

Baltic Earth – Earth System Science for the Baltic Sea region

The BALTEX successor programme was launched at the 7th Study Conference on BALTEX, Borgholm, Öland, Sweden, 10-14 June 2013



BALTEX
(1992-2013)

Vision of the new programme

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



- **Interdisciplinary** and **international** collaboration (study 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

Baltic Earth

Earth System Science for the Baltic Sea Region

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 new programme will **communicate** with **stakeholders** and research funding **agencies** to promote funding relevant for the Grand Challenges
- **International embedment** (GEWEX, possibly Future Earth)

Suggested Grand Challenges



- GC1: Salinity dynamics in the Baltic Sea
- GC2: Land-Sea biogeochemical feedbacks in the Baltic Sea region
- GC3: Natural hazards and extreme events in the Baltic Sea region
- GC4: Understanding sea level dynamics using new technologies
- GC5: Understanding regional variability of water and energy exchanges
- The human impact will be assessed at all levels, wherever possible and sensible
- Website: www.baltic-earth.eu

Baltic Earth Infrastructure

- International BALTEX Secretariat continued as **International Baltic Earth Secretariat** for the time being
- **Interim Science Steering Group (ISSG)** installed, with mandate until June 2014, then presentation of **Baltic Earth Science Plan** and permanent Science Steering Group
- **ISSG members:** Excellent, active “young” scientists; country balance, gender balance, discipline balance, institutional balance
- **Working Groups** installed for each GC, plus
 - WG on Outreach and Communication
 - WG on Education
 - WG on the Utility of Regional Climate Models (BALTEX inherited)
 - WG on the Assessment of Scenario Simulations for the Baltic Sea 1960-2100 (BALTEX inherited)
- **Senior Advisory Board**

Baltic Earth Interim Science Steering Group

Chair

Markus Meier, Head of Oceanographic Research Dept. of SMHI and Professor at Stockholm University, Sweden.

<http://www.smhi.se/en/Research/Research-departments/Oceanography>

Vice-Chair

Anna Rutgersson, Professor of Meteorology, Uppsala University, Sweden.

<http://katalog.uu.se/empInfo/?languageId=1&id=N96-3829>

Members

Juris Aigars, Franz Berger, Inga Dailidienė, Chantal Donnelly, Jari Haapala, Sirje Keevalik, Karol Kulinski, Andreas Lehmann, Kai Myrberg, Carin Nilsson, Anders Omstedt, Irina Partasenok, Piia Post, Marcus Reckermann, Gregor Rehder, Benjamin Smith, Martin Stendel, Hans von Storch, Sergey Zhuravlev, Eduardo Zorita



Natural hazards and extreme events in the Baltic Sea region



A Baltic Earth Grand Challenge

Organisers: Jaari Haapala, FMI; Anna Rutgersson, Uppsala University; Martin Stendel, DMI, Marcus Reckerman, Baltic Earth Secretariat

Background:

- Society is very sensitive to extreme geophysical events that have severe implications for human life, generate economic losses and influence ecosystems.
- A natural disaster links extreme geophysical events to ecosystems and society (in particular weaknesses in ecosystems and society)
- Understanding the underlying causes of natural disasters increases the ability to predict the occurrence and severity and may save human lives as well as mitigate economic losses.



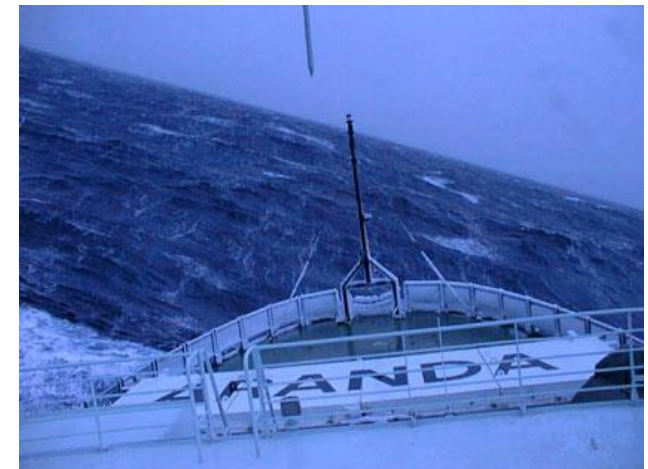
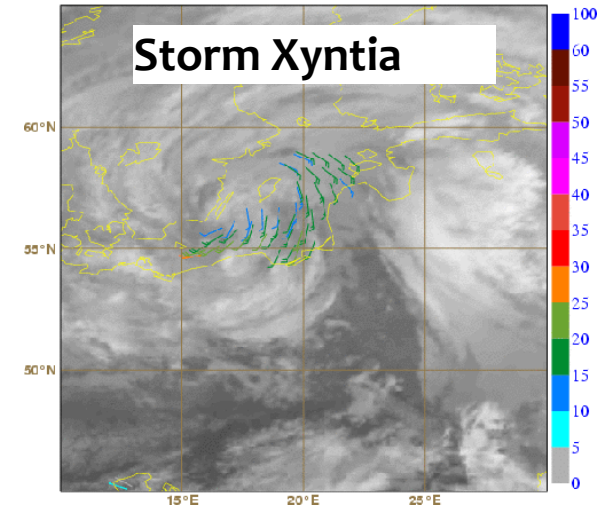
Photos: Martin Stendel and Finn Majlergaard

Natural hazards and extreme events in the Baltic Sea region



Background:

- Many natural hazards have hydrometeorological origin (storms, waves, flooding, droughts).
- Natural hazards are often caused by several factors (storm surge in combination with precipitation and river runoff might cause extreme flooding).
- Prediction capabilities are very limited. This is generally well recognized regarding infrastructure such as dam safety and urban flooding risks.
- The range of ecosystem services at risk is more poorly defined, from vital societal functions such as drinking water supply to biodiversity.



Previously suggested key research themes



- Understanding changes in atmospheric circulation in the Northern Hemisphere (due to higher global mean temperatures and reduced sea ice in the Arctic Ocean) and the impact of circulation changes on climate extremes in the Baltic Sea region in the future.
- Response and contribution of marine processes to changes in extreme and climate variability (water level, waves, ice conditions, sea surface temperature).
- Monthly to seasonal prediction systems and probabilistic estimates of the extreme events.
- How has the achievement of environmental goals influenced changes in extreme conditions (droughts, floods and heat waves)?
- How vulnerable is drinking water security to hydrometeorological extremes?
- What is the response of marine ecosystems to extreme events (coastal processes) using integrated studies (what drives what, when and how?).
- How will the carbon cycle of the Baltic Sea region respond to changes in extreme conditions (the amount, timing and quality of carbon delivered to the Baltic Sea, and the subsequent fate of that carbon).



Gudrun Storm



Workshop goals



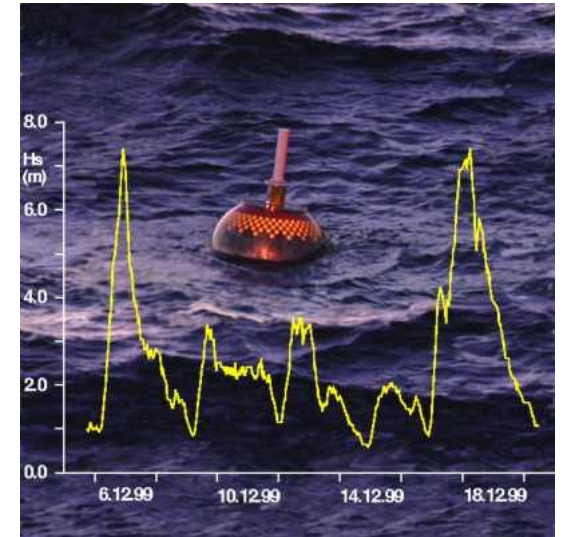
- To establish linkages between groups focusing on observations, statistical analysis and predictions
- To identify gaps in knowledge and weaknesses in our ability to observe, understand and statistically calculate extreme events, and
- To review modelling capabilities to estimate the occurrence of extreme events.

Snowstorm in Gävle



Workshop plan

- Presentations
- Posters
- Topically focused working groups



Projected outcomes

Projected outcomes are

- a review of the current state-of-the-art research, gaps and advances in observations, analysis, modeling and prediction (focusing on the scientific understanding),
- action items with identified partners on how to coordinate overlapping interests, close gaps in knowledge, and enhance networking between groups; and
- plans for further research in Baltic Earth.



Drought map

Anomaly forecast for 2012-01-16

