



First WORKSHOP
on
BALTEX ASSESSMENT OF CLIMATE CHANGE
for the Baltic Sea basin (BACC)

Helsinki, Finland
19 – 20 May 2005



The workshop was held at the HELCOM¹ Secretariat.
Katajanokanlaituri 6 B
FIN-00160 Helsinki, Finland
Tel: +358-(0)9-6220 220
Fax: +358-(0)9-6220 2239

Minutes
(final, as of 8 June 2005)

1. Introduction and Overview

33 participants (see Appendix 1) attended the workshop, including four members of the BACC SSC (Anders Omstedt, Markku Rummukainen, Jouni Räisänen, Hans von Storch). The workshop implementation – in terms of both topics covered and time line – followed closely the workshop agenda, see Appendix 4.

Warm welcome notes were given by Hans von Storch (BACC SSC Chair) as well as Anne Christine Brusendorff (HELCOM Executive Secretary) and Juha-Markku Lepänen (HELCOM Secretary) at the workshop opening. Most of day 1 of the workshop were devoted to summary presentations of the BACC material compiled so far and in-depth discussions of the presented material. The plenary presentations were grouped according to the present book chapters 2, 3 and 4, preceded by an overall introduction given by Hans von Storch. Speakers on chapter 2 included Raino Heino, Heikki Tuomenvirta, Valeri Vuglinski, and Bo Gustafsson. Chapter 3 was presented by Phil Graham, Jouni Räisänen and Erik Kjellström. Joachim Dippner summarized Chapter 4. The ppt files of the presentations are made available for all workshop participants and BACC contributing authors via the BACC website².

The breakout session part of the workshop was conducted in two successive rounds during the second half of the afternoon on 19 May. In the first round three chapter groups convened to review the plenary discussions and discuss implications for the

¹ Helsinki Commission, see www.helcom.fi

² www.gkss.de/BACC

individual chapters. Both the plenary discussion and this first breakout session concluded 1) to relocate parts of the presently compiled material across present chapter divisions, and 2) to complement the presently compiled chapters by further material. Hence, three cross-chapter breakout groups were formed with the objective to discuss and recommend cross-chapter material relocation and addition, including the respective “move” of contributing authors across chapters, if required.

The hard and successful work of day 1 was acknowledged by a delicate reception in the evening of 19 May, which was generously provided by HELCOM.

Day 2 (20 May) started with summary reports given by the chairpersons of the outbreak groups. Decisions on a revised book structure, additional leading and contributing authors, as well as the time plan for future action items and milestones were agreed upon in plenary. Hans von Storch closed the workshop on schedule at 3 pm on 20 May. He in particular appreciated HELCOM’s hospitality and all participants’ engaged contributions.

2. Major Findings and Decisions

2.1 The whole book and individual chapters are expected to formulate one or several hypothesis based on the findings as an overall guidance. For the book as a whole the following two draft hypothesis were suggested:

Hypothesis 1: The current climate change, as observed during the recent 30 years, has already effected the Baltic Sea basin ecosystem.

Hypothesis 2: Future change may cause large changes in the Baltic Sea basin ecosystem and the distribution of key species.

2.2 The character of the whole book is meant to be a description of the state of knowledge claims on the various aspects addressed, including both consensus and – if necessary – clearly spelled-out dissent. So to speak: consensus on dissent. Therefore the authors groups of the various aspects need to be broad. It was also noted that the individual sections and sub-chapters will therefore be “de-personalized” in the sense that all contributing authors will be named in summary for a whole chapter, but no individual link to the specific contribution will be visible. The only exception is the planned annex, see 2.4 The book is a group effort and a group result, not a collection of individual text contributions. The present chapter 4 does not follow this approach consequently enough, but is more a kind of collection of top-expert assessments of the various aspects, and therefore chapter 4 needs substantial revision in this respect. As a consequence, the preparation of chapter 4 is not as advanced as with the other chapters, the reason of which was identified to be a communication problem between the chairman and the lead authors.

2.3 The contents of the present chapter 4 “Climate Related Ecosystem Change” is biased towards *marine* ecosystems. A new chapter 4 on “Climate-related Change in *Terrestrial and Freshwater Ecosystem Change*” (Lead author: Ben Smith) shall be established where existing parts of the present chapter 4 will have to be merged with. The future chapter 5 on “Climate Related Chang in *Marine Ecosystem*” will have three lead authors, Bodo von Bodungen, Joachim Dippner and Ippo Vuorinen.

2.4 Chapters 2 to 5 shall concentrate on changes and trends etc, any descriptions of the state of and processes in the Baltic Sea Basin, which are necessary to understand chapters 2 to 5, will be shifted to the annex of the book. The annex will also include supplementary information, such as details on NAO and AO, statistical methods, data homogeneity etc., for details see the revised structure of the planned book below. The annex shall be of a textbook type with detailed description, which are necessary to understand the described changes in the book chapters. They are expected to contain non-controversial, established facts. The annex is therefore the only part where individual authors for sub-chapters or sections will be named.

2.5 Much of the present chapter 4.1 should go either to chapter 2 (those parts dealing with changes in the physical system, e.g. 4.1.4) or to the annex (e.g. 4.1.1, 4.1.3, and 4.1.7).

2.6 In order to avoid any miss-understandings and inconsistencies across individual chapters, any statements on changes or trends shall precisely identify the valid time period and location or region, and shall make reference to the source quoted. Whenever possible, the most recent time period until 2004 shall be considered because of possible changes in the NAO regime and related changes in the region during the 1990s.

2.7 Several cross links exist in particular between chapters 2 and 3, and chapters 2 and both 4 and 5. It is the responsibility of the chapter lead authors to provide for communication between chapters to avoid inconsistencies. Chapter lead authors are expected to have sufficient cross-chapter understanding. The commitment to the agreed book and chapter hypothesis

2.8 A language editing shall be conducted. Deliang Chen will contact a language editor to learn about prices, procedures and time lines.

3. Revised Structure of the BACC Book

The revised chapter structure is given including some action items and decisions, which are not already mentioned under 2.

Chapter 1: Introduction and Policy Advise

Responsible lead author: Hans von Storch

Details will be established after the external review and finally discussed at the 2nd BACC workshop in Warsaw.

Chapter 2: Past and Current Climate Change, Detection and Attribution

Responsible lead authors: Raina Heino, Heikki Tuomenvirta

Should be shortened to about 100 pages; some parts will go into the annex, e.g. the technical description of NAO, AO;

Chapter 3: Projections of Future Climate Change

Responsible lead author: L. Phil Graham

Chapter 4: Climate-related Change in Terrestrial and Freshwater Ecosystems

Responsible lead author: Ben Smith

Suggested structure : see Appendix 2.

Most of this new chapter will still have still to be written, some parts of the present chapter 4 may be merged; strong coordination with chapter 5 is mandatory; Maciej Radziejewski will suggest contributing authors with knowledge on literature in Polish language.

Chapter 5: Climate-related Change in Marine Ecosystems

Responsible lead authors: Bodo von Bodungen, Joachim Dippner, Ilppo Vuorinen
Major revisions needed, strong coordination with Chapter 4 (Ben Smith) is mandatory. Suggested structure see Appendix 3.

Annexes

This is a new part, the structure of which including responsible authors and maximum number of pages are suggested as follows:

Annex 1: Physical system description (15 pages)

- i) Baltic Sea (Jüri Elken)
- ii) Atmosphere (Hans-Jörg Isemer)
- iii) Hydrology and land surfaces, including rivers and lakes (Esko Kuusisto)

Annex 2: Geology description (5 pages)

(Svante Bjoerk)

Annex 3: Ecosystem description (15 pages)

- i) marine ecosystem (Maijo Lehtiniemi)
- ii) terrestrial ecosystem (Ben Smith)

Annex 4: Observational data used (4 pages)

- i) Atmosphere (Øyvind Nordli)
- ii) Ocean (Philip Axe)
- iii) Runoff (Esko Kuusisto with Göran Lindström)
- iv) Ecology (Juha Flinkman)

Annex 5: Data homogeneity issues (5 pages)

(Raino Heino)

Annex 6: Climate models and scenarios (5 pages)

(Burkhardt Rockel)

Annex 7: NAO and AO (2 pages)

(Joanna Wibig)

Annex 8: Statistical background (trends, significance, oscillation, regime shift,..) (5 pages)

(Hans von Storch, Anders Omstedt)

Annex 9: Glossary

(Responsible coordination: Maciej Radziejewski)

Annex 10: Acronyms

(Responsible coordination: Anders Omstedt)

4. Future BACC Time Line and Milestones

Ad-hoc

H.-J. Isemer to implement E-Mail address list group names for BACC chapter author groups and BACC SSC, as appropriate.

H.-J. Isemer to arrange details for the 2nd BACC workshop to be held 8 and 9 December 2005 in Warsaw, Poland.

H.-J. Isemer to inform Hartmut Graßl, the BALTEX SSG chairman on the results of this workshop and ask him to initiate the organisation of the external review of the BACC material during 1 October to 15 November 2005.

Maciej Radziejewski to suggest contributing authors with knowledge on literature in Polish language, for the new chapter 4, to be communicated to Ben Smith.

Deliang Chen to contact a language editor to learn about prices, procedures and time lines, and communicate to Hans von Storch on this matter.

Joachim Dippner to ask Svante Bjoerk to act as author for Annex A2 on Geology of the Baltic Sea Basin.

Before 10 June 2005

Chapter lead authors to provide the revised chapter contents structure to H.-J. Isemer, for re-distribution, discussion and conclusion by all authors. If possible, this should include a summary including major hypothesis.

Before 1 September 2005

Chapter lead authors and all contributing authors to provide review-ready text for chapters 2 to 5 and the appendices of the BACC book. During September 2005, the compiled BACC material will be subject to an *BACC-internal* review in particular to be provided by BACC SSC members.

1 October 2005

Hans von Storch, Hans-Jörg Isemer, and all lead authors to arrange that the BACC text for chapters 2 to 5 including the appendices is ready for the *BACC-external review* to be organised by the BALTEX SSG chairman Hartmut Graßl. The results of this review are expected to be available **by 15 November 2005**.

15 November 2005

Hans von Storch, Hans-Jörg Isemer, and all lead authors to arrange that the suggestions put forward by the external review are properly accounted for in a revised text version of the BACC text material.

8 and 9 December 2005

2nd BACC Workshop to be held in Warsaw, Poland. The objective of this workshop is to agree on “consensus and dissent” of the BACC book, to discuss the final version of the introduction chapter including policy advice. Workshop participation is manda-

tory for all lead authors and SSC members, all contributing authors are urgently invited to attend.

January 2006

The reviewed and finally concluded BACC material is ready for 1) start of the final editing, including language and technical editing, for the BACC book, and 2) being presented to HELCOM as a base for a thematic assessment report by HELCOM.

Further milestones and deadlines remain valid as planned at the BACC meeting in Copenhagen, January 2005. See the minutes of this meeting for details.

Draft minutes by Hans-Jörg Isemer
25 May 2005

Approved Hans von Storch
30 May 2005

Approved by workshop participants
8 June 2006

Appendix 1

Workshop Participants
as of 20 May 2005

	Name	Affiliation	Country	Chapter
1	Bøssing Christensen, Ole	Danish Meteorological Institute DMI, Copenhagen	Denmark	3
2	Chen, Deliang	Göteborg University, Earth Sciences Center-Oceanography	Sweden	2, 3
3	Dippner, Joachim	Baltic Sea Research Institute, Warnemünde	Germany	4
4	Elken, Jüri	Estonian Marine Institute, Department of Marine Physics, Tallinn	Estonia	4
5	Flinkman, Juha	Finnish Institute of Marine Research, Oceanographic Data Base, Helsinki	Finland	4
6	Graham, L. Phil	Swedish Meteorological and Hydrological Institute SMHI, Rossby Centre, Norrköping	Sweden	3
7	Gustafsson, Bo	Göteborg University, Earth Sciences Center-Oceanography	Sweden	2
8	Haapala, Jari	Finnish Institute of Marine Research, Helsinki	Finland	2
9	Halkka, Antti	Finnish Association for Nature Conservation, Helsinki	Finland	4
10	Heino, Raino	Finnish Meteorological Institute, Helsinki	Finland	2
11	Isemer, Hans-Jörg	GKSS Research Centre, Geesthacht	Germany	-
12	Jaagus, Jaak	University of Tartu, Institute of Geography	Estonia	2
13	Kjellström, Erik	Swedish Meteorological and Hydrological Institute SMHI, Rossby Centre, Norrköping	Sweden	3
14	Kuusisto, Eesko	Finnish Environment Agency, Helsinki	Finland	2
15	Lehikoinen, Esa	University of Turku, Dept. of Biology	Finland	4
16	Myrberg, Kai	Finnish Institute of Marine Research, Helsinki	Finland	2
17	Niedzwiedz, Tadeusz	University of Silesia, Branch of Kraków, Dept. of Climatology, Sosnowiec	Poland	2
18	Nordli, Øyvind	Norwegian Meteorological Institute, Oslo	Norway	2
19	Omstedt, Anders	Göteborg University, Earth Sciences Center-Oceanography	Sweden	2
20	Radziejewski, Maciej	Polish Academy of Sciences, Research Centre for Agricultural and Forest Environment, Poznan	Poland	3
21	Räisänen, Jouni	University of Helsinki, Div. of Atmospheric Sciences	Finland	3
22	Rimkus, Egidijus	Vilnius University, Department of Hydrology and Climatology	Lithuania	2
23	Rockel, Burkhardt	GKSS Research Centre Geesthacht	Germany	3
24	Rummukainen, Markku	Swedish Meteorological and Hydrological Institute SMHI, Norrköping	Sweden	3
25	Smith, Ben	Lund University, Sweden	Sweden	4
26	Skov, Henrik	Danish Hydrological Institute, Water & Environment, Hørsholm	Denmark	4
27	Sofiev, Mikhail	Finnish Meteorological Institute, Air Quality, Helsinki	Finland	4
28	Tuomenvirta, Heikki	Finnish Meteorological Institute, Helsinki	Finland	2
29	Vihma, Timo	Finnish Meteorological Institute, Helsinki	Finland	2
30	von Storch, Hans	GKSS Research Centre Geesthacht	Germany	all
31	Vuglinski, Valery	Russian State Hydrological Institute, St. Petersburg	Russia	2
32	Vuorinen, Ilppo	University of Turku, Archipelago Research Institute	Finland	4
33	Wibig, Joanna	University of Lodz Department of Meteorology and Climatology	Poland	2

Appendix 2

Suggested structure of (new) Chapter 4: Climate-related change in terrestrial and freshwater ecosystems by Ben Smith

4.1 Introduction

Hypotheses:

1. Recent climate change has caused changes in the structure and functioning of terrestrial and freshwater ecosystems in the Baltic catchment area, with impacts on the goods and services they deliver to society.
2. Ongoing climate change will cause further changes in the structure and functioning of terrestrial and freshwater ecosystems in the Baltic catchment area during the next 100 years; this will have further impacts on the goods and services they deliver to society

4.2 Terrestrial ecosystems

4.2.1 Mechanisms of change

- species distributions
- ecosystem biogeochemistry
 - primary production
 - carbon storage
 - hydrology
- non-climatic impacts (includes human impacts)
 - land use
 - forest management
 - agricultural practices
 - nitrogen deposition

4.2.2 Recent and historical impacts

- Potential natural vegetation
- Managed forests
- Agroecosystems

4.2.3 Potential future impacts

- Potential natural vegetation
- Managed forests
- Agroecosystems

4.3 Freshwater aquatic ecosystems

4.3.1 Mechanisms of change

4.3.2 Recent and historical impacts

4.3.3 Potential future impacts

4.4 Feedbacks on other systems

4.4.1 Climate

4.4.2 Marine ecosystems

4.5 Summary

- Evaluation of hypotheses 1 and 2

Appendix 3

Chapter 5 Climate-related change in marine ecosystems

Lead authors: Bodo von Bodungen, Joachim W. Dippner, Ilppo Vuorinen

5.1 Introduction

5.2 Human related ecosystem change

5.2.1 External Input (atmospheric input, nutrients, contaminants, agriculture, aquaculture)

5.2.2 External Pressure (fisheries, sea traffic, tourism)

5.3 Climate related ecosystem change

5.3.1 Introduction

5.3.2 Bacteria

5.3.3 Phytoplankton

5.3.4 Zooplankton

5.3.5 Benthos

5.3.6 Fish

5.3.7 Marine mammals

5.3.8 Sea birds

5.4 Summary

Appendix 4: Explanatory Memorandum and Agenda



WORKSHOP on BALTEX ASSESSMENT OF CLIMATE CHANGE for the Baltic Sea basin (BACC)

**Helsinki, Finland
19 – 20 May 2005**



The workshop will be held at the HELCOM Secretariat.
Katajanokanlaituri 6 B
FIN-00160 Helsinki, Finland
Tel: +358-(0)9-6220 220
Fax: +358-(0)9-6220 2239

3rd Circular as of 16 May 2005

EXPLANATORY MEMORANDUM

Background and Purpose of the Workshop

The objective of the BACC (BALTEX Assessment of Climate Change for the Baltic Sea basin) initiative is to provide the scientific community with an assessment of ongoing climate change in the Baltic Sea Basin based on accessible literature. An important element is the comparison with the historical past (until about 1800) to provide a framework for the severity and unusualness of the change. The planned deliverable of BACC is a review book on our present knowledge about climate changes in the Baltic Sea basin. A group of contributing and lead authors has therefore been established, and individual chapters of the planned book are currently being drafted. The purpose of this workshop is to review the compiled material, harmonize individual chapter contents against the objectives of the book, and undertake all possible efforts towards establishing a final draft manuscript. The expected participants to this workshop are all contributing authors, and members of the BACC Science Steering Group. The workshop will consist of plenary and chapter outbreak sessions and is expected to run for two days.

BACC has recently been endorsed by the BALTEX Science Steering Group, and a joint project with HELCOM (the Helsinki Commission) was suggested in the sense, that HELCOM has indicated interest for using the compiled BACC material for specific HELCOM thematic reports. The workshop will therefore be organised at HELCOM facilities in Helsinki, Finland.

PROVISIONAL AGENDA

Wednesday, 18 May 2005

As the official start of the workshop is early Thursday morning, participants are strongly encouraged to travel to Helsinki already on 18 May.

An informal, non-organized get-together is planned from **20.00 hours** onwards in the “**Key West**” pub located in the building of the **Hotel Grand Marina**.

Thursday, 19 May 2005

9.00 **Opening and Introduction**
Hans von Storch, BACC SSC chairman
Representative of HELCOM
Others tbd

Presentation of Chapters Contents and Discussion

The present chapters contents will be reviewed by the respective chapter lead author. The material presented will be open for discussion by all participants.

9.30 **Chapter 2: Past and Current Climate Change**
Speakers: Raino Heino and Heikki Tuomenvirta
Discussion

Break

11.30 **Chapter 3: Projections of Climate Change**
Speaker: Phil Graham
Discussion

13.00 *Lunch*

Presentation of Chapter Contents and Discussion (*continued*)

14.00 **Chapter 4: Climate-related Ecosystem Change**
Speaker: Bodo von Bodungen
Discussion

15.30 *Break*

16.00 **Breakout Sessions**

Authors of each chapter will convene in separate chapter sessions to discuss the outcome of the morning session and implications for the material to be included in the next draft chapter version.

Breakout sessions are expected to continue throughout the afternoon.

19.00 **Reception at the HELCOM Secretariat**

Friday, 20 May 2005

9.00 Plenary: Summary Presentations of Breakout Sessions

The chapter lead authors will review discussions and conclusions of the breakout sessions. A final overview on the material and findings of chapters 2 to 4 are expected to be given.

10.30 *Break*

11.00 Presentation of the Introduction and Summary chapters

Speaker: Hans von Storch

Discussion

13.00 *Lunch*

14.00 **Final discussion**
Wrap up of the workshop
Future actions and time line
Any other business

15.00 **Closing of the workshop**

Local Logistics

Contact person at HELCOM
Ms. Satu Tofferi-Bishai
Tel: +358- (0)9-6220 2224
E-mail: satu.tofferi-bishai@helcom.fi

Accommodation

Block bookings have been made for 18-20 May 2005 at the following two hotels within walking distance from the HELCOM Secretariat. Participants are kindly requested to make their own reservations directly to one of the hotels below.

Hotel Grand Marina****

Address: Katajanokanlaituri 7, 00160 Helsinki (opposite to HELCOM Secretariat)
Tel.int.: **+358-(0)9-1666 800**
Fax int.: **+358-(0)9-664764/sales dept.**
Reservation code: BACC
Room rate: EUR 115,- /standard single room/night, breakfast included
Deadline for booking: 2 May 2005

Hotel Skatta**

Linnankatu 3, FIN-00160 Helsinki
Tel. +358-9-659233
Fax:int.: +358-80)9-631352
Reservation code: BACC
Room rate: EUR 65,- /single room/night
Deadline for booking: 2 May 2005