

# Baltic Earth

## Earth System Science and Outreach for the Baltic Sea Region



**Baltic Earth**  
Earth System Science for the Baltic Sea Region

### **Marcus Reckermann**

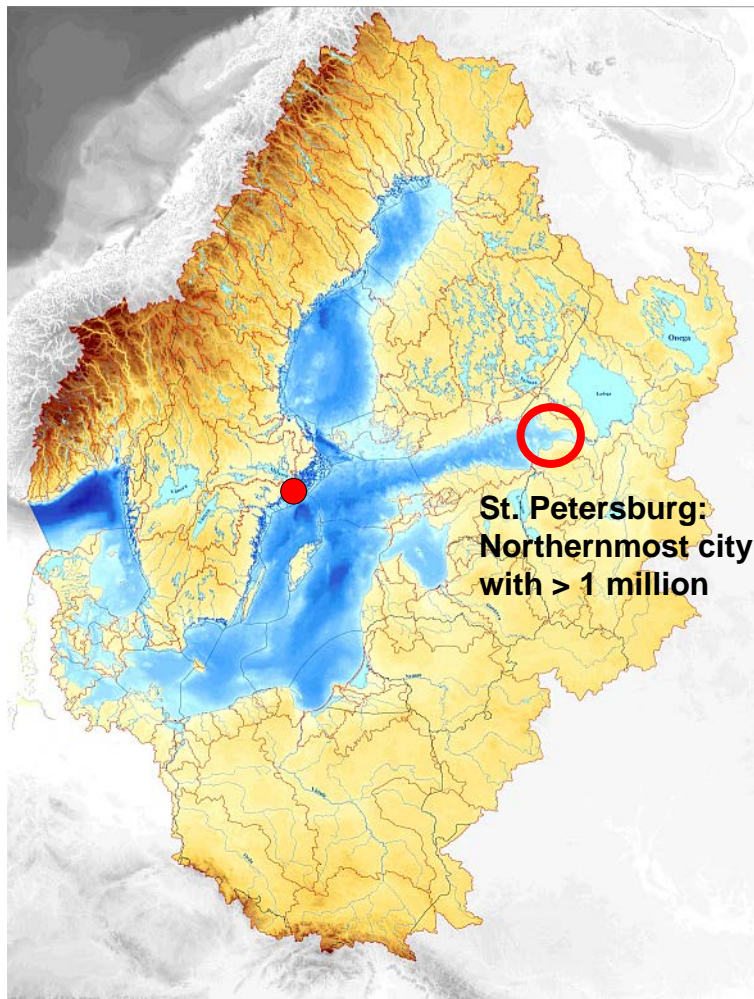
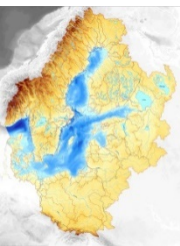
International Baltic Earth Secretariat  
Helmholtz-Zentrum Geesthacht,  
Germany

**Markus Meier, Anna Rutgersson**  
and the Baltic Earth  
Science Steering Group

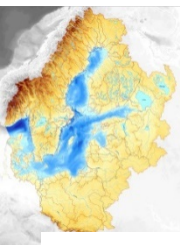
BALTEX Science Steering Group members  
BACC Science Steering Group members  
BACC II Science Steering Group members



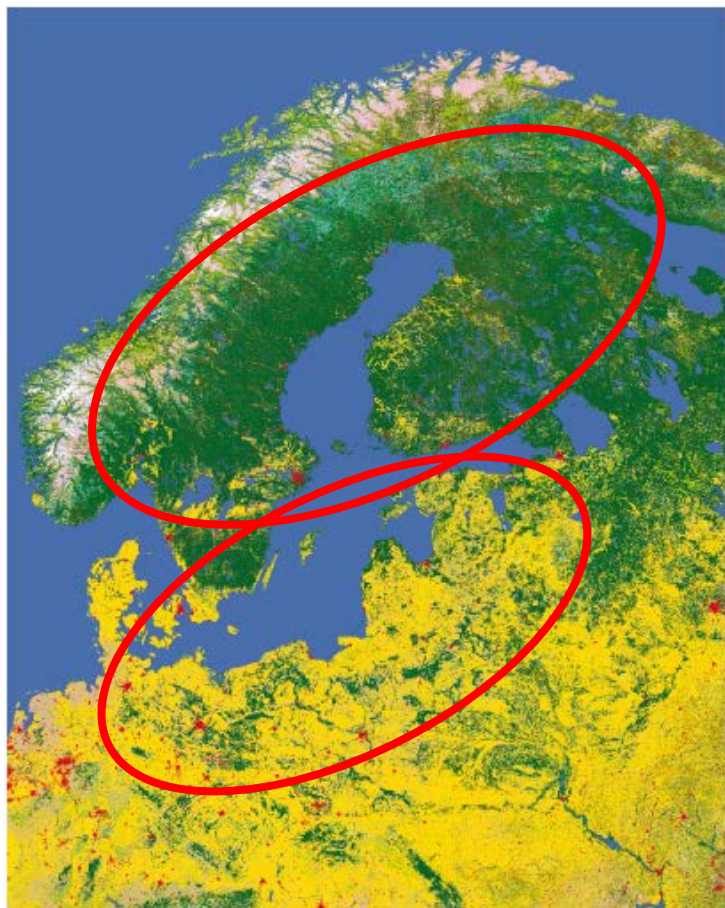
## The Baltic Sea region



- Drainage Basin: 2.13 Mill. km<sup>2</sup>  
(20% of the European continent)
- 85 million people in 14 countries
- Baltic Sea: 380 000 km<sup>2</sup>



## The Baltic Sea region



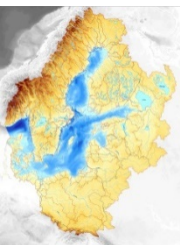
### The North ...

- 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





# The Baltic Sea – Horizontal salinity gradient

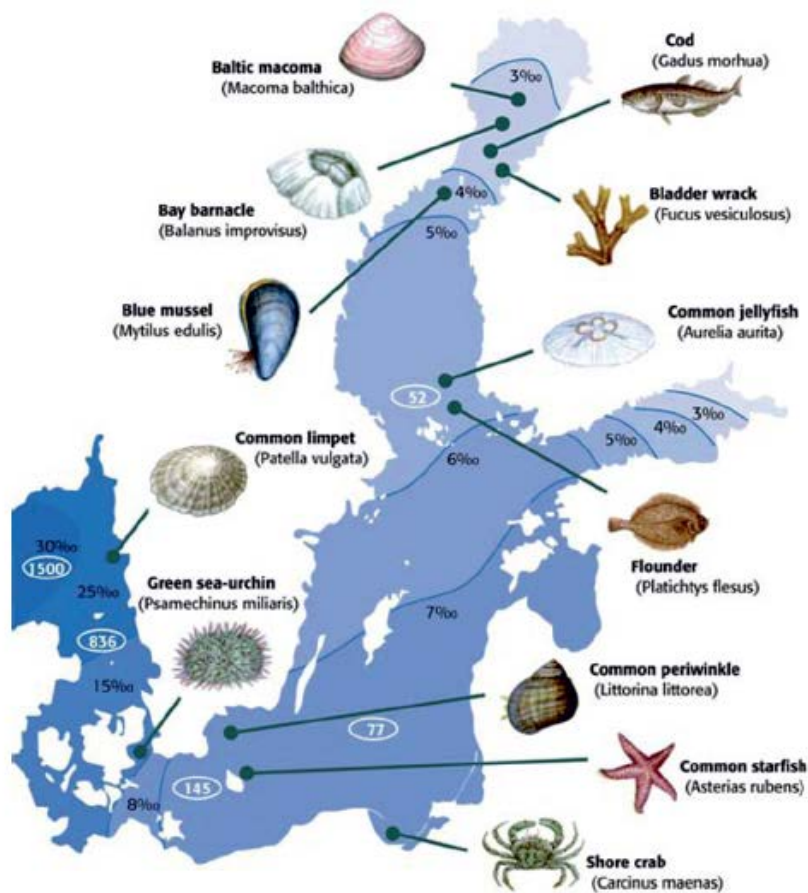
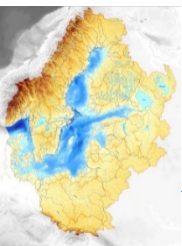


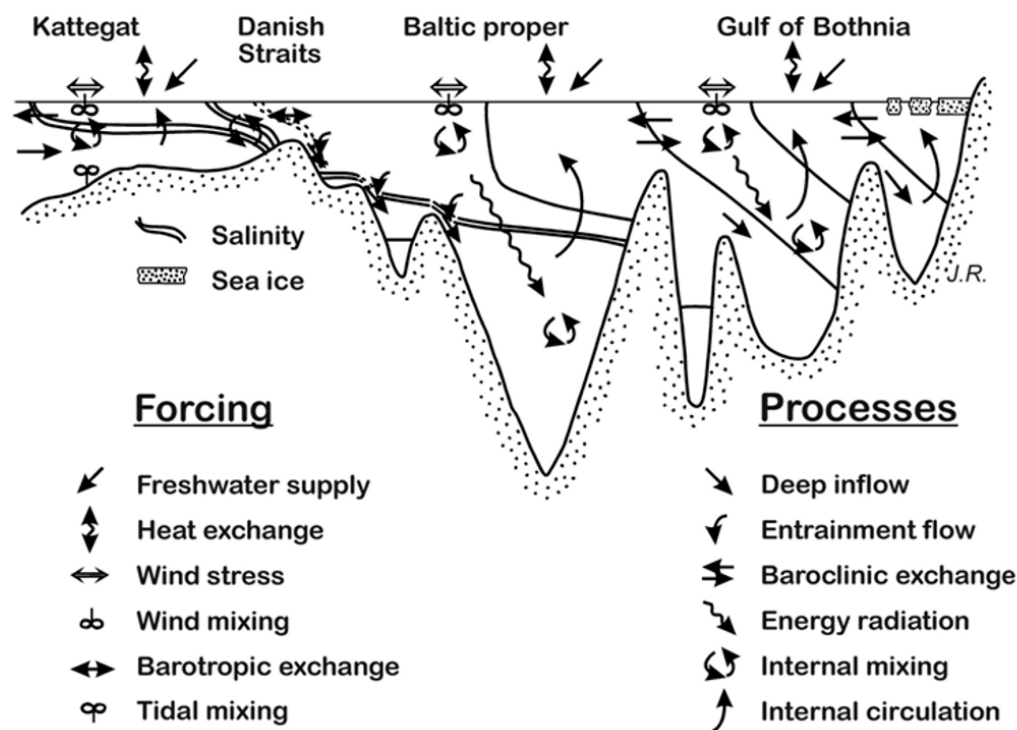
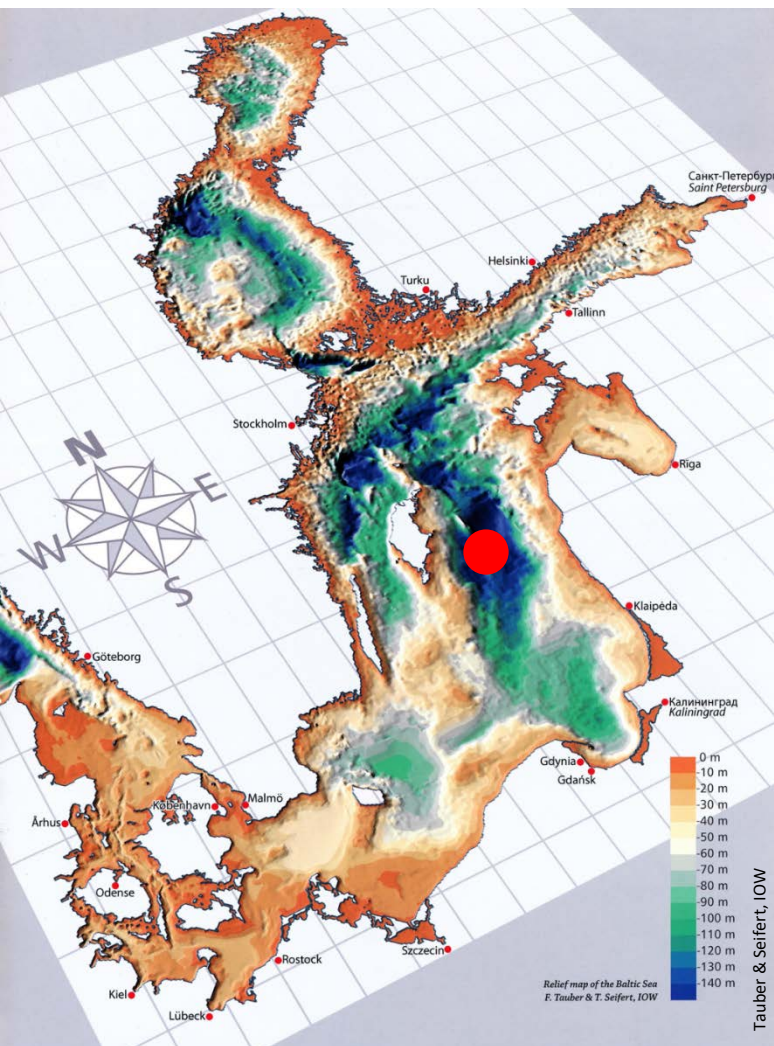
Fig. 1.12. Illustration of how salinity affects biodiversity in the Baltic Sea. The numbers in circles indicate the number of marine macrofauna species found in the area (Figure by Prof. B-O Jansson, Stockholm Marine Research Centre, Stockholm University)

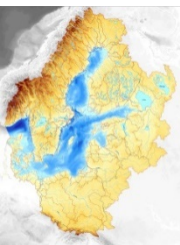


# The Baltic Sea

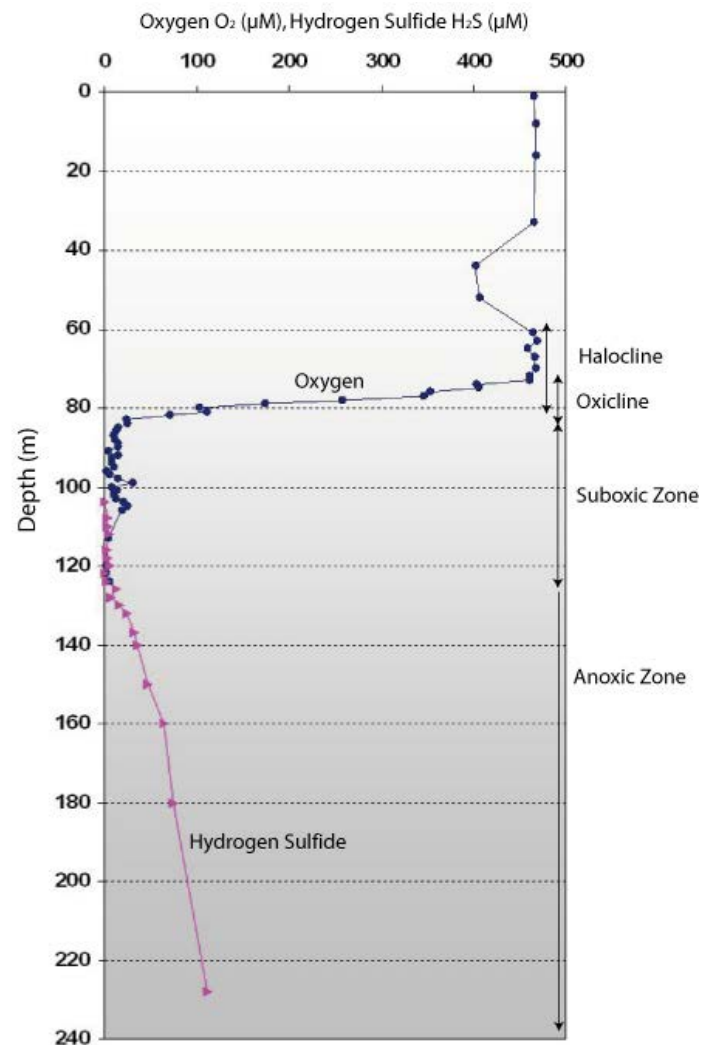
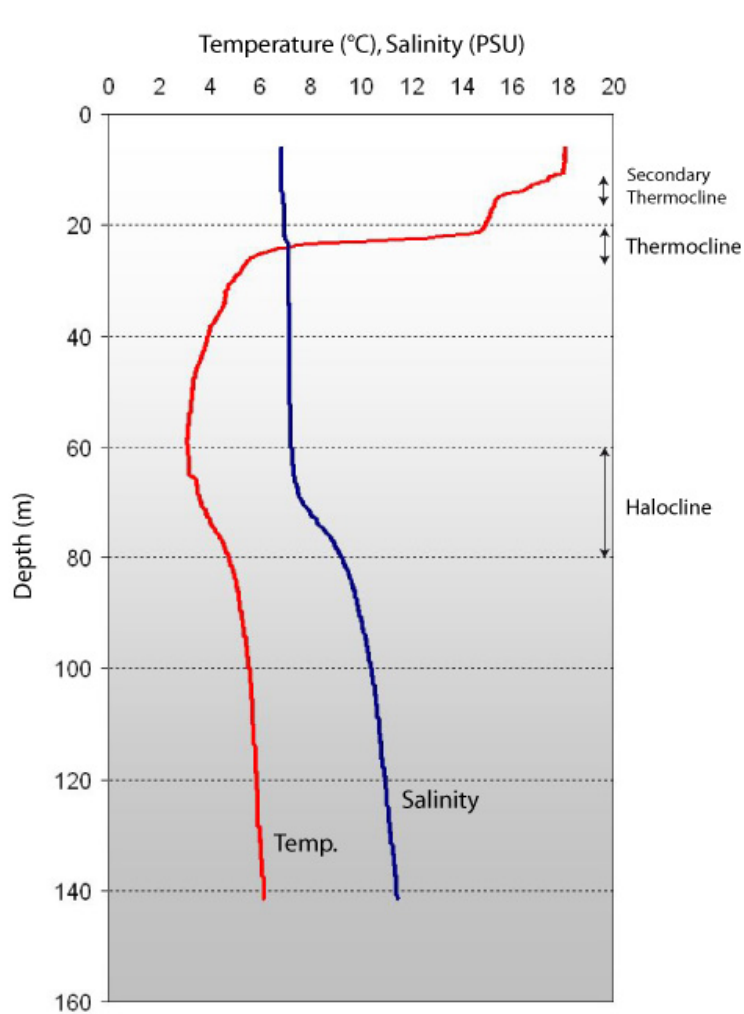


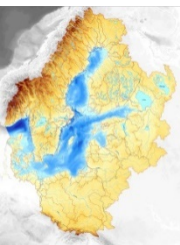
## Sills and basins determine the water exchange and eventually the biogeochemistry of the Baltic Sea



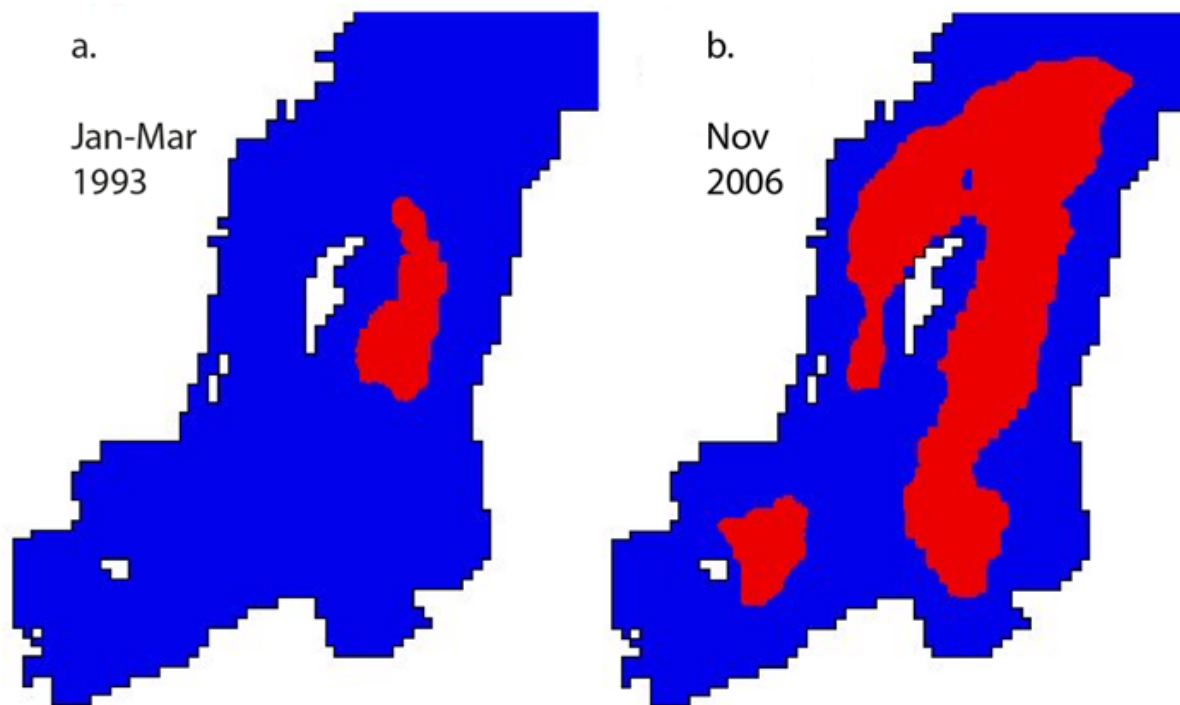


# The Baltic Sea – Vertical stratification

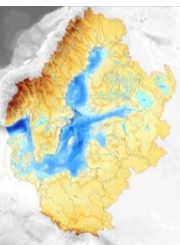




## The Baltic Sea – Hypoxic and anoxic bottom waters



**Fig. 18.8** Sediment area (red) covered by hypoxic waters containing less than  $2 \text{ mL L}^{-1}$  dissolved oxygen: (a) at the end of a long-lasting stagnation period in 1993 ( $11,050 \text{ km}^2$ ) and (b) in 2006 subsequent to some inflow events ( $67,700 \text{ km}^2$ ) (Conley et al. 2009a)



## The Baltic Sea- Major Baltic Inflows – Saltwater intrusions

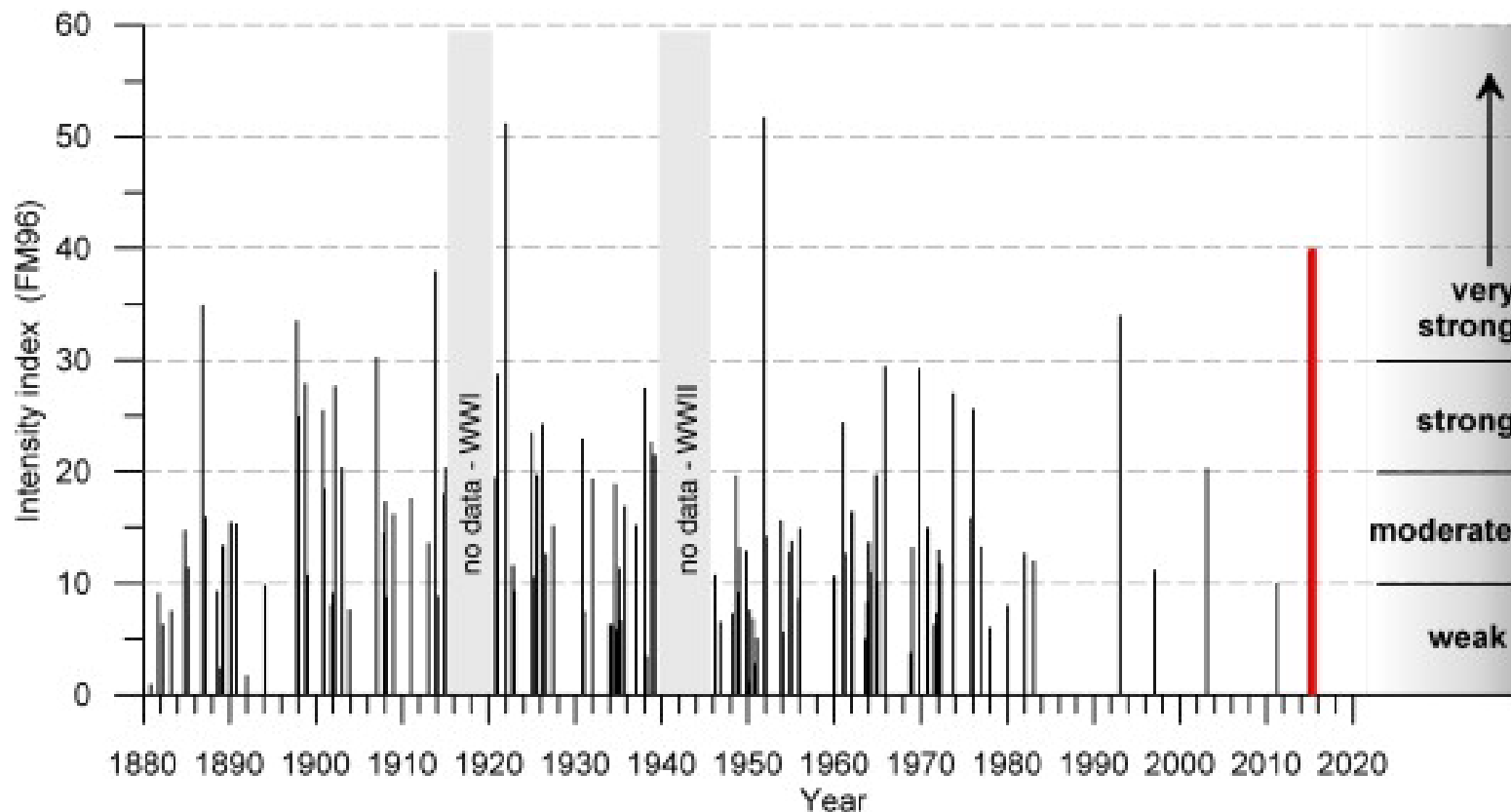
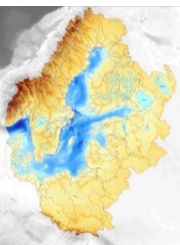


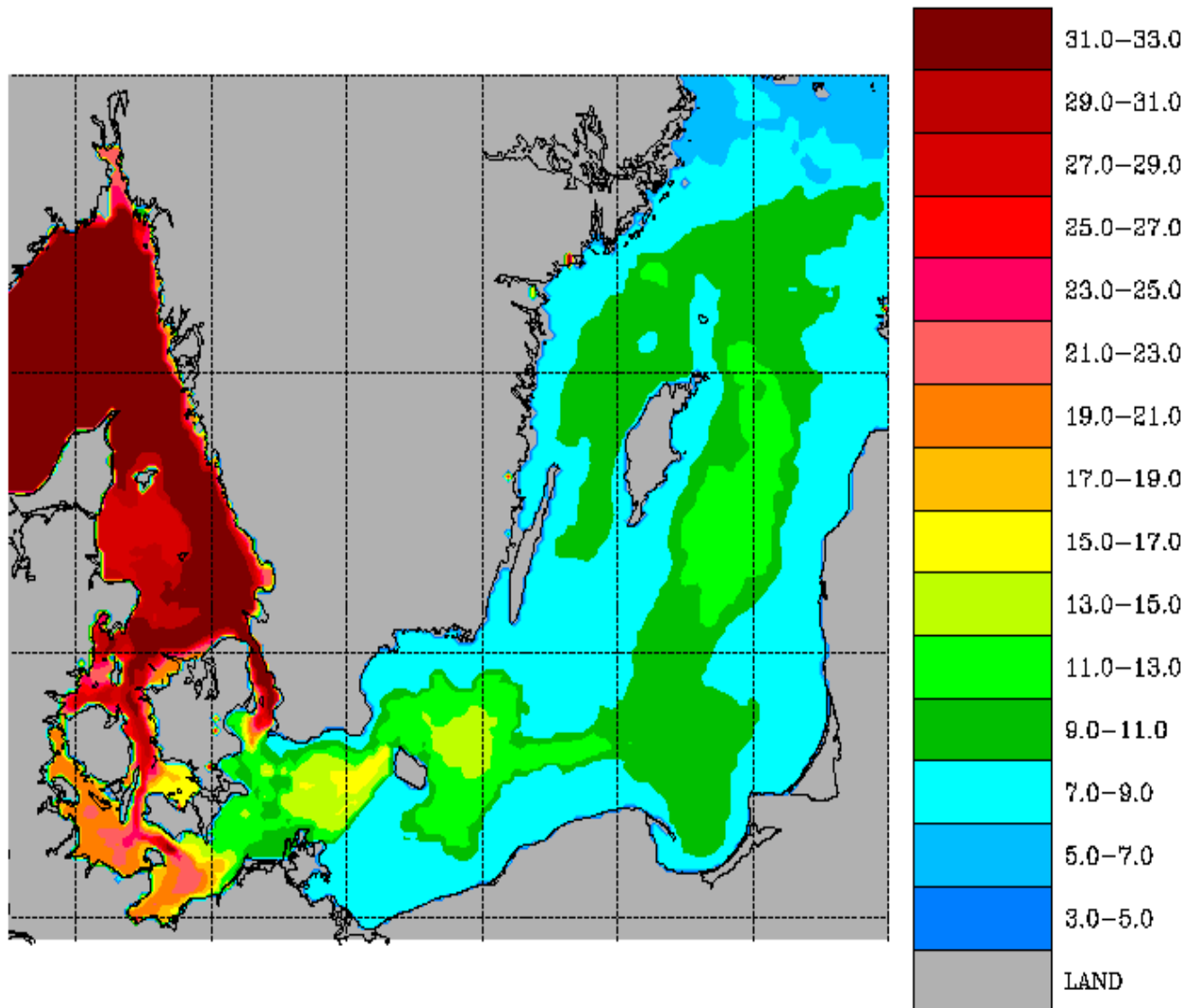
Fig. 16. Intensity index FM96 (Eq. (2)) of MBIs for the period 1880 to 2014 (extended after Matthäus et al., 2008; data from Feistel et al., 2008).

From: Mohrholz et al. 2015 Fresh oxygen for the Baltic Sea — An exceptional saline inflow after a decade of stagnation *Journal of Marine Systems* 148, pp152–166





# The Baltic Sea- Major Baltic Inflows – Saltwater intrusions

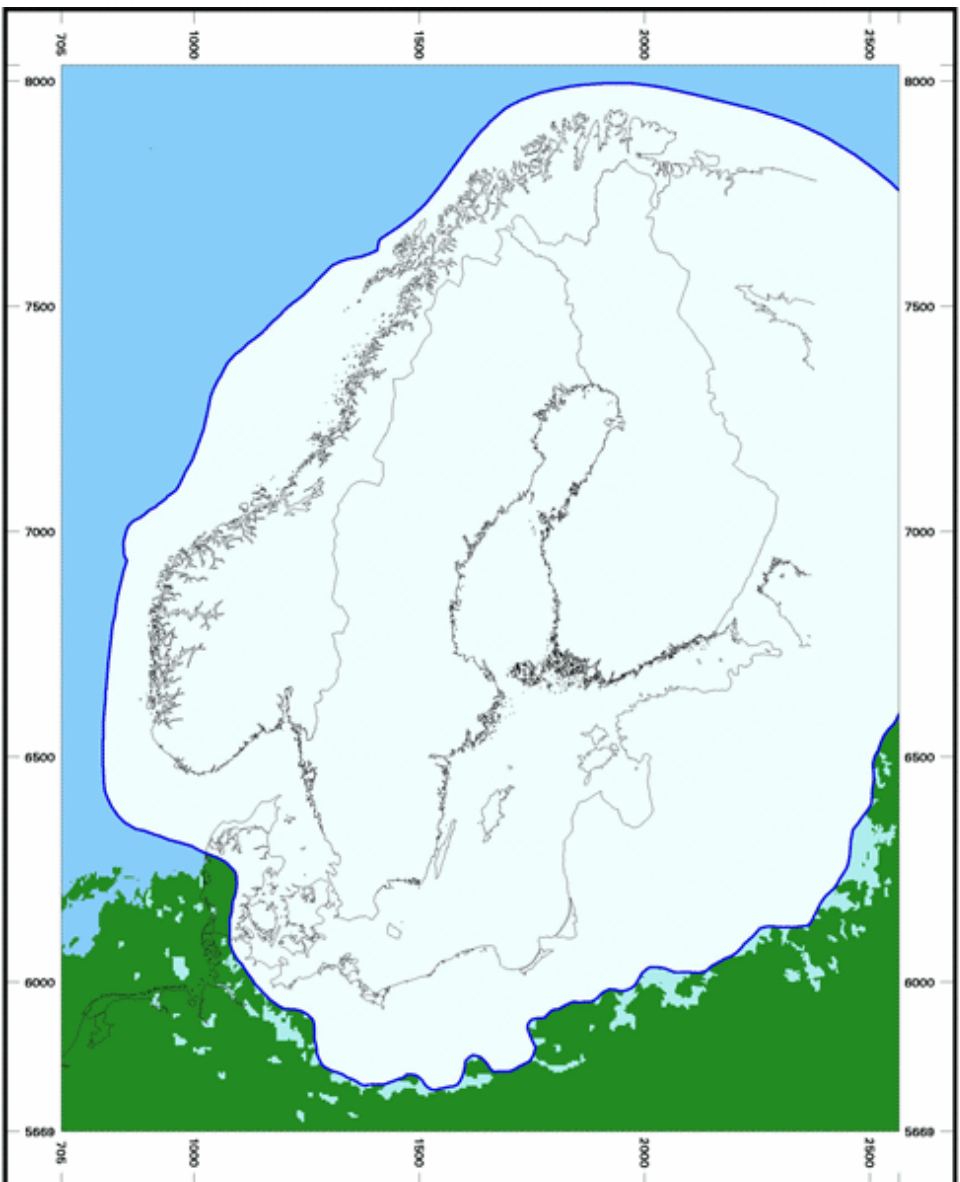


Andreas Lehmann, IfM GEOMAR



## Glacier melt and land uplift

Regional sea level change  
since 19.000 before present



© Sveriges Geologiska Undersökning (SGU), 2000

digital bearbetning Leif Andersson, SGU: 16-FEB-2006



-108.4 – 573.2 meters  
above present sealevel  
eustasi -111.2 baltic level 0 m

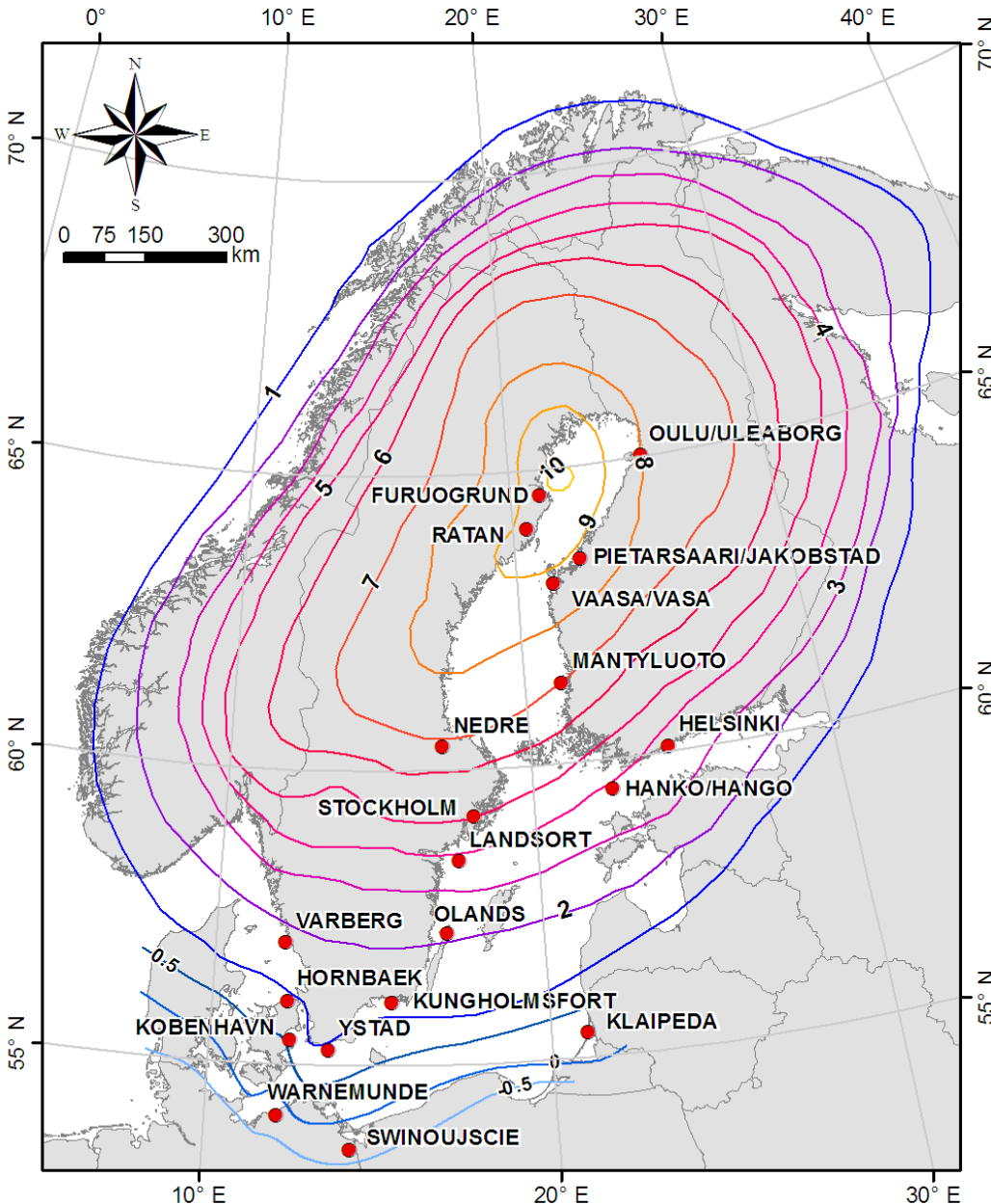
19000 CalBP

17050 CalBC





## Land uplift



## Global Sea Level Rise

Rate during 1901-1990 was  
**1.5 [1.3 to 1.7] mm yr<sup>-1</sup>**

Rate during 1993-2010 was  
**3.2 [2.8 to 3.6] mm yr<sup>-1</sup>**

Expansion + glaciers can  
account for most of this.  
Consistent with the sum of  
the observed contributions  
(high confidence)

From: Climate Change 2013: The  
Physical Basis, IPCC 2013

# Baltic Earth -

## Earth system science for the Baltic Sea region



# 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 7<sup>th</sup> Study Conference on BALTEX, Borgholm, Öland, Sweden, 10-14 June 2013



**BALTEX Phase I: 1993-2002 (Meteorology, Hydrology, Oceanography)**  
**BALTEX Phase II: 2003 - 2012: Second 10 year Phase**

**BALTEX Phase II** has evolved into an **environmental research network** dealing with the **Earth system of the entire Baltic Sea catchment** including terrestrial and marine biogeochemical cycles

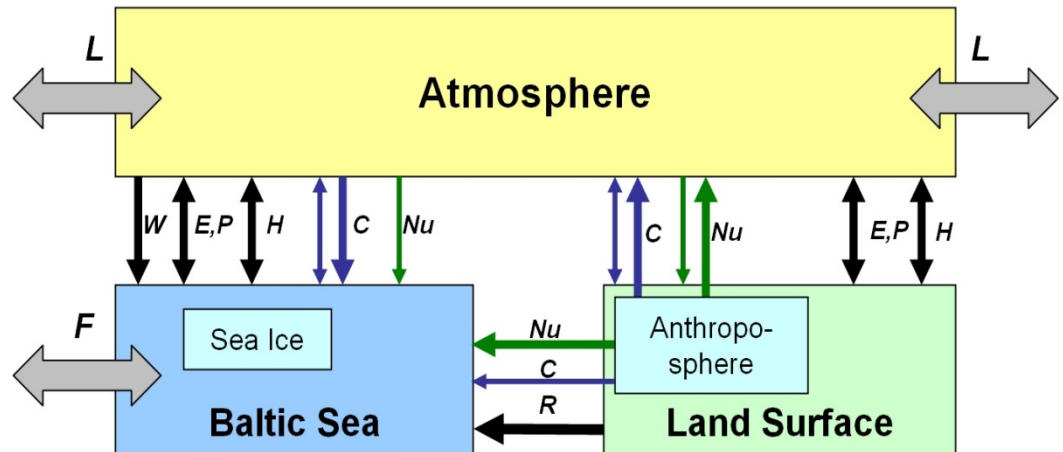
**Scientific disciplines (in Phase II):**

- Meteorology
- Hydrology
- Climatology
- Oceanography
- Biogeochemistry

Important elements are

**Climate variability and change**

and related impacts on the environment and the human sphere



**BALTEX Assessment of Climate Change for the Baltic Sea basin (BACC, BACC II)**



- **International Baltic Earth Secretariat**  
at Helmholtz Zentrum Geesthacht
- **Baltic Earth Science Steering Group (BESSG)** Excellent, active “young” scientists; country balance, gender balance, discipline balance, institutional balance, currently 19 members; meetings biannually
- **Working Groups** installed for each GC plus
  - WG on Outreach and Communication
  - WG on Education
  - WG on the Utility of Regional Climate Models WG on the Assessment of Scenario Simulations for the Baltic Sea 1960-2100
- **Senior Advisory Board**
- **Science Plan**
- **Website, social media**
- **Publication series, Newsletter**
- **Publication database**

# Baltic Earth SSG members



**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 Rander**  
Germany



**Marcus Reckermann**  
Germany



**Ralf Weisse**  
Germany

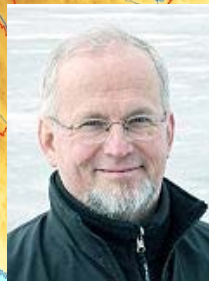


**Franz Berger**  
Germany



**Karol Kulinski**  
Poland

# Baltic Earth Advisory Board



**Anders Omstedt**  
Sweden



**Andris Andrusaitis**  
BONUS



**Jannica Hadlin**  
HELCOM



**Valery Vuglinsky**  
Russia



**Fritz Köster**  
Denmark



**Jüri Elken**  
Estonia



**Sirje Keevallik**  
Estonia



**Hans von Storch**  
Germany



**Joan Cuxart**  
GEWEX



**Kay Emeis**  
Germany



**Hans-Jörg Isemer**  
Germany





# 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](#)

## Publications

## Website etc.

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.

## Events

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.

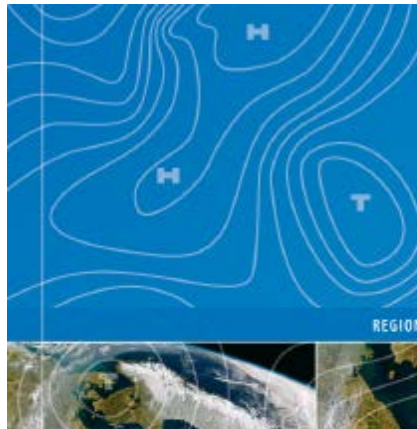
Infrastructure

Secretariat

Publications

Website etc.

Events



Baltic Sea Environment Proceedings No. 111

### Climate Change the Baltic Sea Area

HELCOM Thematic Assessment in



### Ostseeküste im Klimawandel

Ein Handbuch zum Forschungsstand

Eos, Vol. 95, No. 13, 1 April 2014



The BACC II Author Team

Helsinki Commission  
Baltic Marine Environment Protection Commission



VOLUME 95 NUMBER 13  
1 April 2014  
PAGES 109–116

### An Earth System Science Program for the Baltic Sea Region

PAGES 109–110

From Russia in the east to Sweden, Denmark, and Germany in the west, reaching south to the tips of the Czech Republic, Slovakia, and Ukraine, the Baltic Sea watershed drains nearly 20% of Europe (see Figure 1). In the highly populated south, the temperate climate hosts intensive agriculture and industry. In the north, the landscape is boreal and rural. In the Baltic Sea itself, complex bathymetry and stratification patterns as well as extended hypoxic and anoxic deep waters add to the diversity. Yet in recent history, the differences across the Baltic Sea region have been more than physical: in the mid-20th century, the watershed was split in two.

The rise of the Iron Curtain in the wake of World War II had a tremendous effect on the exchange of scientific information in the region, driving a wedge through a mature research community and a strong scientific infrastructure. Building on this pre-Cold War history, soon after the Berlin Wall fell, the Baltic Sea Experiment (BALTEX) began, a project intended to promote research and outreach activities concerning the meteorology, hydrology, oceanography, regional climatology, and, in its latter phase, biogeochemistry of the Baltic Sea region. This project, in turn, helped reforge the connections between the research communities from the east and the west.

Now, after 20 years of successful research networking, BALTEX (1990–2013) has been succeeded by Baltic Earth, an expanded program with a revised focus on Earth system science. Re-launched in June 2013, Baltic Earth is inviting interested scientists to collaborate and contribute to its implementation.

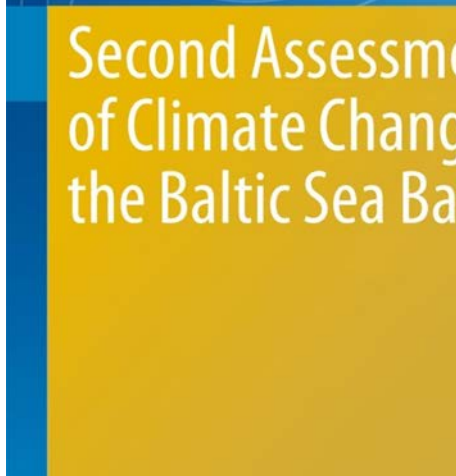
*Baltic Earth and the Legacy of BALTEX*

Although Baltic Earth will face new challenges, it has been given a head start by an

heriting the BALTEX network of people and institutions, its infrastructure, including the BALTEX secretariat, conferences, workshops, and publication series; and its scientific legacy [Reckermann et al., 2011, and references therein]. Like its progenitor, Baltic Earth aims to contribute to the understanding of regional energy, water, and matter fluxes and their effects on the regional climate. Thus, the vision of Baltic Earth is to achieve an improved Earth system understanding of the Baltic Sea region, with a more holistic view that encompasses processes in the atmosphere, land, sea, and anthroposphere.

From its very beginning, BALTEX had been part of and contributed to the Global Energy and Water Exchanges Project (GEWEX), within the World Climate Research Programme (WCRP), and Baltic Earth will continue this legacy.

In the coming years, the efforts of Baltic Earth will be guided by specific grand challenges defined by the program that pose major interdisciplinary research questions that studies of the Baltic Sea region can help answer. Thematic assessments of particular research topics compiled by expert groups, such as the BALTEX Assessment of Climate Change for the Baltic Sea Basin (BACC), <http://www.baltic-earth.eu/BACC2> [see Reckermann et al., 2008] will help Baltic Earth scientists identify gaps in current knowledge and will guide the development plans to address these grand challenges.



Baltic Sea Environment Proceedings

### Climate change in the Baltic Sea HELCOM thematic assessment



Helsinki Commission  
Baltic Marine Environment Protection Commission

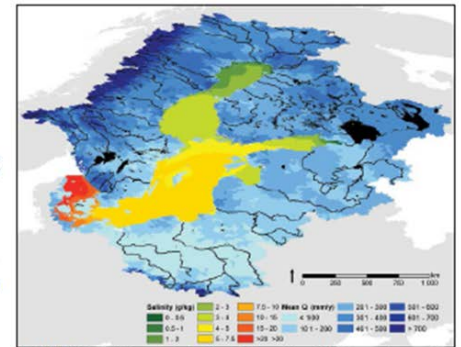


Fig. 1. The Baltic Sea drainage basin together with the spatial variability in annual mean water discharge (Q) calculated with the Hydrological Predictions for the Environment (HP2E) model [Arheimer et al., 2012] and with annual mean sea surface salinity in the Baltic Sea. This salinity diagram shows the gradient from high (red) to low (green) salinity, calculated with the Rostky Centre Ocean model [Meier et al., 2012]. Courtesy of René Caplan. © Helmholtz-Zentrum Geesthacht



# Baltic Earth

Earth System Science for the Baltic Sea Region

Secretariat

Publications

Website

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[1st Baltic Earth Conference: Multiple drivers for 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

### Compilation of BALTEX

Website

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

- Name, initial/co-authors: initial, family name also
- E-mail address of first author
- Journal name, volume number, pages
- Year of publication
- Keywords - maximum 5
- Abstract (in English)

**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](#).

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## Publications

[International Baltic Earth Secretariat Publication Series](#)

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[Baltic Earth Newsletter](#)

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programmes objectives of programme are continuously updated on the BALTEX™ or

[Baltic Earth](#)

server of the Helmholtz-Zentrum Geesthacht. For security reasons visitors are advised to login by [Silke Köppen at the Baltic Earth](#)



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**1<sup>st</sup> Baltic Earth Conference**  
**Multiple drivers for Earth 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

### Announcements



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

Baltic Earth stands for the vision to achieve an improved Earth system understanding. Research disciplines of BALTEX continue to be relevant, but a more holistic approach is needed. This means that the research disciplines of BALTEX continue to be relevant, but a more holistic approach is needed. This means that the research disciplines of BALTEX continue to be relevant, but a more holistic approach is needed. This means that the research disciplines of BALTEX continue to be relevant, but a more holistic approach is needed.

A science plan is currently being developed. A science plan is currently being developed. A science plan is currently being developed. A science plan is currently being developed. A science plan is currently being developed.

### NEWS

 **Baltic Earth Seminar at Fehmarnbelt Days 2016 "Exchanges between the North and Baltic Seas - A scientific overview".**  
 Presentations online [here...](#)

 **North Sea Climate Change Assessment now online available as Open Access! Congratulations for this tremendous effort!**

**Interview with students and lecturers about the Askö Summer School...**  
 A short note by the Baltic Sea Centre of Stockholm University ...

### Assessment Report of the Gulf of Finland published

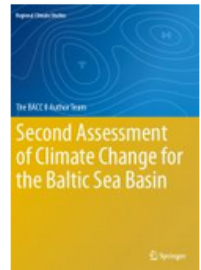


The Finnish Environment Institute SYKE has published an assessment of the Gulf of Finland, compiling the research results of over a hundred Finnish, Russian and Estonian researchers. The over 300-page publication includes recent information on issues such as eutrophication, hazardous substances, invasive species, noise, maritime traffic, and plastic waste. The publication is the most important result of the Gulf of Finland Year arranged by the countries. The publication includes for

### Upcoming Events

For past events look [here...](#)

### The BACC Blog



**BACC I (2008) download**



Infrastructure

Secretariat

Publications

Website etc.

Events

## The BACC Blog

Regional Climate Change in the Baltic Sea region and its impacts on marine and terrestrial environments

[www.baltic-earth.eu/BACC2/](http://www.baltic-earth.eu/BACC2/)

TUESDAY, 30 AUGUST 2016

### Baltic Earth Summer School on "Climate change in the Baltic Sea region"



20 students from 6 countries from around the Baltic Sea have gathered on the beautiful Swedish island of Askö for the third Baltic Earth summer school. After a rainy start, the sun is out and everybody is in good spirits for the days to come. Coming from an interdisciplinary mix of backgrounds (meteorology, oceanography, geography, social science, coastal engineering), the Master and PhD students will learn about the state of the art of climate and climate change research in the Baltic Sea region. Seven lectures will cover all aspects of climate change in the Baltic Sea region. Course coordinators are Markus Meier from the Leibniz Institute for Baltic Sea Research Warnemünde and Marcus Reckermann from the International Baltic Earth Secretariat at Helmholtz-Zentrum Geesthacht. The summer school is also co-organized by the Universities of Rostock and Stockholm. More at <http://www.baltic-earth.eu/summerschool2016/>

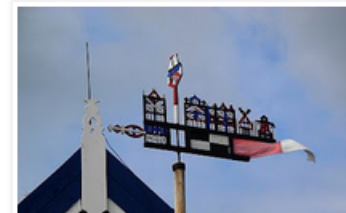


Posted by Marcus Reckermann at 17:35 No comments.

TUESDAY, 8 DECEMBER 2015

### 1st Baltic Earth Conference, Nida, Lithuania, 13-17 June 2016: Call for Papers open!

One important outcome of the BACC II book has been the understanding that the observed environmental changes are often caused by a mixture of interwoven factors, among them 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 which makes the identification of a single, or even dominant factor responsible for the change difficult.



The scope of this first Baltic Earth Conference 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

THE BACC II BOOK (2015)



THE BACC BOOK (2008)



HOW TO USE THIS BLOG

BACC I and BACC II Lead Authors and SSC members have the right to submit postings, i.e. to begin new threads. Anyone can respond and comment. Just click on the comment line. Postings may also be sent to Marcus Reckermann and Hans von Storch and will be posted with a short delay.

Please follow the common netiquette rules, i.e. refrain from insulting language, but be to the point. Please give your name or use an alias - comments from "anonymous" should be avoided.

BACCGROUND

The BACC Blog is an open platform to exchange views and comments about the BACC project (BALTEX and Baltic Earth Assessment of Climate Change for the Baltic Sea Basin).

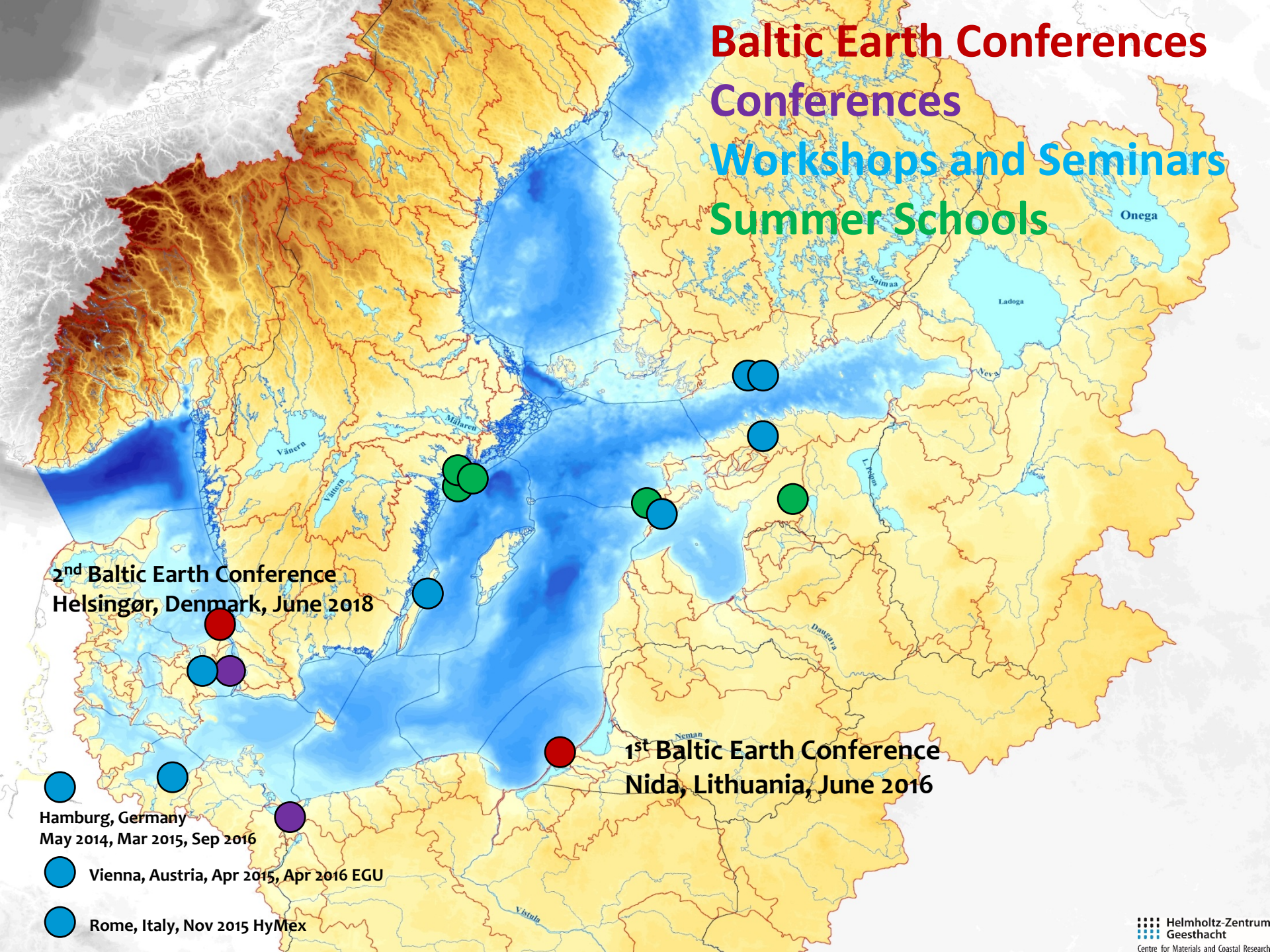
The regional climate change assessment report for the Baltic Sea basin was published in January 2008 (BACC Author Team, 2008). The assessment is an example for a type of urgently needed reports helping to put global climate change (as portrayed e.g. by the IPCC reports) into a regional perspective, which local stakeholders and politicians can relate to. The so called BACC (BALTEX Assessment of Climate Change for the Baltic Sea Basin) report was compiled by a consortium of 84 scientists from 13 countries around the Baltic Sea and covers various disciplines related to climate research and ecological impacts. The book is divided in chapters on past and current climate change, on projected future anthropogenic climate change, and on observed and projected impacts on terrestrial and marine ecosystems. Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research

# Baltic Earth Conferences

## Conferences

### Workshops and Seminars

### Summer Schools



**2<sup>nd</sup> Baltic Earth Conference**  
Helsingør, Denmark, June 2018

**1<sup>st</sup> 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

## Events

### Summer Schools



### Workshops and Seminars

International advanced PhD course on

**Impact of climate change  
on the marine environment  
with special focus  
on the role of changing extremes**

co-organized by the  
"Baltic Ecosystem Adaptive Management" (BEAM) and Baltic  
Earth programmes and funded by BEAM



**Askö Laboratory, Trosa, Sweden**

**24 - 30 August 2015**

A Doctoral Students Conference

**Challenges for Earth system science  
in the Baltic Sea region:  
From measurements to models**

co-organized by the  
the University of Tartu and Baltic Earth



**University of Tartu and Vilsandi Island  
Estonia**

**10 - 14 August 2015**



## Events

### Summer Schools

### Workshops and Seminars

### Topical Conferences

### Baltic Earth Conferences



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!



## Events

Summer Schools

Workshops and Seminars

Topical Conferences

Baltic Earth Conferences



FINNISH METEOROLOGICAL INSTITUTE



Baltic Earth

Baltic Earth Workshop on

**Natural hazards and extreme events in the Baltic Sea region**

Finnish Meteorological Institute, Dynamicum, Helsinki

30-31 January 2014



S Y K E



Baltic Earth  
Earth System Science for the Baltic Sea Region



Gulf of Finland  
Year 2014

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Baltic Earth - Gulf of Finland Year 2014 Modelling Workshop on

**Using modelling as a tool to ensure sustainable development of the Gulf of Finland-Baltic Sea ecosystem**

A scientific workshop in support of the Gulf of Finland Declaration

Finnish Environment Institute (SYKE), Helsinki 24-25 November 2014



GULF OF FINLAND



Gulf of Finland  
Year 2014



Baltic Earth

An open Baltic Earth PhD seminar in connection to the Gulf of Finland Final Scientific Forum

**Exchange processes between the Gulf of Finland and other Baltic Sea basins**

Tallinn, Estonia, 19 November 2015



Helmholtz-Zentrum  
Geesthacht  
Centre for Materials and Coastal Research

## Events

Summer Schools

Workshops and Seminars

Topical Conferences

Baltic Earth Conferences



**Baltic Earth**  
Earth System Science for the Baltic Sea Region

**Climate modelling and impacts  
from the global to the regional  
to the urban scale**

An international scientific seminar

10 March 2015

Holcim Auditorium  
HafenCity Universität

Überseeallee 16, 20457 Hamburg, Germany

Scope of the seminar is to give an overview over the current state of research in the fields of global and regional climate modelling, and the impacts on the regional and urban scales.

Posters related to the seminar topic are invited to be presented. Poster abstract and registration deadline is 2 March 2015. There are no fees involved.

This open seminar is organised in connection with the 4<sup>th</sup> Baltic Earth Science Steering Group Meeting by the International Baltic Earth Secretariat at Helmholtz-Zentrum Geesthacht in cooperation with HafenCity Universität Hamburg (HCU) and the Cluster of Excellence CliSAP of Hamburg University, which stands for „Integrated Climate System Analysis and Prediction“.

Baltic Earth is the research network for Earth system science in the Baltic Sea region. [www.baltic-earth.eu](http://www.baltic-earth.eu)

**HCU** HafenCity Universität  
Hamburg

**U+H**  
Universität Hamburg  
DER FORSCHUNG | DER LÖHRE | DER BILDUNG

**DKRZ**  
DEUTSCHES  
KLIMARECHENZENTRUM

**clisap**

Max-Planck-Institut  
für Meteorologie

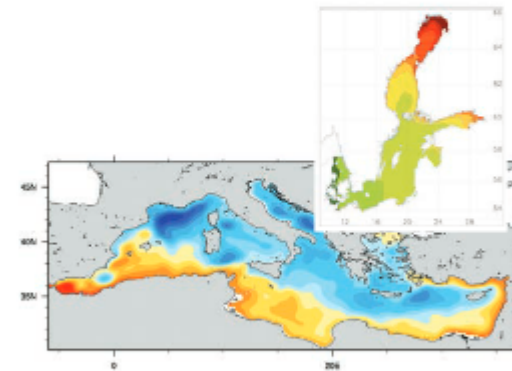
**Helmholtz-Zentrum  
Geesthacht**  
Zentrum für Material- und Küstenforschung

A joint  
**HyMeX-Baltic Earth**  
Workshop

**HyMeX**



**Joint regional climate system  
modelling for the  
European sea regions**



**ENEA**  
Rome, Italy  
5-6 November 2015

**Announcement  
and Call for Papers**



## Events

Summer Schools

Workshops and  
Seminars

Topical Conferences

Baltic Earth  
Conferences

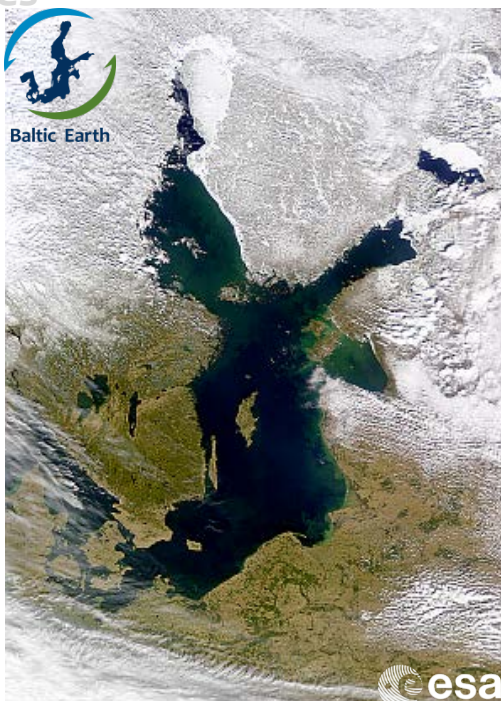
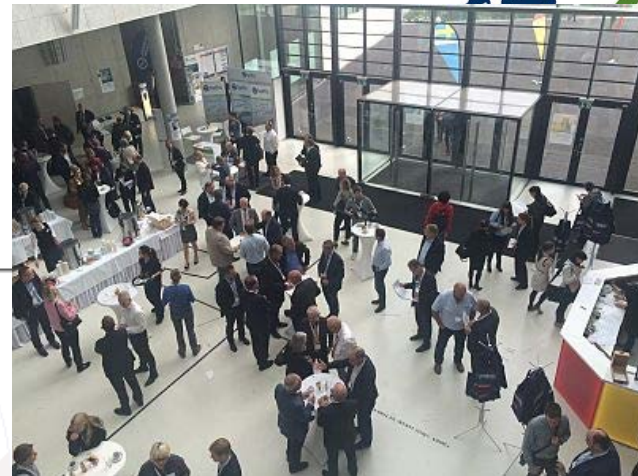


**FEHMARNBELT  
DAYS 2016**  
HAMBURG  
20-22 SEPTEMBER

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**Exchanges between the North and Baltic Seas –  
A scientific overview**

HafenCity University Hamburg, Germany  
21 September, 9 – 12:30



Joint Baltic Earth-ESA Workshop on  
**Remote Sensing applications  
in the Baltic Sea region**

Helsinki, Finland

**29-31 March 2017**



## Events

Summer Schools

Workshops and Seminars

Topical Conferences

Baltic Earth Conferences



### Regional Climate System Modelling for the European Sea Regions



Universitat Illes Balears  
Palma de Mallorca, Spain  
14 - 16 March 2018

Announcement  
Call for Papers





## Events

Summer Schools

Workshops and Seminars

Topical Conferences

Baltic Earth Conferences

2<sup>nd</sup> International Conference

### Climate Change - The environmental and socio-economic response in the southern Baltic region



Szczecin, Poland  
12 - 15 May 2014

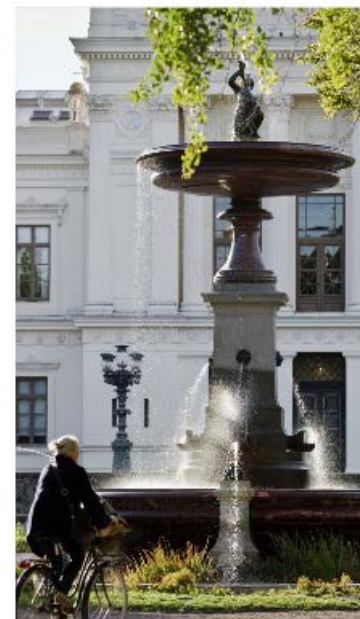


Baltic Earth

First Announcement

3<sup>rd</sup> Lund Regional-scale  
Climate Modelling Workshop

### 21<sup>st</sup> Century Challenges in Regional Climate Modelling



Lund, Sweden  
16 - 19 June 2014



First Announcement



## Events

Summer Schools

Workshops and  
Seminars

Topical Conferences

**Baltic Earth  
Conferences**

# 1<sup>st</sup> Baltic Earth Conference

Nida, Curonian Spit, Lithuania

13 - 17 June 2016



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



**Second Announcement and Call for Papers**

## Events

Summer Schools

Workshops and  
Seminars

Topical Conferences

**Baltic Earth  
Conferences**

# 2<sup>nd</sup> Baltic Earth Conference

Helsingør, Denmark

11 - 15 June 2018



## The Baltic Sea Region in Transition







Baltic Earth

Research Topic

# The Baltic Sea Region in Transition

Comment

0



Manage topic

Submit your abstract

Submit your manuscript

Overview

Articles

42  
Authors

Impact

Comments

VIEWS

622

## 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 researchers fell in the early 1990. Baltic Earth, and its precursor programme BALTEX have fostered the collaboration of Earth system research across the countries and scientific disciplines for 25 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 climatic, 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 Helsingør, 11-15 June 2018, 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

1. to processes and spatial fluxes of volume, energy, momentum and

## Topic Editors



**Marcus Reckermann**

Helmholtz-Zentrum Geesthacht  
Zentrum für Material- und Küstenforschung,  
Helmholtz-Gemeinschaft Deutscher Forschungszentren (HZ)  
Geesthacht, Germany

16 publications



**Markus Meier**

Leibniz Institute for Baltic Sea Research (LG)  
Warnemünde, Germany



**Martin Stendel**

Danish Meteorological Institute  
Denmark



23 publications

Baltic E...

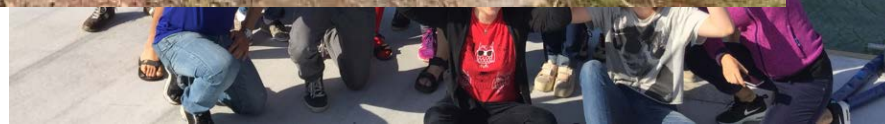
Summer  
Young  
at Balti

Tartu 2015



Askö 2018

Askö



# Baltic Earth Young Scientists Facebook Group

Baltic Earth Summer School "Climate of the Baltic Sea Regi ...


Secretariat Startseite Freunde finden

Baltic Earth Summer School "Climate of the Baltic Sea Region" Geschlossene Gruppe

Info Diskussion Mitglieder Veranstaltungen Fotos Gruppe moderieren

Gruppe durchsuchen

Favoriten: Baltic Earth Summer S..., Baltic Earth



Beigetreten Benachrichtigungen Teilen Mehr

Beitrag Foto/Video Live-Video Mehr

Schreib etwas ...

Foto/Video Treffen planen Watch Party

**Fixierte Beiträge sind jetzt Ankündigungen**

Du kannst jetzt mehrere Beiträge als Ankündigung posten, indem du zu einem beliebigen Beitrag gehst und „Als Ankündigung markieren“ auswählst. Mitglieder sehen die aktuellste Ankündigung, die noch nicht gelesen wurde oben in der Gruppe als Beitrag. Alte Ankündigungen findest du im Tab „Ankündigungen“.

Hilfereich aufrufen

NEUESTE AKTIVITÄT

BalticEarth Secretariat 22. Juni

MITGLIEDER HINZUFÜGEN Einladung einbetten

Gib einen Namen oder eine E-Mail-Adresse ein ...

MITGLIEDER 45 Mitglieder

Diese Woche gibt es ein neues Mitglied. Poste einen Beitrag zur Begrüßung. Verfasse einen Beitrag

VORGESCHLAGENE MITGLIEDER Verbergen

Freunde

- Maciej T. Tomczak Mitglied hinzufügen
- Torsten Fischer Mitglied hinzufügen
- Nastassja Åstrand Capetillo Mitglied hinzufügen

EINGELADEN Mehr anzeigen

reuterru@... Erinnerung senden

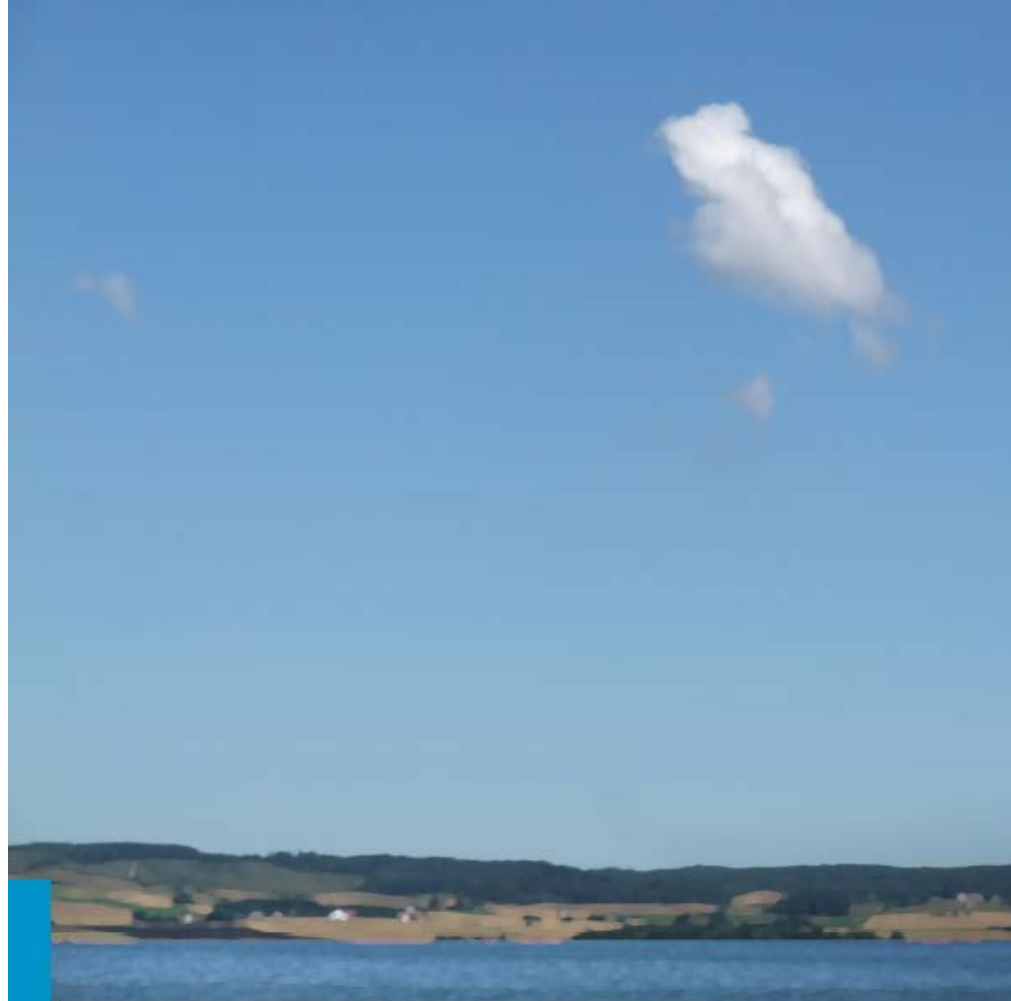
# Baltic Earth Science Plan and Grand Challenges



- 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 sensible

# Baltic Earth Science Plan 2017

<https://www.baltic.earth>



International Baltic Earth Secretariat Publication No. 11, February 2017

## Baltic Earth Science Plan 2017

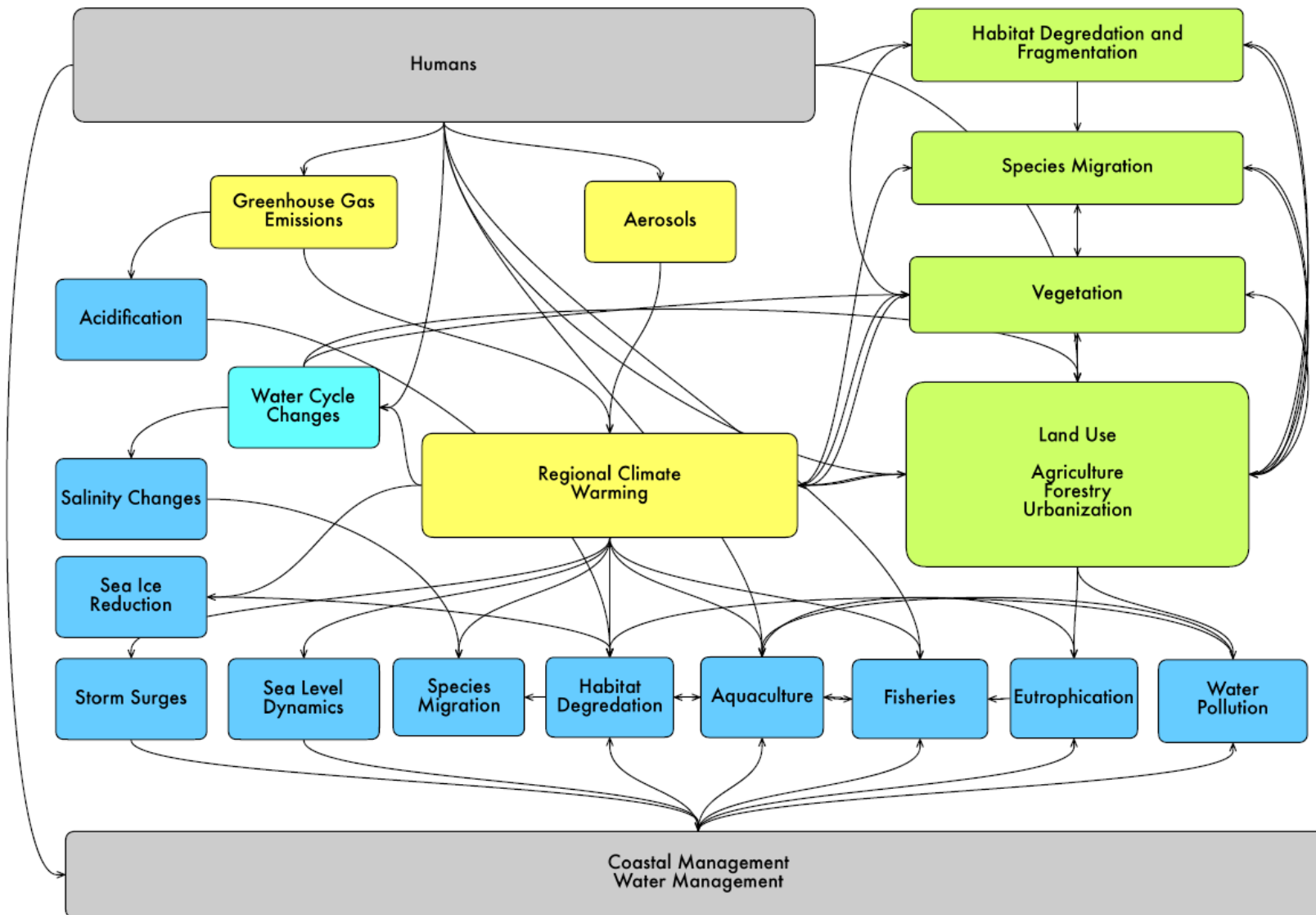




## Currently: 6 Grand Challenges

- 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 of regional Earth system changes

# Multiple drivers of regional Earth system changes



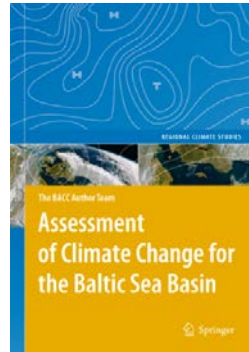
from Baltic Earth Science Plan 2017



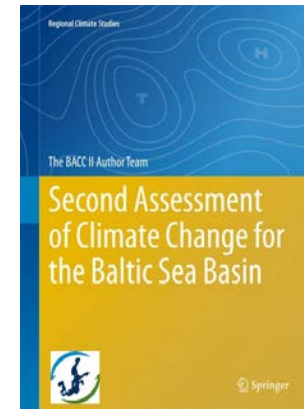
## BACC and BACC 2

**BACC =** **BALTEX Assessment of Climate Change for the Baltic Sea region**  
**Baltic Earth Assessment of Climate Change for the Baltic Sea region**

**BALTEX**  
↓  
**2008**



**Baltic Earth**  
↓  
**2015**



**Independent review of available published knowledge on Climate Change in the Baltic Sea region; elaborated by independent international network of researchers from the BALTEX/Baltic Earth networks**

**No „Guru“ work but honest group assessment, attempting to assemble the available published knowledge; consensus but also dissensus**





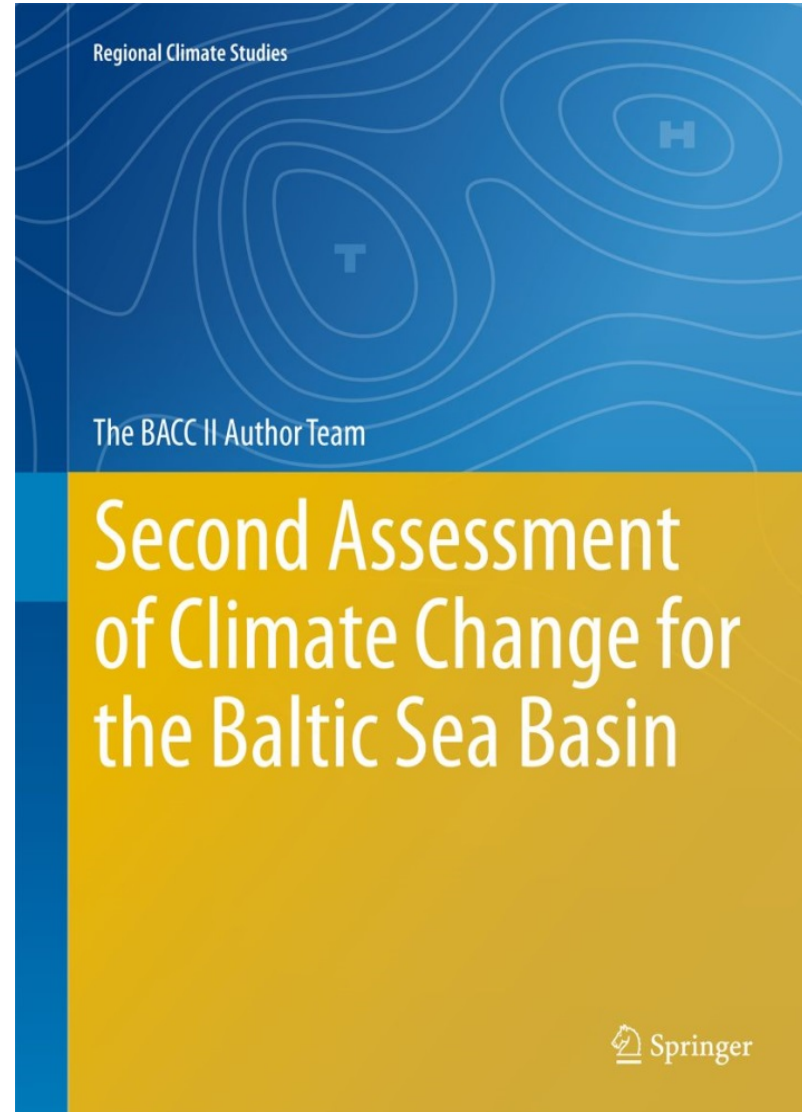
- Clearly observed increases in temperature (air und water) as well as sea level ; connected changes in freezing and melting dates, ice cover, coastal erosion, vegetation periods, plant growth
- Uncertainties in precipitation and wind
- Further warming and sea level rise expected (but land uplift in the North counteracts sea level rise)
- Anthropogenic climate warming is but one man-made factor for observed environmental changes in the region (e.g. eutrophication, land use and fragmentation, pollution, overfishing)
- Further research necessary, particularly in the role of land cover and aerosols for the regional climate



Open Access download BACC I and BACC II



<https://www.baltic.earth/BACC2>



**Upcoming:**

## **New Baltic Earth Assessment Reports (BEAR)**



**Independent reviews of the available knowledge on the Baltic Earth Grand Challenges and other related topics**

**Review paper format published as Special Issue in Open Access Journal**

- Salinity dynamics (BE-GC1)
- Land-sea interlinkages (BE-GC2)
- Natural hazards and extreme events (BE-GC3)
- Sea level dynamics and coastal erosion (BE-GC4)
- Regional variability of water and energy exchanges (BE-GC5)
- Multiple drivers for Earth system changes (BE-GC6)
- Coupled regional Earth system Modelling (BE topic)
- Climate change and impacts in the Baltic Sea region (BACC III)
- New climate observation systems

**Due 2020**

Enjoy your time here!

