

Baltic Earth

Earth System Science and Outreach for the Baltic Sea Region

Recent developments 2016/2017



Marcus Reckermann

International Baltic Earth Secretariat
Helmholtz-Zentrum Geesthacht, Germany

Markus Meier, Anna Rutgersson

and the Baltic Earth Science Steering Group members

Second Assessment
of Climate Change for
the Baltic Sea Basin

Springer

GEWEX

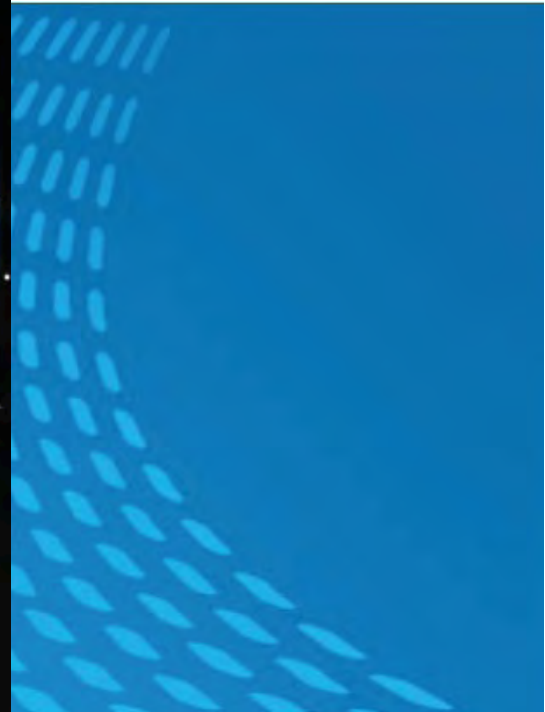


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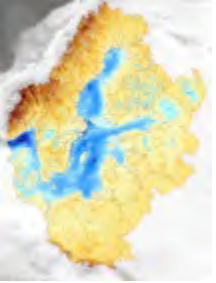
Centre for Materials and Coastal Research



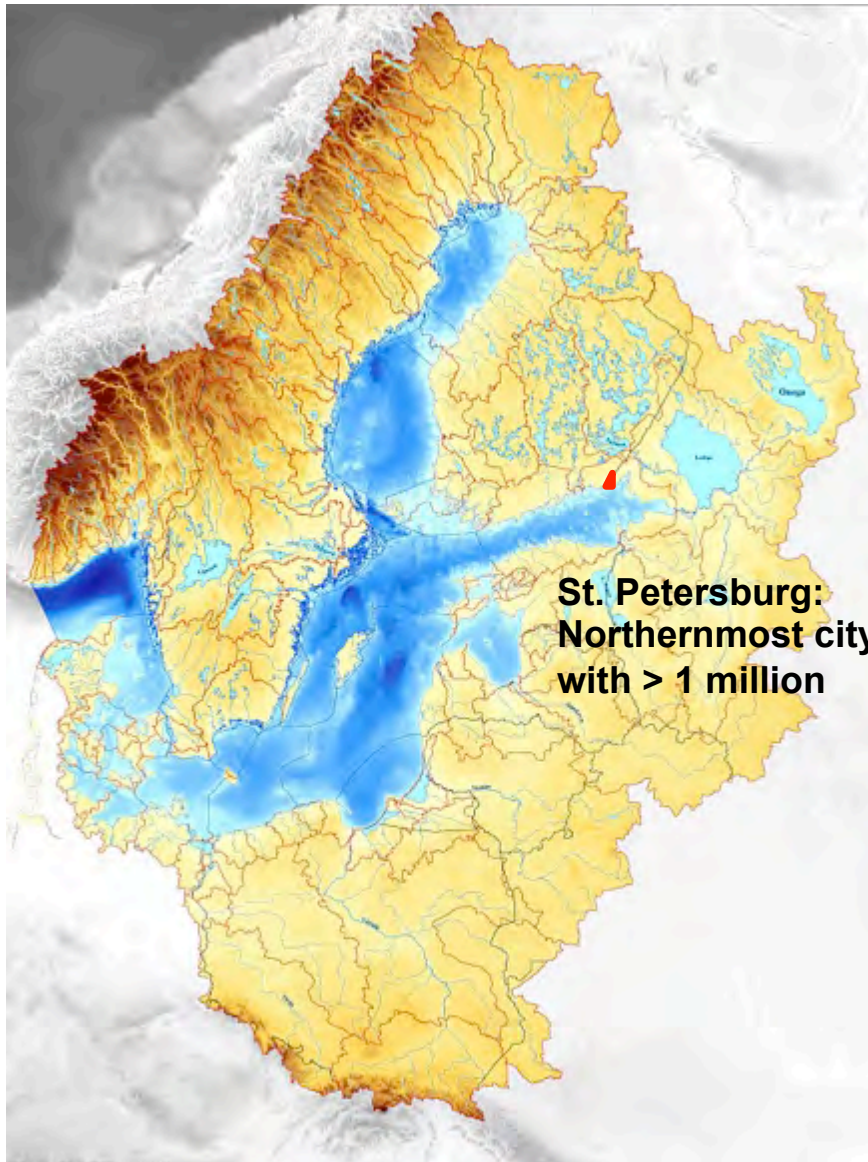
The Baltic Sea region



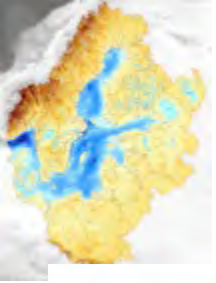
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Center for Materials and Coastal Research



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





Motivation for an international interdisciplinary research network



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1990



1991





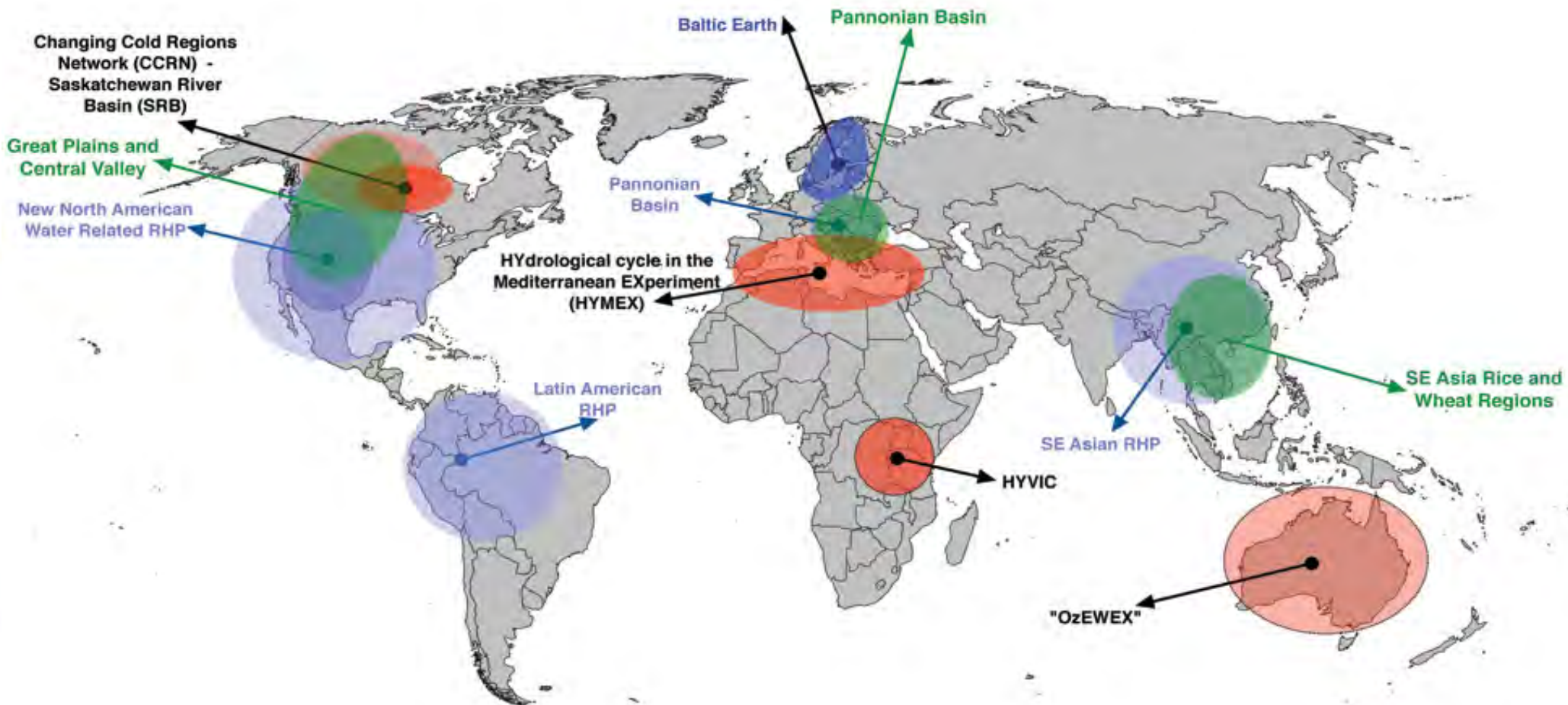
BALTEX was founded in 1992 as part of the GEWEX programme of WCRP



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GEWEX REGIONAL HYDROCLIMATE PROJECTS





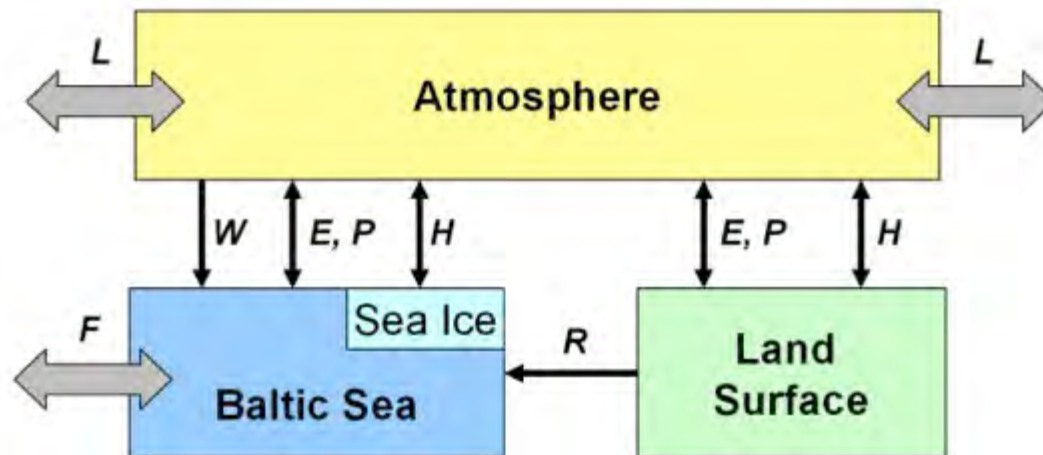
BALTEX Phase I: 1992 – 2003: First 10 year Phase



BALTEX was founded in 1992 as part of the GEWEX programme of WCRP

The **hydrological cycle** and the **exchange of energy** between the atmosphere and the surface of the Earth (**physical part of the climate system**)

Major disciplines: Meteorology, Oceanography, Hydrology



Major outcomes of BALTEX Phase I (1992-2003):

Building of research and observation network; data exchange and availability, development of coupled regional atmosphere-land-ocean models



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

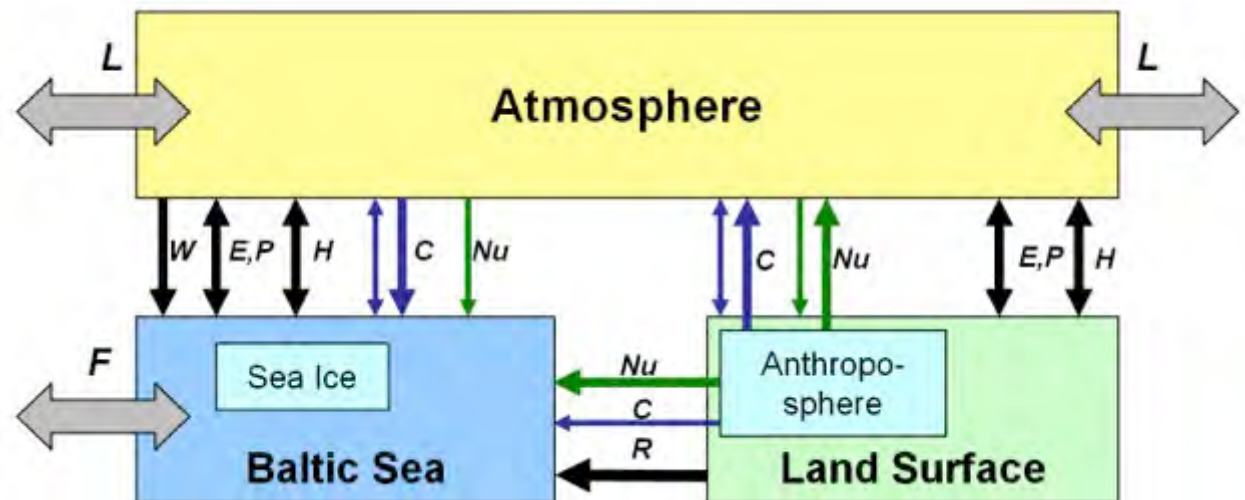
Scientific disciplines (in Phase II):

- 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) 2008

Baltic Earth Assessment of Climate Change for the Baltic Sea basin (BACC II) 2015

Baltic Earth – Launch in June 2013



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Baltic Earth launched at the
7th Study Conference on BALTEX in June 2013



this guy...



... in the presence of
the King of Sweden



Baltic Earth

Earth System Science for the Baltic Sea Region

Vision of the new programme

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

- **Interdisciplinary** and **international** collaboration (conferences, workshops, 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 infrastructure
- No central funding, non-hierarchical structure

Baltic Earth SSG members



Anna Rutgersson
Sweden



Jari Haapala
Finland



Kai Myrberg
Finland



Sergey Zhuravlev



Anders Omstedt
Sweden



Martin Stendel
Denmark



Ben S
Sweden



Chair

Markus Meier, Head of Physical Oceanography, Baltic Sea Research Institute, Germany

Vice-Chair

Anna Rutgersson, Professor of Meteorology, Uppsala University, Sweden



Irina Partasenok
Belarus



Corinna Schrum
Germany



Andreas Lehmann
Germany



Markus Meier
Germany



Gregor Rehder
Germany



Marcus Reckermann



Ralf Weisse



Franz Berger
Germany

Karol Kulinski
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Germany



Hans-Jörg Isemer





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.



Baltic Earth

Earth System Science for the Baltic Sea Region

Secretariat

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The BALTEX/Baltic Earth Publication Library

Compilation of BALTEX/Baltic Earth Publications

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Publications

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

1st Baltic Earth Multiple drivers system changes Baltic Sea region Nida, Curonian Spit, Lithuania 13-17 June 2016

BACC II

Publications

- [International Baltic Earth Secretariat Publication Series](#)
- [New Baltic Earth Publications](#)
- [Baltic Earth Newsletter](#)
- [BALTEX/Baltic Earth Online Library](#)
- [BALTEX/Baltic Earth Publications Compilation](#)

earth programmes the objectives of programme are continuously "BALTEX" or

Baltic Earth

Helmholtz-Zentrum Geesthacht

Secretariat
ing information:

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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Website




Baltic Earth

Earth System Science for the Baltic Sea Region

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

[BACC II](#)

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Announcements

 Position open for a
Geoscientist (m/f) in
scientific data analysis and
webtool development.
Application deadline: 26 Oct.
The position is limited to 36
months, location is Helmholtz-
Zentrum Geesthacht, Germany.
[More...](#)

 [BALTEX Website...](#)



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 Baltic Sea region. Baltic Earth brings together a broad international research community around core scientific issues identified as fundamental to informing societal 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 knowledge exchange and research funders aims to ensure impact and relevance of the research. Baltic Earth targets the atmosphere, land and marine environment and human impact in the region. Baltic Earth targets the atmosphere, land and marine environment and human impact in the region. Baltic Earth targets the atmosphere, land and marine environment and human impact in the region. [More...](#)

...matio, environmental and human impact in the region. Baltic Earth targets the atmosphere, land and marine environment and human impact in the region. Baltic Earth targets the atmosphere, land and marine environment and human impact in the region. [More...](#)

NEWS

 **BONUS Call 2017 "Synthesis" open** [More...](#)

 **Announcing the 5th International Water Forum** [More...](#) Belarus. [More Info here...](#)

 **From small scales to large scales** [More...](#) 9-10 October 2017 in Tallinn, Estonia. [More Info here...](#)
Note: Abstract submission deadline extended

 **Baltic Earth session at AGU 2017 on Regional Seas worldwide**
Comparing Marginal Seas around the World – Coping with Similar Problems in Different Ways?
A session at the AGU Fall meeting in New Orleans, 11-15 December 2017.
[More here...](#)

 **3rd Baltic Earth Newsletter** Download [here...](#)

Baltic Earth back in the GEWEX family

For 20 years, BALTEX had been associated with GEWEX, the Global Energy and Water Exchanges programme of the World Climate Research Programme WCRP as a Regional Hydroclimate Project (RHP). After the transition to Baltic Earth with a modified steering group and portfolio, it was decided to continue this fruitful international cooperation and re-apply for status as RHP in the GEWEX Hydroclimatology Panel (GHP). At the recent meeting in Gif-sur-Mer, France in October 2016, Baltic Earth was accepted as initial phase RHP by the GHP steering group. [More on GEWEX...](#)

High BACC II book download numbers

The book was published in April 2015 as Open Access book with Springer, and the download numbers have since been astonishing. Springer has registered a total of approximately 90,000 chapter downloads, of which

Upcoming Events

5th International Water Forum «Water Resources and Climate» 5-6 October 2017 in Minsk, Belarus. [More Info here...](#)

From small scales to large scales –The Gulf of Finland Science Days 2017, 9-10 October 2017 in Tallinn, Estonia. [More Info here...](#)

SHIPPING AND THE ENVIRONMENT – From Regional to Global Perspectives 24 - 25 October 2017, Gothenburg, Sweden. [First Announcement...](#)

Baltic Earth session at AGU 2017: Comparing Marginal Seas around the World – Coping with Similar Problems in Different Ways?
A session at the AGU Fall meeting in New Orleans, 11-15 December 2017. [More here...](#)

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

Baltic Earth Newsletter

The BACC Blog



Secretariat

Publications

Website etc.

Events



The screenshot shows the homepage of the Baltic Earth website. At the top left is the logo, a stylized figure holding a staff, with the text "Baltic Earth" and "Earth System Science for the Baltic Sea Region". A navigation menu on the left includes links for Home/News, Background, Grand Challenges, Working Groups, Projects, Publications, Organization, International Baltic Earth Association, Events, Contact, and How to collaborate. A central banner features two flags (one with a figure, one with a globe) and the text "Extending the knowledge of the regional Earth system in the Baltic Sea region". Below this is a paragraph describing the project's goals. A "NEWS" section contains several items with red star icons, including "DONUS Call 2017 'Synthesis' open", "Announcing the 5th International Water Forum", "From small scales to large scales - The Gulf of Finland Science Days 2017", "Baltic Earth session at AGU 2017 on Regional Seas", and "5th Baltic Earth Newsletter Download". An "Announcements" section includes a position opening for a Geoscientist and a BACC book announcement. The right sidebar features "Upcoming Events" with details for the 5th International Water Forum and the Gulf of Finland Science Days, "SHIPPING AND THE ENVIRONMENT", and "Baltic Earth session at AGU 2017". At the bottom right, there are images for "The BACC Blog" and "Second Assessment of Climate Change for the Baltic Sea".

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

4 Hamburg, Germany
May 2014, Mar 2015, Sep 2016

4 Vienna, Austria, Apr 2015, Apr 2016 EGU

4 Rome, Italy, Nov 2015 HyMex



Events

1st Baltic Earth Conference

Nida, Curonian Spit, Lithuania

13 - 17 June 2016



Summer Schools

Workshops and
Seminars

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

Topical Conferences



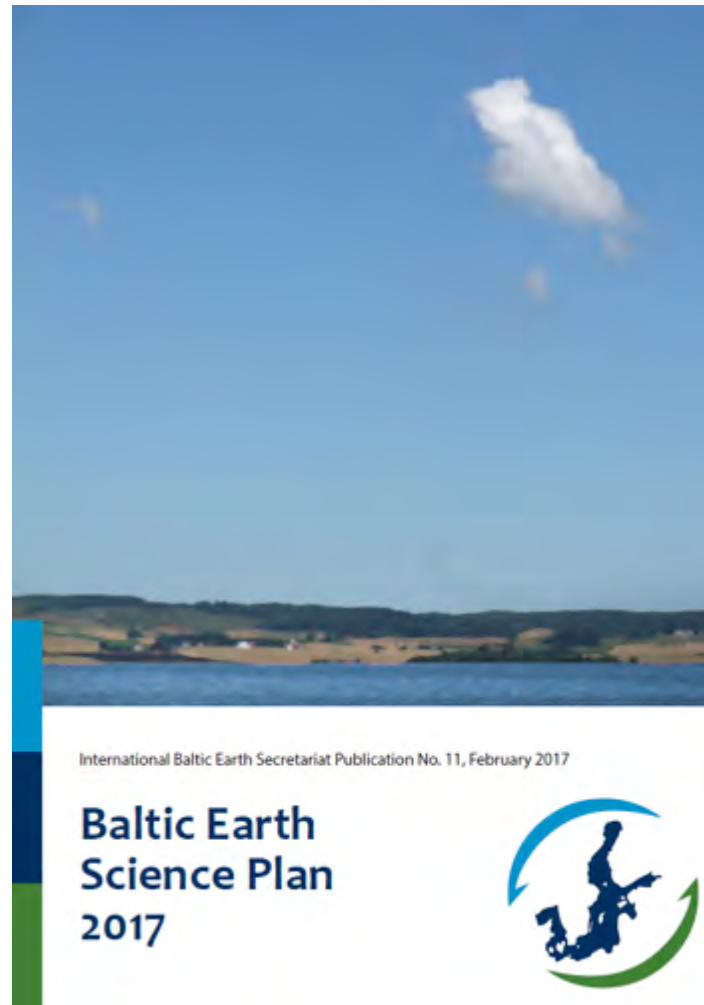
**Baltic Earth
Conferences**

Second Announcement and Call for Papers



- 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



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

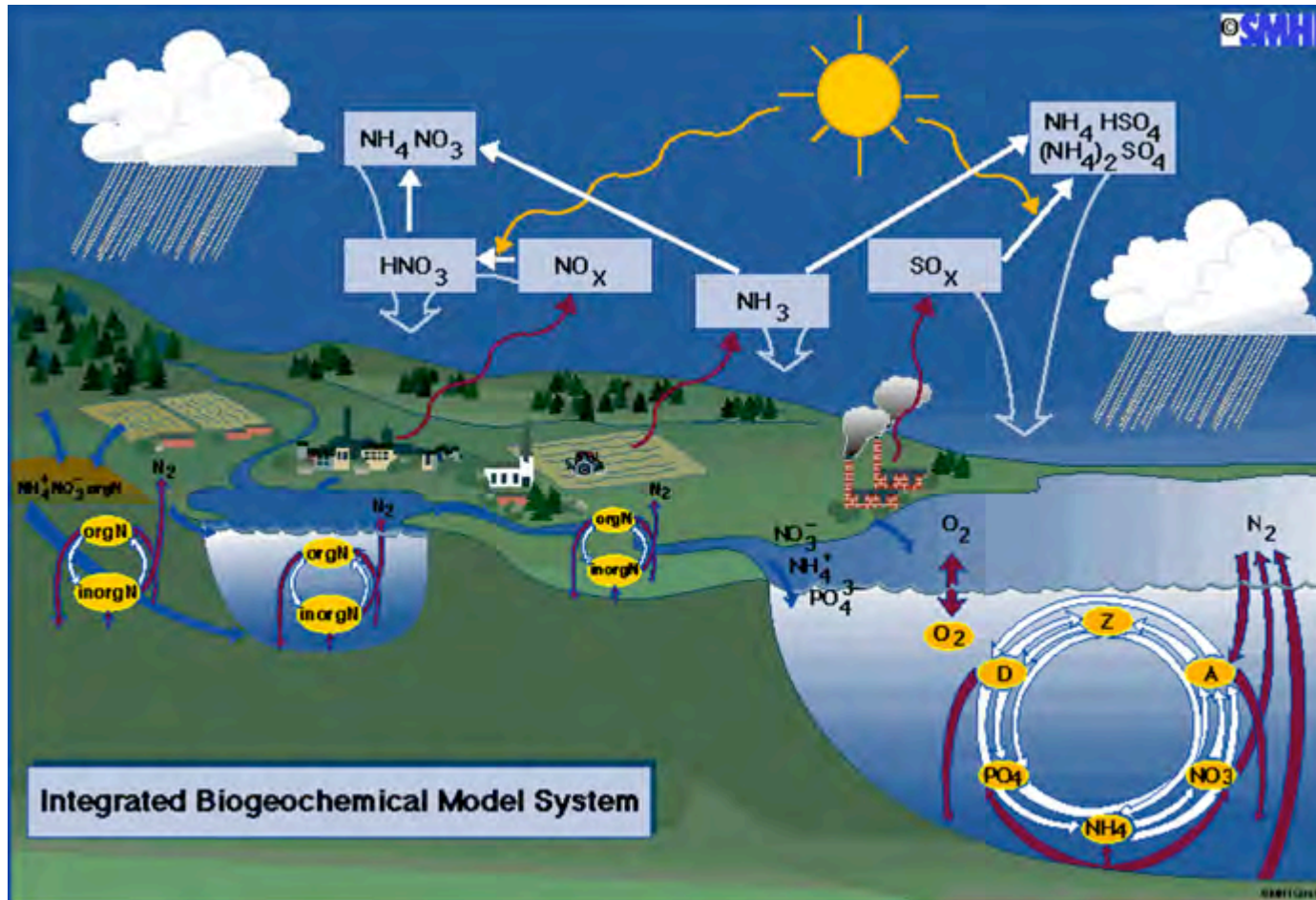
WGs to all GCs plus

- Baltic Earth Working Group on Coupled Regional Earth System Modelling
- Baltic Earth Working Group on Outreach and Communication
- Baltic Earth Working Group on Education
- Baltic Earth Working Group on Regional Seas (envisaged)

WG on Regional Climate System Modelling

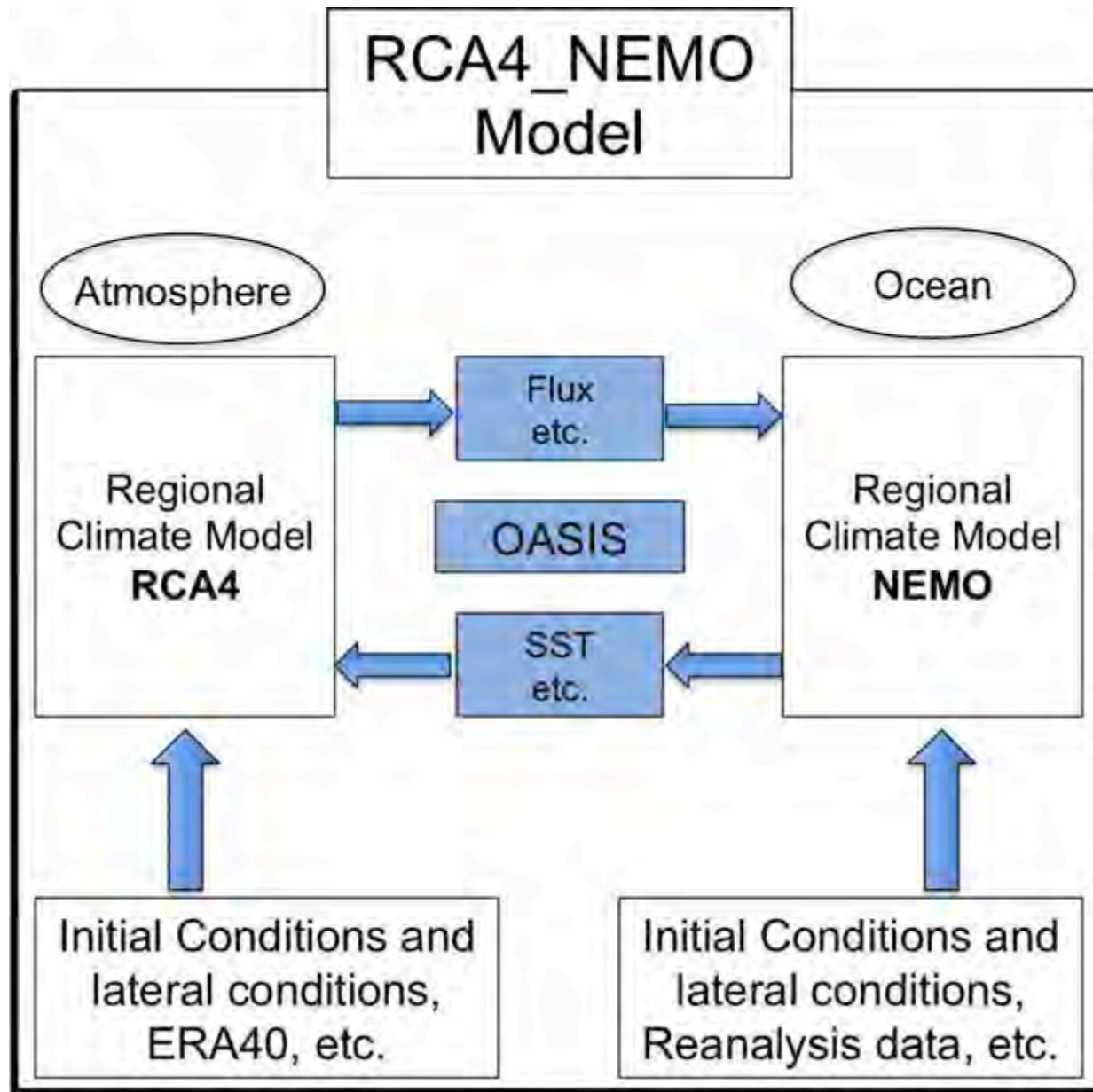


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Earth system science treat the Earth as an integrated system and seeks a deeper understanding of the physical, chemical, biological and human interactions that determine the past, current and future state of the Earth

WG on Regional Climate System Modelling



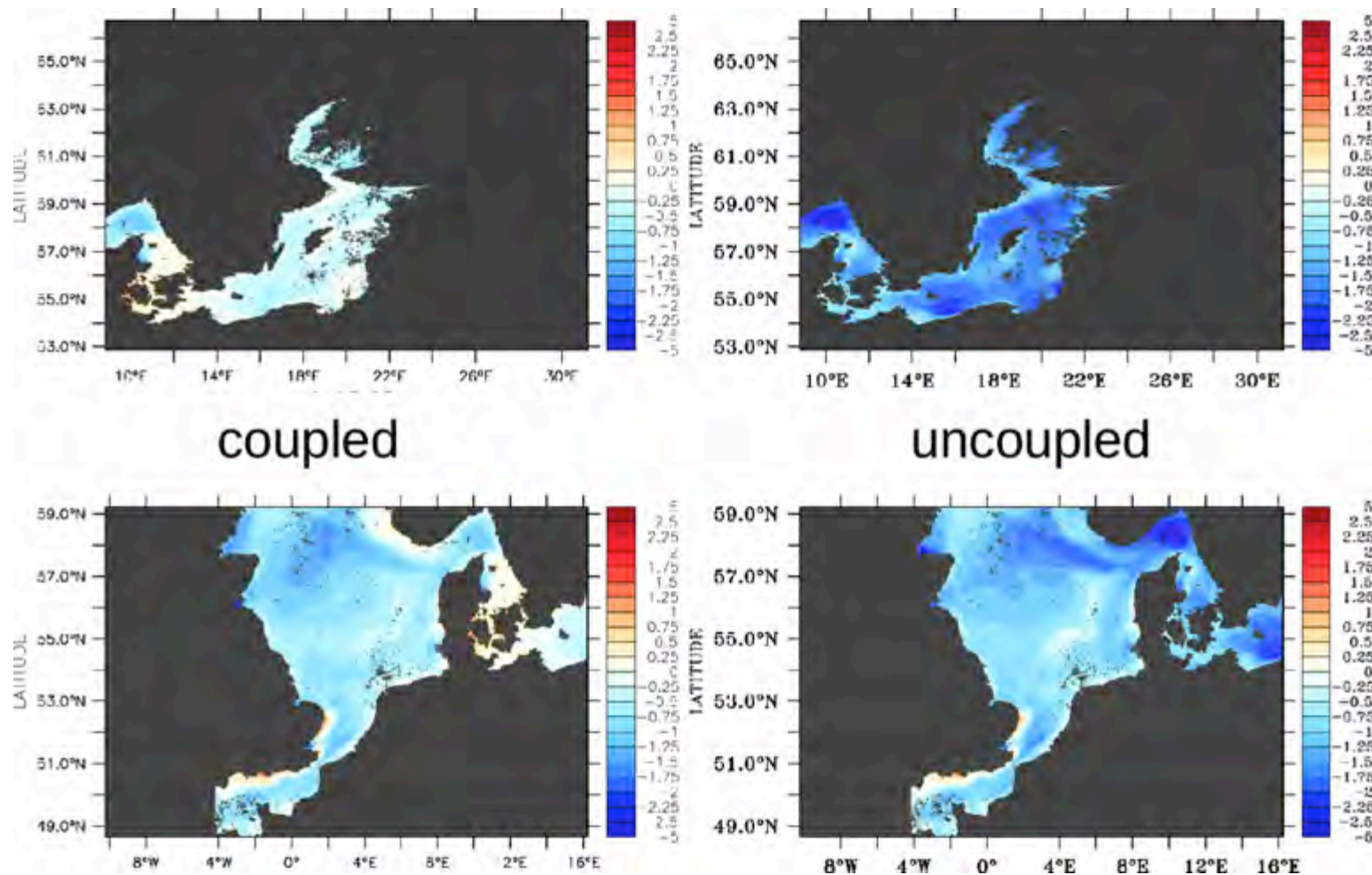
Additional components

- sea ice
- waves
- marine biogeochemistry
- (marine food web)
- sediments
- land surface and hydrology
- lakes
- (dynamic land vegetation)
- (atmospheric chemistry)

WG on Regional Climate System Modelling



Winter SST bias from BSH climatology (Average 1990-2011)



WG on Regional Climate System Modelling

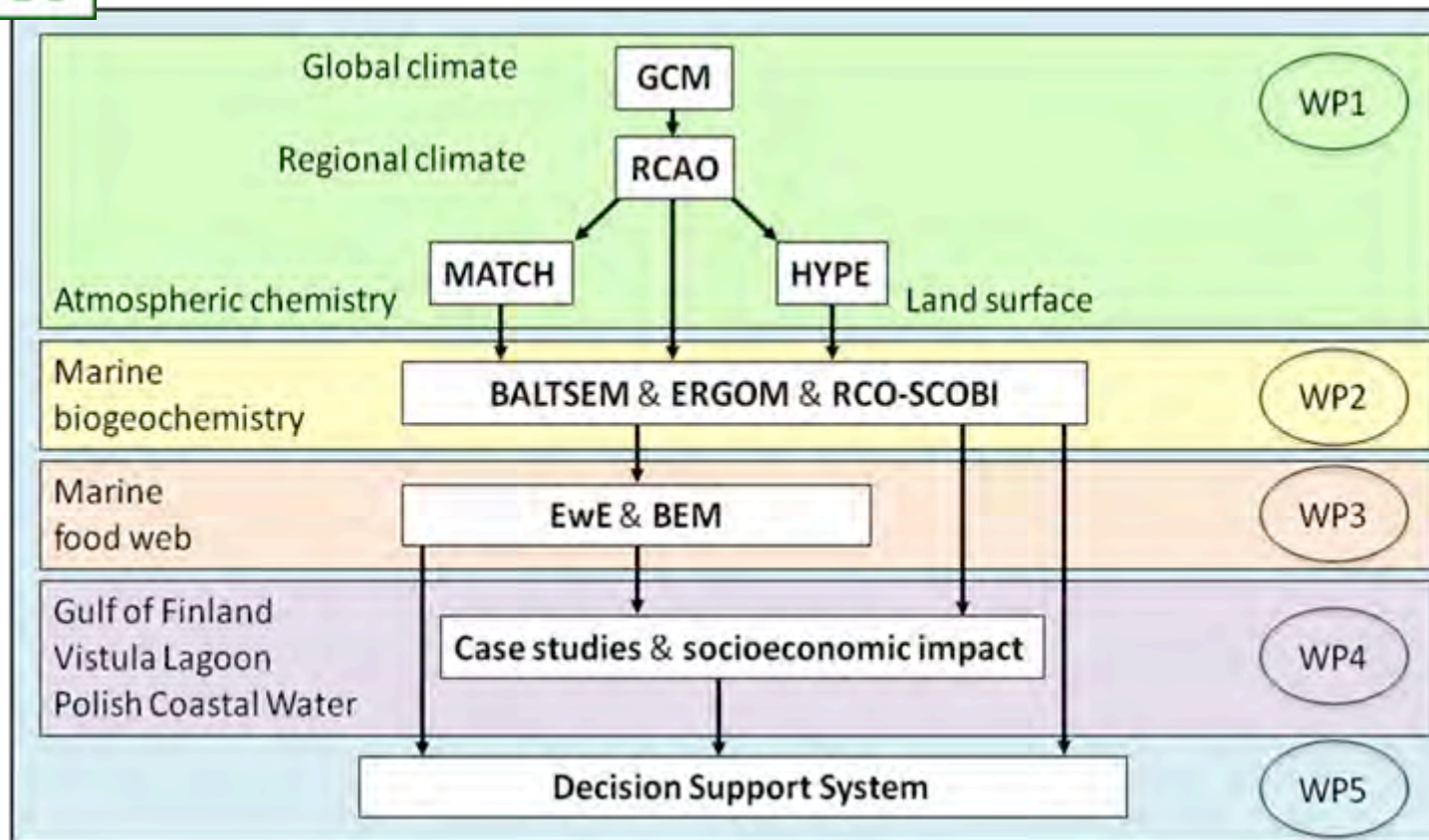


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BONUS

SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION



Advanced modeling tool for scenarios of the Baltic Sea Ecosystem to SUPPORT decision making (Meier et al. 2011, GRL)

Recent accomplishments (current year)



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The screenshot shows the website for the journal Earth System Dynamics, published by the European Geosciences Union (EGU). The page features a navigation menu on the left with options like 'Submit a manuscript', 'Manuscript tracking', 'About', 'Editorial board', 'Articles', 'Special issues', 'Published special issues', 'Schedule', 'How to apply', 'Highlight articles', 'Subscribe to alerts', 'Peer review', 'For authors', and 'For reviewers'. There is also a user login section and a 'Follow @EGU_ESD' button. The main content area is titled 'Special issue' and features a prominent article: 'Multiple drivers for Earth system changes in the Baltic Sea region'. The article is edited by M. Meier, A. Rutgersson, B. Smith, M. Reckermann, and I. Didenkulova. The text describes the goal of the special issue, which is to improve Earth system understanding of the Baltic Sea region by assessing anthropogenic impacts and their interactions with natural processes. It also mentions the 1st Baltic Earth Conference held in Nida, Lithuania, in June 2016. Below the main article, there are three more articles listed with their dates and titles: 'Effects of the 2014 major Baltic inflow on methane and nitrous oxide dynamics in the water column of the central Baltic Sea' (14 Sep 2017), 'Low-frequency variability in North Sea and Baltic Sea identified through simulations with the 3-D coupled physical-biogeochemical model ECOSMO' (07 Sep 2017), and 'Satellite altimetry reveals spatial patterns of variations in the Baltic Sea wave climate' (08 Aug 2017). On the right side of the page, there are search boxes for articles and web pages, and a 'Copernicus Publications' logo.

20 submitted
14 published or accepted
4 currently under review
2 rejected
(as of 10 October 2017)

Recent accomplishments (current year)



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Oceans

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Regional and Local Climates
Statistics of Climate Systems

Browse All

FROM THE EDITOR IN CHIEF

Hans Von Storch
of the Institute for Coastal Research of the Helmholtz Center Geesthacht and the Meteorological Institute of the University of Hamburg welcomes you to the expanding Oxford Research Encyclopedia of Climate Science.
Read more

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Silke Beck
Department of Environmental Politics,
Helmholtz Centre for Environmental Research

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DISCOVER FORTHCOMING ARTICLES

JOIN THE ORE COMMUNITY

FEATURED ARTICLE: CLIMATE CHANGE CONSPIRACY THEORIES

Featured Article: The Oxford Research Encyclopedia of Climate Science now features full-length articles, such as "Climate Change Conspiracy Theories" by Joseph E. Uscinski, Karen Douglas, and Stephan Lewandowsky. Image: Courtesy of

NEW AND FEATURED

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

"The growing concern about global warming has turned focus in Sweden and other Baltic countries toward the connection between history and climate. The clear connection between the climate fluctuations during the last 300 years and the major social changes that took place in these centuries needs to be further studied..."
—By Svan Litja

Climate Change Communication in Relation to Race, Place, and Gender

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Special Project on
Climate and regional change
in the Baltic Sea region

Overview articles reflecting the state of
science for an interdisciplinary
readership, authored by experts in the
field

Envisaged for this project:

~ 40 articles

First just now published

~ 10 in preparation and review

For many authorship pending

<http://climatescience.oxfordre.com>

Recent accomplishments (current year)



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BONUS INTEGRAL

Integrated carbon and Trace Gas monitoring for the Baltic sea

- Use of the (extended) ICOS network for **biogeochemical monitoring of the Baltic Sea**, in combination to existing monitoring programs
- **Improved ASE-parameterizations** for the Baltic Sea
- Provide best experimentally based seasonal concentration charts for **carbon dioxide, methane, and nitrous oxide**
- Full integration of **carbon system into high resolution physical biogeochemical model**
- Advice for countries with upcoming ICOS infrastructure
- Model-output based recommendations on effective biogeochemical monitoring

- Funded as a BONUS Blue Baltic project, starting date July 1st, 2017, 3 years
- Budget 2.1 Mio €
- 8 Partners from 5 countries
- Including three current Baltic ICOS stations



Recent accomplishments (current year)



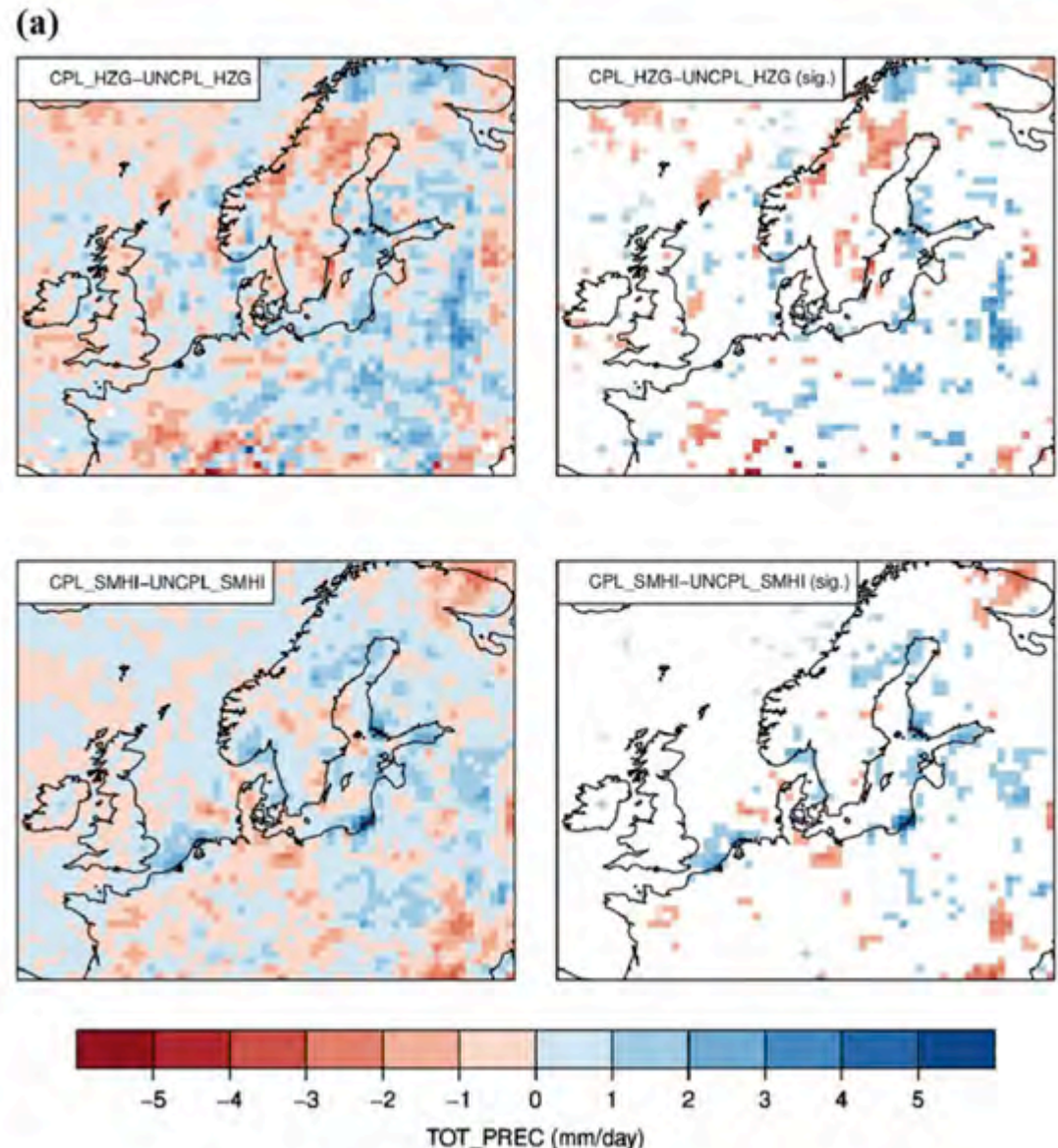
- 13-17 June 2016: **1st Baltic Earth Conference “Multiple drivers for Earth system changes in the Baltic Sea region”** in Nida, Lithuania, June 2016
- 29 August – 5 September 2016: **International Baltic Earth Summer School** on Climate change in the Baltic Sea region, Askö Laboratory, Trosa, Sweden
- 12–16 September 2016: **Session on "Evaluation and quality assurance of climate services – Methods, criteria and pitfalls"** at 16th EMS Annual Meeting & 11th European Conference on Applied Climatology (ECAC), 12–16 September 2016, Trieste, Italy
- 21 September 2016: **Baltic Earth Seminar on " Exchanges between the North and Baltic Seas – A scientific overview"** in the framework of the Fehmarn Belt Days 2016, Hamburg HafenCity University, Germany
- 11-12 October 2016: **15th Polish-German Seminar on Coastal Research**, Maritime Museum, Hamburg, Germany
- 22-24 November 2016: **Baltic Earth Working Group meeting on Scenario Simulations** Leibniz Institute for Baltic Sea Research, Warnemünde, Germany
- 7-8 February 2017: **Baltic Earth Workshop on "Coupled atmosphere-ocean modeling for the Baltic Sea and North Sea"**, Leibniz Institute for Baltic Sea Research Warnemünde (IOW), Germany
- 8-10 March 2017: **8th Baltic Earth Science Steering Group meeting**, Leibniz Institute for Baltic Sea Research Warnemünde (IOW), Germany.
- 9 March 2017: **Baltic Earth Seminar on "Major Baltic Inflows"** connected to the 8th Baltic Earth Science Steering Group meeting, Leibniz Institute for Baltic Sea Research Warnemünde (IOW), Germany
- 29-31 March 2017: **Baltic from Space: Joint ESA-Baltic Earth Workshop on remote sensing applications in the Baltic Sea region**, Helsinki, Finland
- 23-28 April 2017: **EGU General Assembly 2017**, Vienna, Austria: **Baltic Earth Session on Climate change and its impacts in the Baltic and North Sea regions: Observations and model projections**, based on the work of the recently published regional BACC II (Baltic Sea region) and NOSCCA (North Sea region) climate change reports
- 28 August – 4 September 2017: **International Baltic Earth Summer School** on Climate change in the Baltic Sea region, Askö Laboratory, Trosa, Sweden

Examples from current research

Baltic Earth GC 5: Regional variability of water and energy exchanges in the Baltic Sea region
[GEWEX GSQ1: Observations and Predictions of Precipitation](#)

Ho-Hagemann HTM, Gröger M, Rockel B, Zahn M, Geyer B, Meier HEM, 2017. **Effects of air-sea coupling over the North Sea and the Baltic Sea on simulated summer precipitation over Central Europe.** *Climate Dynamics* 48:1-26, March 2017

A coupling of atmosphere and ocean can improve the dry biases for different regional climate models but not always; but particularly for summer heavy precipitation over central Europe



Daily precipitation differences (mm/day) between the coupled and uncoupled CCLM (top row) and RCA4 (bottom row) for summer (JJA) for the period 1986–2009. The left column shows the difference in heavy precipitation (exceeds the 90th percentile). White colour denotes missing values. The right column shows only the differences that are significant at the 95% confidence level (tested with a 2-sided t test).

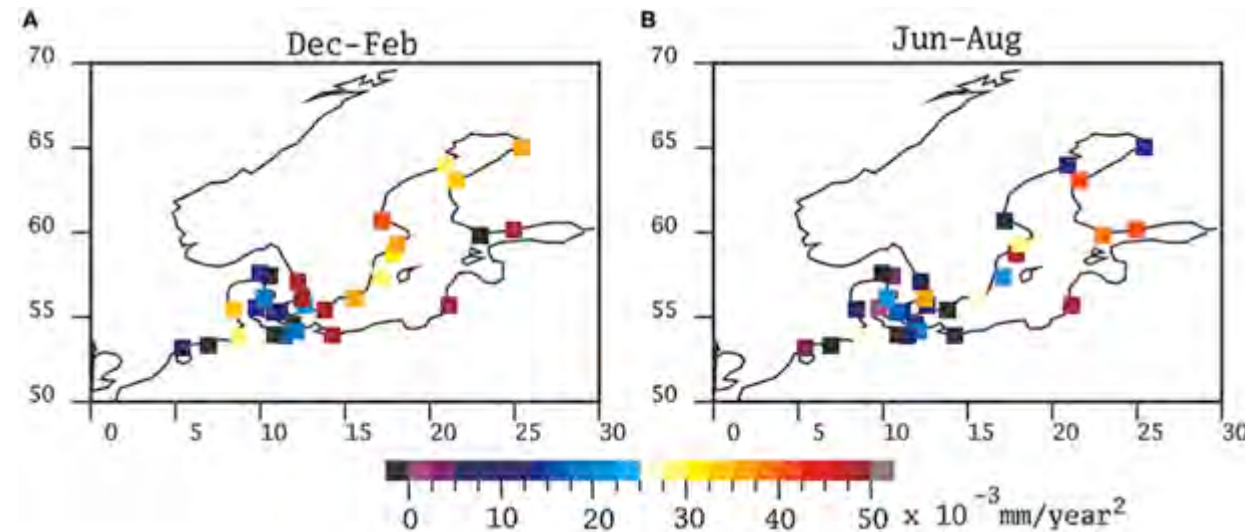
Examples from current research



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Baltic Earth GC 4: Sea Level and Coastal
Dynamics in the Baltic Sea region
[WCRP Grand Challenges: Regional Sea-Level
Change and coastal impacts](#)

Hünicke B, Zorita E 2016: **Statistical Analysis of
the Accerleration of Baltic Mean Sea Level
Rise, 1900-2012** Front. Mar. Sci., 22, July 2016



- Globally, sea level is expected to accelerate
- An acceleration for the Baltic Sea was tested statistically since 1900
- Acceleration was found to be mostly positive but very low and statistically not significant
- Absolute values due to acceleration would only add some cm to the expected rise of up to 1m at 2100

Acceleration of the annual mean sea-level in the
Baltic Sea tide-gauges estimated in the period 1900–
2012 in wintertime (A) and summertime (B) by the
method gtols (see paper)

Planned activities (next year)



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A joint
MedCORDEX - Baltic Earth
Workshop



2nd Joint Regional Climate System
Modelling for the
European Sea Regions



University of the Balearic Islands
Mallorca, Spain
14 - 16 March 2018

Announcement
and Call for Papers

The aim of this workshop is to share recent progress in the understanding of **regional climate variability** with special focus on **coupled effects between sea, atmosphere, land and anthroposphere**.

In this workshop, we will focus on European seas and their catchment areas like the **Mediterranean Sea, Black Sea, North Sea, Baltic Sea and Arctic Ocean** - highly sensitive areas where global models fail to give reliable information about changing climate because key processes are not properly resolved.

Contributions related to any aspect of the **description and modelling of regional climate** are welcome. Some of the topics addressed in the workshop will be the description of **present and future regional climates**, the development and evaluation of **regional climate system models** and the assessment of **extreme and high impact events**.

Website and Call for papers in preparation

Abstract Deadline: 12 January 2018

Notifications of authors: 22 January 2018

Registration Deadline: 26 February 2018

Planned activities (next year)



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2nd Baltic Earth Conference

Helsingør Denmark
11 - 15 June 2018



The Baltic Sea in Transition



Second Announcement and Call for Papers



www.baltic.earth/helsingor2018

2nd Announcement November 2017

Abstract Submission February 2018

Registration and Hotel Reservations April 2018

Planned activities (next year)



Helmholtz-Zentrum
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Centre for Materials and Coastal Research

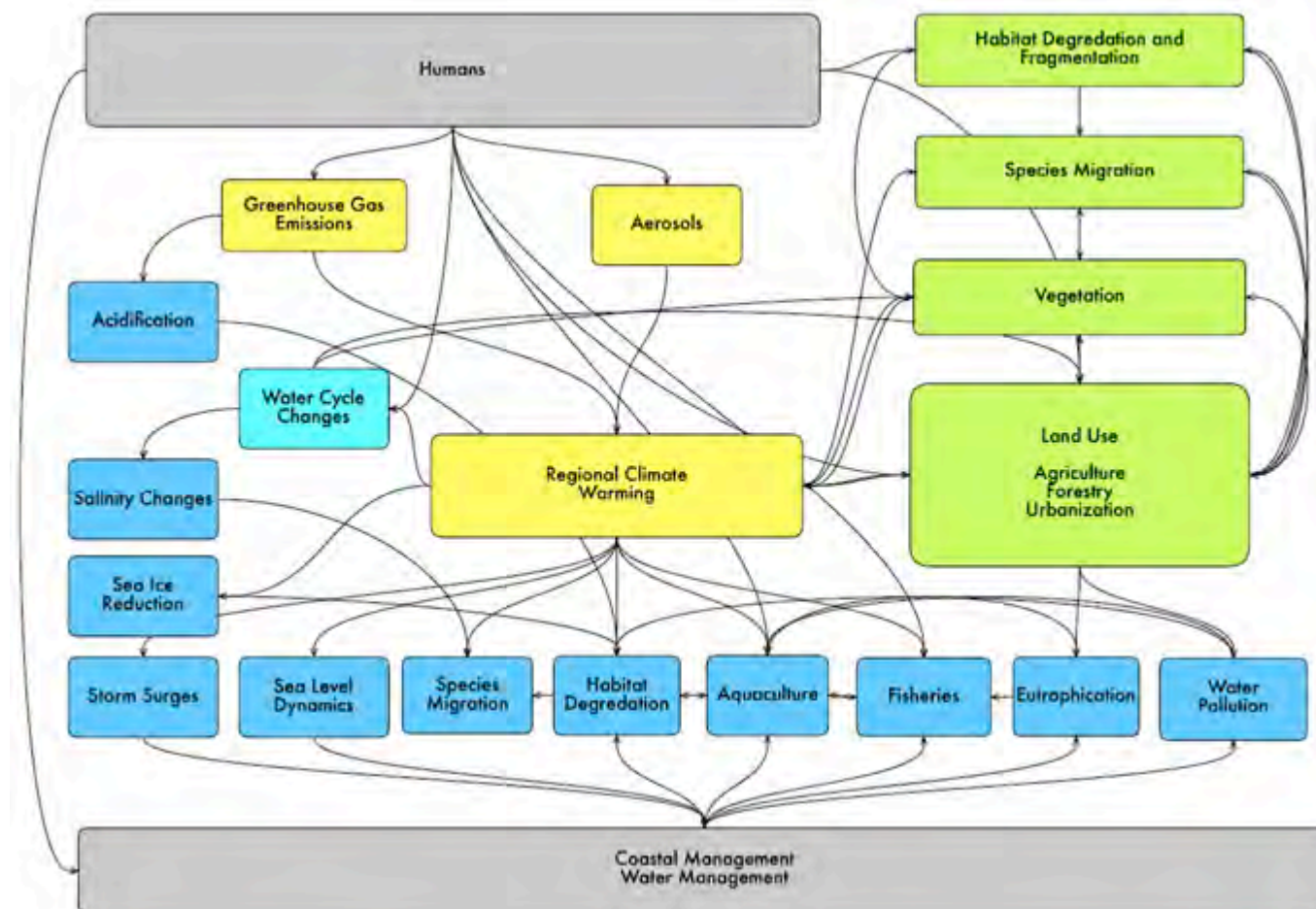


4th Baltic Earth Summer School on Climate change in the Baltic Sea region
Askö, Sweden; Aug-Sept 2018

Planned activities (next year)



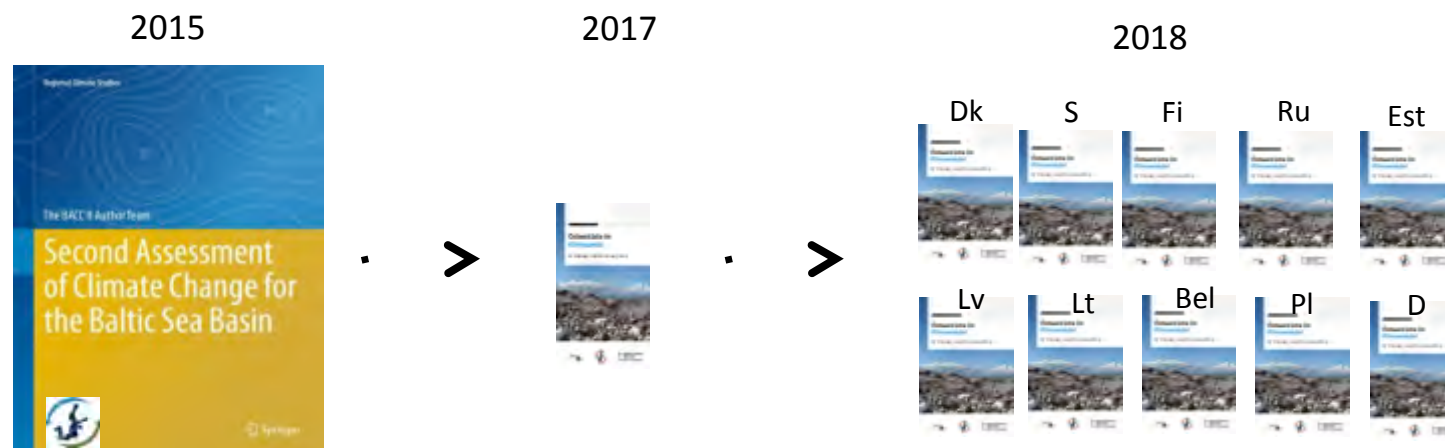
Baltic Earth Workshop on Multiple drivers of regional Earth system changes Second half of 2018



Planned activities (next year)



Climate change overview booklets for non-scientists, laypeople, general public



- Original report
- Open Access Book
- Print and free online
- English

- Summary for laypeople (English base version)
- Paper brochure for free distribution
- Free online
- English

- Summary for laypeople in diff. languages
- General summary (translation of English base version) plus country specific details
- Paper brochure for free distribution
- Produced in country by responsible institution
- Free online
- All languages of the Baltic Sea region

Thank you and have a great meeting!



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Info material at desk here:

