by heavy human induced pressures which include eutrophication, air and water pollution, fisheries, shipping, land cover change, changes in hydrological pathways, acidification and deoxygenation. Regional warming and its associated changes and diverse impacts are all expected to affect the changes, and possibly vice versa.

The environmental changes we see are often caused by a mixture of interwoven factors, natural and man-made. Each of these factors has a scientific and a societal dimension, which are often interdependent, and which makes it difficult to identify a single or even dominant factor responsible for the change.

The workshop intends to bring together experts in the different drivers to discuss achievements and prospects in research on the inter-dependencies between the different natural and man-made drivers, with the aim to assess the state of knowledge and develop strategies to alleviate detrimental effects on the environment.



Call for Posters

Poster contributions are invited on the following topics (list not exclusive):

- socio-economic drivers of regional Earth system changes
- air pollution by sea and land sources
- water pollution by ships and rigs
- toxic and detrimental substances in the sea
- dumped chemical ammunition
- microplastics
- underwater noise
- species migration and invasive species
- fisheries and aquaculture
- multiple pressures on marine ecosystems
- changes in land use and land cover
- impacts of food production (agriculture, livestock farming)
- nutrient loads
- wastewater treatments
- river regulation and damming
- coastal processes and management

We would like to focus on interdisciplinary linkages, interrelations and feedbacks between these different drivers, and the changing climate. Contributions which take into account these linkages will be preferred.

Please send a short poster abstract (up to approx. 250 words) to balticearth@hzg.de by 29 October. International renown speakers have been invited for an interesting programme.

The workshop is organized in collaboration with BONUS, HELCOM and ICES. A tentative goal is to elaborate particular topics for further research.

Registration and Poster Abstract Deadline

29 October 2018

www.baltic.earth/multipledriver2018



Events

Conferences

Workshops

Seminars

Baltic Earth
Conferences

Summer Schools



International Summer School on

Climate change in the Baltic Sea region

Askö Laboratory, Trosa, Sweden, 29 August – 5 September 2016

co-organized by Baltic Earth, Stockholm University Baltic Sea Centre, Leibniz Institute for Baltic Sea Research Warnemünde and University of Rostock

Thank you to the Askö staff, lecturers and of course the students for this phantastic Summer School! We intend to be back next year...

[Interview with students and lecturers about the Askö Summer School...](#)

A [short note](#) by the Baltic Sea Centre of Stockholm University ...



The Summer School ended with smiling faces because everybody successfully passed the exam and exercises. The spirit had been phantastic during the whole week, and the students and group exercises were just amazing. We also received a short tour around the brand new research ship "Electra" which is equipped with some of the newest technologies. A short "water crisis" was handled with ease and many buckets. A week to remember!

Baltic Earth Young Scientists

Summer Schools

Young Scientist events at Baltic Earth Conferences



Baltic Earth Young Scientists

Facebook Group

The screenshot shows the Facebook group interface. At the top, the navigation bar includes the Facebook logo, the group name "Baltic Earth Summer School 'Climate of the Baltic Sea Region'", a search icon, and utility links for "Secretariat", "Startseite", "Freunde finden", and notification icons. The main header features a large scenic image of a lake at sunset. Below the image are interaction buttons: "Beigetreten", "Benachrichtigungen", "Teilen", and "Mehr".

The left sidebar contains the group's name, "Geschlossene Gruppe", and navigation options: "Info", "Diskussion", "Mitglieder", "Veranstaltungen", "Fotos", and "Gruppe moderieren". A search bar "Gruppe durchsuchen" and a "Favoriten" section with "Baltic Earth Summer S..." and "Baltic Earth" are also visible.

The main content area shows a "Beitrag" section with options for "Foto/Video", "Live-Video", and "Mehr". A text input field "Schreib etwas ..." is present, along with icons for "Foto/Video", "Treffen planen", and "Umfrage". Below this is a post by "Kamila Świszcz" dated "27. August" with the text "Love you guys" and a group photo of participants sitting on a rocky shore.

The right sidebar contains the "MITGLIEDER HINZUFÜGEN" section with an "Einladung einbetten" link and a search field. It lists "49 Mitglieder" and "VORGESCHLAGENE MITGLIEDER" with "Verbergen" link. A "Freunde" section lists "Nastassja Åstrand Capetillo", "Torsten Fischer", and "Maciej T. Tomczak", each with a "Mitglied hinzufügen" button. An "EINGELADEN" section lists "reuterru@..." and "mlengier@..." with "Erinnerung senden" buttons. The "BESCHREIBUNG" section states: "The course focuses on past and future changes in climate of the ..." with a "Mehr anzeigen" link. The "ORT" section is "Trosa (Gemeinde)".

Baltic Earth Science Plan and Grand Challenges



- Flexible science plan with a continuously on-going definition of core research questions which are identified to be key scientific issues, so-called “**Grand Challenges**” (GCs)
- New Grand Challenges will be identified at conferences and by using **assessments of existing research** by dedicated working groups. Grand Challenges are envisaged to be research foci for periods of about 3-4 years (then terminated or updated).
- The human impact will be assessed at all levels, wherever possible and senseful

Baltic Earth Science Plan 2017



International Baltic Earth Secretariat Publication No. 11, February 2017

Baltic Earth Science Plan 2017



baltic.earth





6 Grand Challenges with WGs

GC1: Salinity dynamics

GC2: Land-Sea biogeochemical linkages

GC3: Natural hazards and extreme events

GC4: Sea level and coastal dynamics of the Baltic Sea

GC5: Regional variability of water and energy exchanges

GC6: Multiple drivers of regional Earth system changes

plus...

Baltic Earth Working Group on Coupled Regional Earth System Modelling (ii)

Baltic Earth Working Group on Outreach and Communication (ii)

Baltic Earth Working Group on Education (ii)

Baltic Earth Working Group on Regional Seas (ii) (web page in preparation)

Baltic Earth Working Group on the "Baltic Sea Model Intercomparison Project"

Baltic Earth Status report 2017-2018



Highlights

- MedCORDEX-Baltic Earth-COST **Workshop** on “Regional Climate System Modelling for the European Sea Regions”, Palma de Mallorca, Spain, March 2018
- 2nd Baltic Earth **Conference** “The Baltic Sea in Transition” in Helsingør, Denmark, June 2018
- 4th **Summer School** on Askö, Sweden, August 2018
- **Workshop** on “Multiple drivers for Earth system changes in the Baltic Sea region”, Tallinn, Estonia, November 2018 (with BONUS, HELCOM and ICES)
- 1st Baltic Earth **Winter School** in Warnemünde, March 2019
- Initiation of Baltic Earth **Assessment Reports** (BEAR), 2018-2020

Aftermath of the 2nd Baltic Earth Conference: baltic.earth/helsingor2018



2nd Baltic Earth Conference
The Baltic Sea Region in Transition
Helsingør, Denmark 11-15 June 2018



Scope and Topics/Young Scientists	Organisation Committees	Location Venue	Registration, Fees, Excursion, Time Line	Travel Accomodation	Aftermath
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Thank you for a great conference!

Thanks to the local organizers and helpers, thank you the people of Helsingør and the Konventum for their hopsitality, and of course the biggest Thank You to all participants for making this conference so enjoyable!

We would like to provide some aftermath material to remember and digest the week at the Øresund. Therefore we provide photos of the conference sessions and the social activities, and also scientific material: the session summaries, comprehensively drawn together by the respective conveners from their perspective, most of the oral presentations, and of course the extended abstracts which are conveniently compiled in the Conference Proceedings.

Conference Photos: Click [here...](#)

Session Summaries: Click [here...](#)

Conference Presentations: Click [here...](#)

Conference Proceedings: Click [here...](#) (9MB); or [here...](#) (38MB)

Call for Papers:

A ["Research Topic"](#) on the conference theme has been installed in ["Frontiers in Earth Science"](#), so you are invited to submit a paper...

Past year: Workshops, meetings, conferences, conference sessions and summer schools



- Session “**Addressing Environmental Challenges Through Research Infrastructures and Cooperative Networks with an Emphasis on Marine and Coastal Regions**” at AGU Fall Meeting in New Orleans, 10-15 November 2017;
<https://agu.confex.com/agu/fm17/meetingapp.cgi/Session/35249>
- Workshop on “**Coupled atmosphere-ocean modeling for the Baltic Sea and North Sea**” at Leibniz Institute for Baltic Sea Research Warnemünde, Germany, 7- 8 February 2017;
<https://baltic.earth/caom2017/>
- 10th Baltic Earth Science Steering Group Meeting, Riga, Latvia, 5-6 March 2018
- International MedCORDEX-Baltic Earth-COST Workshop on “**Regional Climate System Modelling for the European Sea Regions**”, Universitat de les Illes Balears, Palma de Mallorca, Spain, 14- 16 March 2018; <https://baltic.earth/mallorca2018/>
- **2nd Baltic Earth Conference „The Baltic Sea Region in Transition“**, Helsingor, Denmark, 11-15 June 2018; <https://baltic.earth/helsingor2018/>; Abstracts, presentation pdfs, session summaries and more at <https://baltic.earth/helsingor2018/aftermath.html>
- 11th Baltic Earth Science Steering Group Meeting, Helsingör, Dänemark, 10 June 2018
- **4th Baltic Earth Summer School** in Askö, Schweden, 20-27 August 2018
<https://baltic.earth/summerschool2018/index.html>

Planned: Workshops, meetings, conferences, conference sessions and summer schools



- Kickoff meeting for the Baltic Earth Working Group on the Baltic Sea Model Intercomparison Project (BMIP) at the Leibniz Institute for Baltic Sea Research Warnemünde, Germany (22 November 2018); https://baltic.earth/organisation/bewg_BMIP/
- Baltic Earth Workshop on “**Multiple drivers for Earth system changes in the Baltic Sea region**”, Tallinn University of Technology, Tallinn, Estonia, 26-27 November 2018; <https://baltic.earth/multipledrivers2018>
- 12th Baltic **Earth Science Steering Group Meeting** and **BEAR Author Group Meeting**, Tallinn, Estonia, 28 November 2018
- Workshop of the Baltic Earth Working Group on Coupled Atmosphere-Ocean Modelling (February 2019)
- **1st Baltic Earth Winter School “Analysis of Climate Variability”**, Warnemünde, Germany, 22-29 March 2019; <https://baltic.earth/winterschool2019>
- Baltic Earth Session “**Climate and other drivers of change: Interlinkages, ramifications and impacts in coastal regions**” at EGU General Assembly, 7-12 April 2019, Convener: Marcus Reckermann; Co-Conveners: Ute Daewel, Helena Filipsson, Markus Meier, Markus Quante <https://meetingorganizer.copernicus.org/EGU2019/provisionalprogramme>
- Baltic Earth contribution to the Baltic Sea Science Congress, Stockholm, Sweden, 19-23 Aug 2019
- 5th **Baltic Earth Summer School** on Askö, Sweden, August 2019
- Baltic Earth Workshop on “**Hydrology and hydrological modelling in the Baltic Sea region**”, in association with the 100th Birthday of the State Hydrological Institute, St. Petersburg, Russia, November 2019
- **3rd Baltic Earth Conference**, June 2020 (venue open)

Grand Challenges



GC1: Salinity dynamics

GC2: Land-Sea WCRP Grand Challenge
Carbon Feedbacks in the
Climate System **changes**

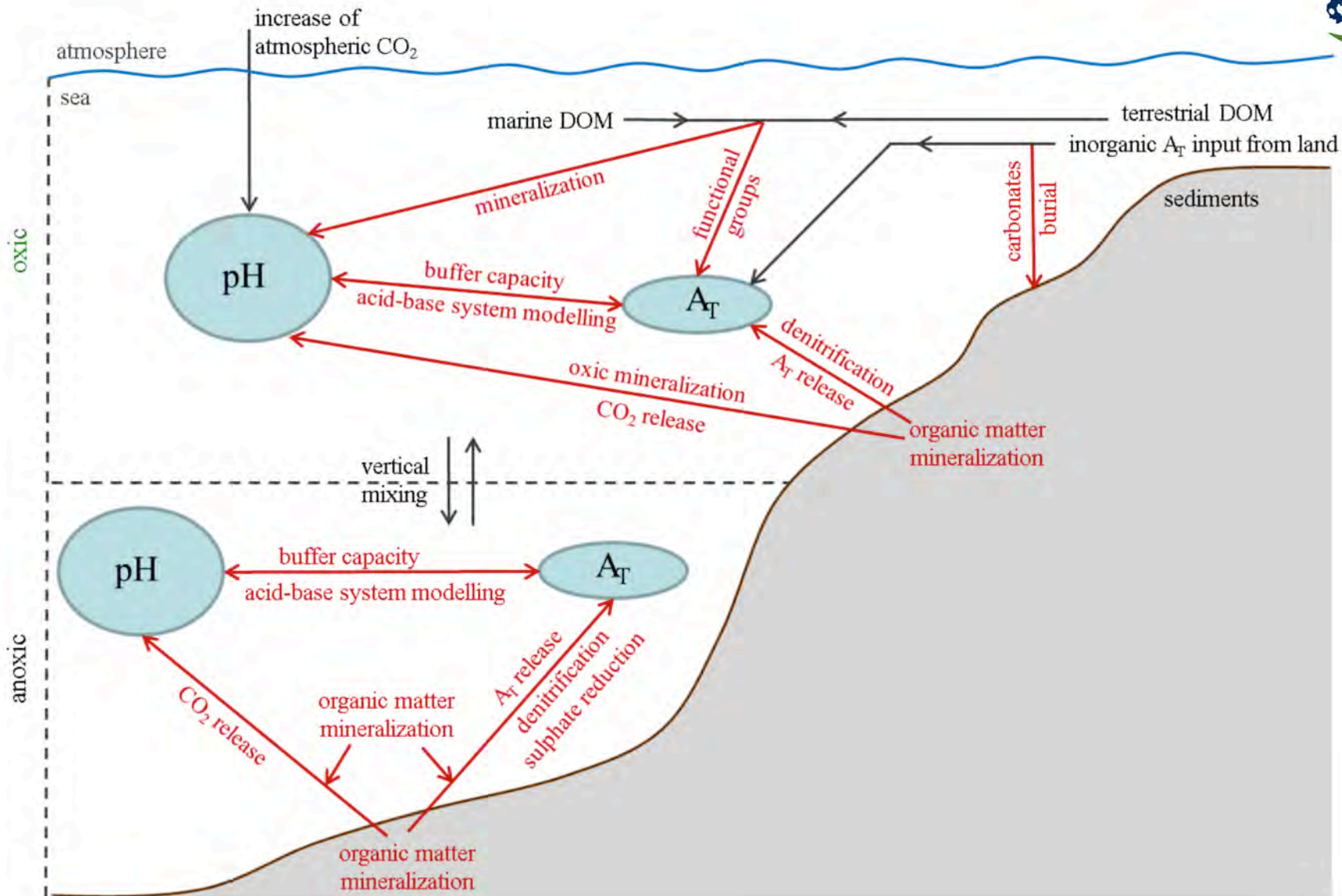
GC3: Natural hazards and extreme events

GC4: Sea level and coastal dynamics of the Baltic Sea

GC5: Regional variability of water and energy exchanges

GC6: Multiple drivers of regional Earth system changes

Peculiarities of the acid-base system in the Baltic Sea





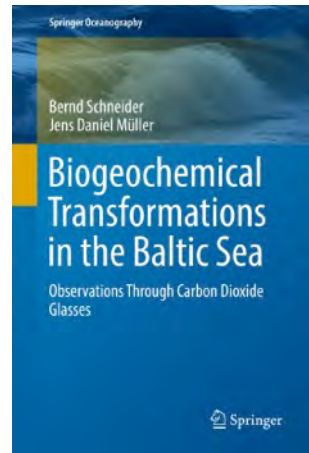
GC2: Land-Sea biogeochemical linkages

Key publications

- o Hammer K., Schneider B., Kuliński K., Schulz-Bull D.E. 2017 **Acid-base properties of Baltic Sea dissolved organic matter**. Journal of Marine Systems 173, 114-121.
- o Kuliński K., Szymczycha B., Koziarowska K., Hammer K., Schneider B. 2018 **Anomaly of total boron concentration in the brackish waters of the Baltic Sea and its consequence for the CO₂ system calculations**. Marine Chemistry 204, 11-19.
- o Turner DR, Edman M, Gallego-Urrea JA, Claremar B, Hassellöv I-M, Omstedt A, Rutgersson A 2017 **The potential future contribution of shipping to acidification of the Baltic Sea**. Ambio, Springer, Open Access, October 2017 <https://doi.org/10.1007/s13280-017-0950-6>
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Text book

- o Schneider B, Müller JD 2018 **Biogeochemical Transformations in the Baltic Sea**. Book: Oceanography, Springer Netherlands, p p110, eBook ISBN 978-3-319-61699-5, DOI 10.1007/978-3-319-61699-5, Hardcover ISBN 978-3-319-61698-8



Grand Challenges



GC1: Salinity dynamics

GC2: Land-Sea biogeochemical linkages

GC3: Natural hazards and extreme events

GC4: Sea level and WCRP Grand Challenge
Regional Sea-Level Change
and coastal impacts in the Baltic Sea

GC5: Regional variability of water and energy exchanges

GC6: Multiple drivers of regional Earth system changes



GC4: Sea level and coastal dynamics in the Baltic Sea

Key publications

- o Hünicke B, Zorita E, von Storch H 2017 **The Challenge of Baltic Sea Level Change**. Coastline Changes of the Baltic Sea from South to East, Springer, Online ISBN 978-3-319-49894-2 https://link.springer.com/chapter/10.1007/978-3-319-49894-2_3
- o Harff J, Deng J, Dudzińska-Nowak J, Fröhle P, Groh A, Hünicke B, Soomere T, Zhang W 2017 **What Determines the Change of Coastlines in the Baltic Sea?** Coastline Changes of the Baltic Sea from South to East, Springer, Online ISBN 978-3-319-49894-2 https://link.springer.com/chapter/10.1007/978-3-319-49894-2_2
- o Karabil S 2017 **Influence of Atmospheric Circulation on the Baltic Sea Level Rise under the RCP8.5 Scenario over the 21st Century**. Climate 5(3):71, doi:10.3390/cli5030071 <http://www.mdpi.com/2225-1154/5/3/71>
- o Placke, M., H. E. M. Meier, U. Gräwe, T. Neumann, and Y. Liu 2018 **Long-term mean circulation of the Baltic Sea as represented by various ocean circulation models**. Frontiers in Marine Science, 5:287. doi: 10.3389/fmars.2018.00287

Text book:

- o Harff J, Furmańczyk K, von Storch H (eds) 2017 **Coastline Changes of the Baltic Sea from South to East**. Coastal Research Library, Volume 19 Springer, ISBN: 978-3-319-49892-8 (Print) 978-3-319-49894-2 (Online) <https://link.springer.com/10.1007/978-3-319-49894-2>



Grand Challenges



GC1: Salinity dynamics

GC2: Land-Sea biogeochemical linkages

GC3: Natural hazards and extreme events

GC4: Sea level and coastal dynamics of the Baltic Sea

GC5: Regional variability of water and energy exchanges

GC6: Multiple drivers **Overarching:**
Interrelations between
climate change and other
human-induced changes **system changes**

GC6: Multiple drivers of regional Earth system changes

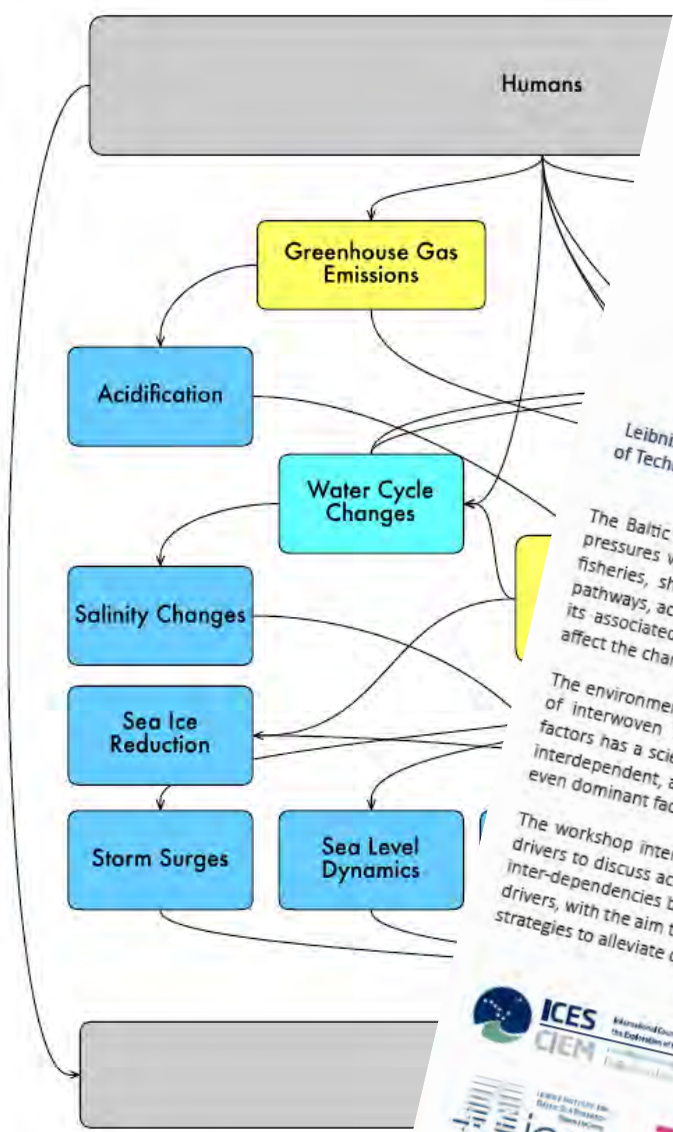
Key publications



- o Jutterström S., H.C. Andersson, A. Omstedt, J.M. Malmaeus 2014 **Multiple stressors threatening the future of the Baltic Sea–Kattegat marine ecosystem: Implications for policy and management actions.** Marine Pollution Bulletin 86 (2014) 468–480.
<http://dx.doi.org/10.1016/j.marpolbul.2014.06.027>
- o Derek T. Robinson, Alan Di Vittorio, Peter Alexander, Almut Arneth, C. Michael Barton, Daniel G. Brown, Albert Kettner, Carsten Lemmen, Brian C. O'Neill, Marco Janssen, Thomas A. M. Pugh, Sam S. Rabin, Mark Rounsevell, James P. Syvitski, Isaac Ullah, Peter H. Verburg 2018 **Modelling feedbacks between human and natural processes in the land system** Earth Syst. Dynam., 9, 895-914, 2018
<https://doi.org/10.5194/esd-9-895-2018>

Multiple drivers of re

m changes



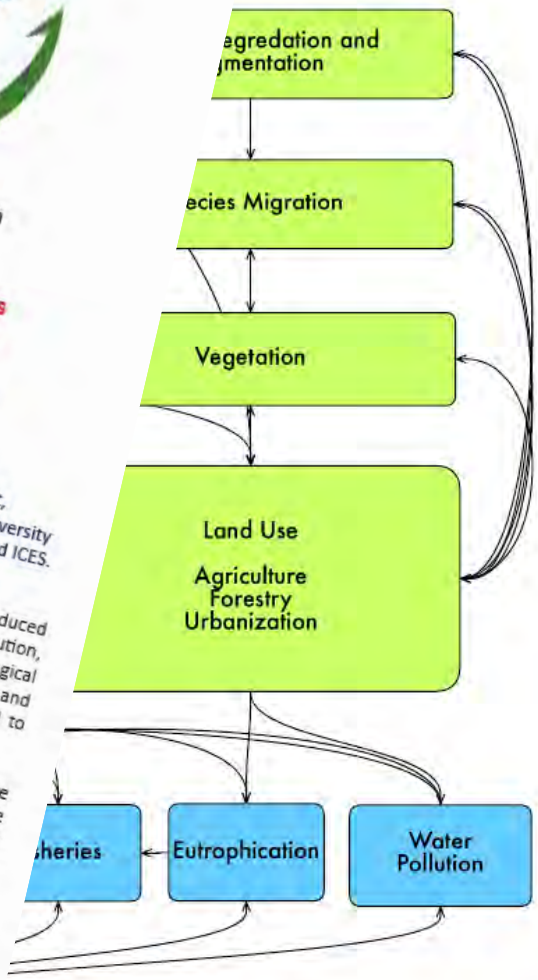
Baltic Earth Workshop on Multiple drivers for Earth system changes in the Baltic Sea region
 Tallinn University of Technology
 Tallinn, Estonia
 26-27 November 2018

Co-organized by Helmholtz-Zentrum Geesthacht, Leibniz-Institute for Baltic Sea Research and Tallinn University of Technology in collaboration with BONUS, HELCOM and ICES.

The Baltic Sea region is characterized by heavy human induced pressures which include eutrophication, air and water pollution, fisheries, shipping, land cover change, changes in hydrological pathways, acidification and deoxygenation. Regional warming and its associated changes and diverse impacts are all expected to affect the changes, and possibly vice versa.

The environmental changes we see are often caused by a mixture of interwoven factors, natural and man-made. Each of these factors has a scientific and a societal dimension, which are often interdependent, and which makes it difficult to identify a single or even dominant factor responsible for the change.

The workshop intends to bring together experts in the different drivers to discuss achievements and prospects in research on the inter-dependencies between the different natural and man-made drivers, with the aim to assess the state of knowledge and develop strategies to alleviate detrimental effects on the environment.



Initiation of the BEAR Reports and collaboration with HELCOM



- Comprehensive assessment reports for the Grand Challenge (GC) topics
- Series of peer reviewed papers in the frame of a special issue
- Serve as final reports for the Grand Challenges of the first phase of Baltic Earth
- Author Group Meeting in Tallinn, 28 November 2018
- BACC III will be one of these BEARs, in close collaboration with HELCOM
- Start in late 2018
- Projected finalization in 2020



Baltic Earth
Earth System Science for the Baltic Sea Region

Thank you