Assessment of Climate Change for the Baltic Sea Basin

The BACC Project

International Conference
Göteborg, Sweden
22 – 23 May 2006

Programme

BACC (BALTEX Assessment of Climate Change for the Baltic Sea Basin) integrates available knowledge of historical, current and expected future climate change. The unique feature of BACC is the combination of evidence on climate change and related impacts on marine, freshwater and terrestrial ecosystems in the Baltic Sea Basin, which encompasses the entire water catchment region surrounding the Baltic Sea.

The **Purpose of the Conference** is to discuss the BACC assessment with the scientific community, interested stakeholders, including policy makers and journalists. The first day of the Conference will be devoted to scientific discussions and the individual chapter lead authors will present the BACC results both as oral lectures and posters. The second day discussions will be dedicated to bridge science, policy and public and includes a panel discussion.

Background: The BACC project is a joint venture of BALTEX (Baltic Sea Experiment) and HELCOM, the Baltic Marine Environment Protection Commission, as an example of a dialogue between the scientific community and environmental policy makers. Based on available literature, BACC provides an assessment of ongoing and possible future climate variations in the Baltic Sea basin, where the term *climate variations* is used for both *natural climate variability* and *anthropogenic climate change*. BALTEX is a continental-scale experiment within GEWEX (Global Energy and Water Cycle Experiment) and WCRP (World Climate Research Programme).

The Conference is jointly organized by

GÖTEBORG UNIVERSITY

GKSS FORSCHUNGSZENTRUM

Monday, 22 May 2006 The Scientific Discussion

8.30 Registration

Coffee and refreshments

10.00 **Opening and Welcome**

Addresses will be given on behalf of

- The City of Göteborg (*Elisabet Rothenberg,* First Deputy Lord Mayor)
- Göteborg University (*Gunnar Svedberg*, Vice-chancellor)
- BALTEX (*Hartmut Graßl*, SSG Chair)
- HELCOM (*Anne Christine Brusendorff*, Executive Secretary)
- The BACC project (*Hans von Storch*, Coordinator and SSC Chair)

10.45 **Part 1: Presentation of BACC results**

Chair: *Anders Omstedt,* Göteborg University, Sweden

The responsible lead authors organize a lecture session of one hour duration for each BACC chapter. The focus of this part is on presentation for the scientific community. Here, only limited time will be devoted to discussion with the audience, while more extended possibilities for detailed discussion will be given in part 2, see below.

10.45 ***Detection of past and current climate change***

Speaker: *Raino Heino*, Finnish Meteorological Institute, Finland

Knowledge on past and current change and variability of components of the climate system of the Baltic Sea Basin will be assessed. Evidence presented spans the preceding two centuries. The section entitled *the atmosphere* focuses on atmospheric circulation and parameters such as surface air temperature, precipitation, cloud amount and surface radiation budget components. Also included are findings on extremes of *e.g.* air temperature, precipitation, wind speed and storms. *Hydrological changes* dealt with cover the entire water catchment of the Baltic Sea and are divided into the water regime, including runoff, lakes, wetlands, floods and droughts; ice conditions on rivers and lakes; and snow cover. *The Baltic Sea* section addresses a variety of marine parameters, such as temperature and salinity, optical properties, sea level, water exchanges to the North Sea, sea ice, wind waves, and coastal erosion.

11.30 Questions and Discussion

11.45 ***Projections of future climate change***

Speaker: *L. Phil Graham*
Swedish Meteorological and Hydrological Institute, Sweden

The science of establishing climate change projections, taking into account anthropogenic influence on greenhouse gases, is the focus of this chapter. An overview of the current understanding of global climate change and how this is applied for projections into the 21st century for the Baltic Sea basin is given. Important processes for the global climate and their representation in global climate models (GCMs) are introduced. Projected global changes are summarised and then put into specific context for the Baltic Sea basin. This includes discussion of the performance of such models for the present climate. A range of future climate outcomes is presented, originating from using several GCMs and from using a set of different projected greenhouse gases emissions scenarios. Due to the coarse scales of GCMs, downscaling techniques are used to produce detailed results on regional to local scales. Methods for both statistical downscaling and dynamical downscaling using regional climate models are described. Results for the key climate variables of precipitation and temperature, and others, are summarised for the Baltic Sea basin. Projections of climate change are further coupled to hydrological and oceanographic processes via models to assess basin wide climate change impacts. Hydrological modelling shows how climate-driven changes impact on the distribution and timing of runoff into the Baltic Sea. Oceanographic modelling shows corresponding changes to water temperature, sea ice, salinity and sea levels.

12.30 Questions and Discussion

12.45 *Lunch*

14.00 Chair: *Markku Rummukainen*
Swedish Meteorological and Hydrological Institute, Sweden

14.00 ***Climate-related change in terrestrial and fresh-water ecosystems***

Speaker: *Benjamin Smith*, Lund University, Sweden

The potential impacts of the changing physical climate system, as highlighted in the preceding chapters, on terrestrial and freshwater ecosystems of the Baltic Sea basin are synthesized from available studies. Two hypotheses, namely, (i) that climate change over recent decades has affected ecosystems within the Baltic Sea basin, impacting the services they provide to human society; and, (ii) that ongoing climate change will cause further changes in ecosystems and their services over the remainder of the 21st century, are evaluated and assessed. We attempt to distinguish impacts of climate from those of other drivers of ecosystem processes, such as atmospheric CO_2 concentrations, nutrient deposition rates, as well as changes in human land use and land management. As terrestrial, freshwater and marine ecosystems do not exist in isolation from each other, we also address links between them, specifically nutrient fluxes from land ecosystems to the Baltic Sea, and eutrophication of freshwater and marine habitats due to pollution loads from agriculture.

14.45 Questions and Discussion

15.00 ***Climate-related change in marine ecosystems***

Speaker: *Joachim W. Dippner*
Baltic Sea Research Institute IOW, Warnemünde, Germany

Climate induced changes in the marine ecosystem of the Baltic Sea dealt with here consider changes through all trophic levels from bacteria up to sea birds and marine mammals. As with the terrestrial ecosystems we relate the marine ecosystem changes to the past, present and possible future changes and variability assessed in the physical climate system, where we attempt to discriminate between natural variability and anthropogenic climate change. Human related change in marine ecosystem also considers external inputs such as atmospheric input, input of nutrients and contaminants, and eutrophication due to aquaculture as well as external pressure due to other use of the Baltic Sea.

15.45 Questions and Discussion

16.00 **Part 2: Discussion of BACC results at posters**
Conference participants are invited to discuss the BACC results presented in part 1 of the Conference with BACC authors. Posters showing main BACC results presented in part 1 of the Conference are displayed for detailed discussion purposes. Both lead and contributing authors will be available for discussion with the audience. Refreshments will be offered along with the discussion for a healthy and fruitful discussion environment.

Coffee and refreshments are served during poster discussions.

18.30 **Joint Dinner of Conference participants**

Tuesday, 23 May 2006 Creating Public Awareness

9.00 **Part 3: Present knowledge on climate change**

Chair: *Mikko Alestalo,* Finnish Meteorological Institute, Finland

This part of the Conference will summarise the BACC results and present the HELCOM experience on the co-operation with the BACC scientists, as background for the subsequent panel discussion. The target community to be addressed will include scientists and in particular stakeholders, such as policy makers, environmental administration, public and media.

9.00 **Summary of BACC results**

Speaker: *Hans von Storch*, GKSS Research Centre, Germany

10.00 **HELCOM (Helsinki Commission) bridging science and policy**

The BACC scientists and HELCOM have been co-operating to use the scientific findings of BACC for producing a HELCOM Thematic Assessment Report on Climate Change in the Baltic Sea area. Experiences on the co-operation and the HELCOM requirements on environmental assessment with special reference to the BACC assessment are summarized.

Speakers: *Juha-Markku Leppänen, Janet Pawlak*
Helsinki Commission (HELCOM), Finland

10.30 *Health break*

11.00 **Part 4: Panel discussion on climate change and related implications**

The objective of the panel discussion will be bridging science and policy using the BACC-HELCOM co-operation as an example and thereby discussing questions such as: What are major messages of the Conference and related implications? How can information on climate change research best be transferred to the public? How can scientific knowledge be translated into environmental actions? What is the role of advanced science in policy making, and what is required by policy makers and the public? Panel members will include scientists, representatives of stakeholders, and media.

Panel members

- *Sirpa Asko-Seljävaara*, Member of the Finnish Parliament, Finland
- *Lennart Bengtsson*, University of Reading, United Kingdom
- *Anne Christine Brusendorff*, HELCOM Executive Secretary, Finland
- *Heike Imhoff*, Head of German delegation to HELCOM, Germany
- *Annika Söderpalm*, Journalist, Sweden; moderator of the panel discussion
- *Andres Tarand*, Member of European Parliament, Estonia
- *Gerald Traufetter*, Science editor of the German weekly news magazine "Der Spiegel", Germany
- *Hans von Storch*, BACC SSC chair, GKSS Research Centre, Germany
- *Maciej Zalewski*, Director of the European Regional Centre for Ecohydrology under the auspices of UNESCO, Lodz, Poland

13.00 **Closing of the Conference**

The BACC Project

BACC Science Steering Committee

Hans von Storch (Chair), GKSS Research Centre Geesthacht, Germany
Sten Bergström, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Jens Hesselbjerg Christensen, Danish Meteorological Institute, Copenhagen, Denmark
Eigil Kaas, Danish Meteorological Institute, Copenhagen, Denmark
Zbigniew W. Kundzewicz, R.C. of Agriculture and Forest Environment, Poznan, Poland
Anders Omstedt, Göteborg University, Sweden
Jouni Räisänen, Helsinki University, Finland
Markku Rummukainen, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Morten Søndergaard, Copenhagen University, Denmark
Bodo von Bodungen, Baltic Sea Research Institute, Warnemünde, Germany

BACC lead authors

Joachim Dippner, Baltic Sea Research Institute, Warnemünde, Germany
Phil Graham, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Bo Gustafsson, Göteborg University, Sweden
Raino Heino, Finnish Meteorological Institute, Helsinki, Finland
Anders Omstedt, Göteborg University, Sweden
Benjamin Smith, Lund University, Sweden
Heikki Tuomenvirta, Finnish Meteorological Institute, Helsinki, Finland
Hans von Storch, GKSS Research Centre Geesthacht, Germany
Valery Vuglinsky, Russian State Hydrological Institute, St. Petersburg, Russia
Ilppo Vuorinen, University of Turku, Finland

BACC authors

Anto Aasa, University of Tartu, Estonia
Rein Ahas, University of Tartu, Estonia
*Hans Alexandersson***,** Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Philip Axe, Swedish Meteorological and Hydrological Institute, Vastra Frolunda, Sweden
Lars Bärring, Meteorological and Hydrological Institute, Norrköping, and Lund University, Sweden
Svante Björck, Lund University, Sweden
Thorsten Blenckner, Uppsala University, Sweden
Agrita Briede, University of Latvia, Riga, Latvia
Terry Callaghan, KVA Abisko Scientific Research Station, Sweden
John Cappelen, Danish Meteorological Institute, Copenhagen, Denmark
Deliang Chen, Göteborg University, Sweden
Ole Bøssing Christensen, Danish Meteorological Institute, Copenhagen, Denmark
Gerhard Dahlmann, Bundesamt für Schifffahrt und Hydrographie, Hamburg, Germany
Darius Daunys, Klaipeda University, Lithuania
Jacqueline de Chazal, Université Catholique de Louvain, Belgium
Malgorzata Falarz, University of Silesia, Sosnowiec, Poland
Jüri Elken, Estonian Marine Institute, University of Tartu, Tallinn, Estonia
Juha Flinkman, Finnish Institute of Marine Research, Helsinki, Finland
Eirik Førland, Norwegian Meteorological Institute, Oslo, Norway
Jari Haapala, Finnish Institute of Marine Research, Helsinki, Finland
Eberhard Hagen, Baltic Sea Research Institute, Warnemünde, Germany
Lars Håkanson, Uppsala University, Sweden
Antti Halkka, University of Helsinki, Finland
Marianne Holmer, University of Southern Denmark, Odense, Denmark
Christoph Humborg, Stockholm University, Sweden

BACC authors (continued)

Hans-Jörg Isemer, GKSS Research Centre Geesthacht, Germany
Jaak Jaagus, University of Tartu, Estonia
Anna-Maria Jönsson, Lund University, Sweden
Seppo Kellomäki, University of Joensuu, Finland
Lev Kitaev, Institute of Geography, RAS, Moscow, Russia
Erik Kjellström, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Friedrich Köster, Danish Institute for Fisheries Research, Charlottenlund, Denmark
Are Kont, Tallinn University, Estonia
Valentina Krysanova, Potsdam Institute for Climate Impact Research, Germany
Ain Kull, University of Tartu, Estonia
Esko Kuusisto, Finnish Environment Agency, Helsinki, Finland
Esa Lehikoinen, University of Turku, Finland
Maiju Lehtiniemi, Finnish Institute of Marine Research, Helsinki, Finland
Göran Lindström, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden
Brian MacKenzie, Danish Institute for Fisheries Research, Charlottenlund, Denmark
Ülo Mander, University of Tartu, Estonia
Wolfgang Matthäus, Rostock University, Germany
Markus Meier, Swedish Meteorological and Hydrological Institute, Norrköping , Sweden
Miroslaw Mietus, Institute of Meteorology and Water Management, Gdynia, Poland
Anders Moberg, Stockholm University, Sweden
Christian Möllmann, Danish Institute for Fisheries Research, Charlottenlund, Denmark
Flemming Møhlenberg, Danish Hydrological Institute, Hørsholm, Denmark
Kai Myrberg, Finnish Institute of Marine Research, Helsinki, Finland
Tadeusz Niedzwiedz, University of Silesia, Sosnowiec, Poland
Tiina Nõges, Estonian University of Life Sciences, Estonia
Peeter Nõges, EC Joint Research Centre, Ispra, Italy
Øyvind Nordli, Norwegian Meteorological Institute, Oslo, Norway
Sergej Olenin, Klaipeda University, Lithuania
Kaarel Orviku, Merin Ltd., Estonia
Zbigniew Pruszak, Institute of Hydroengieneering, PAS, Gdansk, Poland
Maciej Radziejewski, R. C. of Agriculture and Forest Environment, Poznan, Poland
Jouni Räisänen, University of Helsinki, Finland
Egidijus Rimkus, Vilnius University, Lithuania
Burkhardt Rockel, GKSS Research Centre Geesthacht, Germany
Mark Rounsevell, Université Catholique de Louvain, Belgium
Kimmo Ruosteenoja, Finnish Meteorological Institute, Helsinki, Finland
Viivi Russak, Tartu Observatory, Estonia
Ralf Scheibe, Greifswald University, Germany
Doris Schiedek, Baltic Sea Research Institute, Warnemünde, Germany
Corinna Schrum, Hamburg University, Germany
Klaus Schwarzer, University of Kiel, Germany
Henrik Skov, Danish Hydrological Institute, Hørsholm, Denmark
Mikhail Sofiev, Finnish Meteorological Institute, Helsinki, Finland
Wilhelm Steingrube, Greifswald University, Germany
Ülo Suursaar, University of Tartu, Estonia
Piotr Tryjanowski, Adam Mickiewicz University, Poznan, Poland
Timo Vihma, Finnish Meteorological Institute, Helsinki, Finland
Bodo von Bodungen, Baltic Sea Research Institute, Warnemünde, Germany
Norbert Wasmund, Baltic Sea Research Institute, Warnemünde, Germany
Joanna Wibig, University of Lodz, Poland
Annett Wolf, Lund University, Sweden

Conference Venue:
Conference Centre Wallenberg of Göteborg University, Medicinaregatan 20 A

The Conference is jointly organized by

Göteborg University

GÖTEBORG UNIVERSITY

GKSS Research Centre Geesthacht

GKSS FORSCHUNGSZENTRUM in der HELMHOLTZ-GEMEINSCHAFT

HELCOM Helsinki Commission

The following institutions act as co-organizers and support the Conference

Swedish Meteorological and Hydrological Institute, Norrköping, Sweden

SMHI

The Swedish National Committee for IGBP and WCRP, Stockholm, Sweden

KUNGL VETENSKAPSAKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES
Svenska Nationalkommittén för IGBP och WCRP
The Swedish National Committee for the IGBP and WCRP

Finnish Meteorological Institute Helsinki, Finland

Baltic Sea Research Institute Warnemünde, Germany

IOW

Finnish Institute of Marine Research Helsinki, Finland

FIMR