

Minutes of

16th Meeting
of the
BALTEX Science Steering Group

held at

Gudhjem Bibliotek
Gudhjem, Bornholm, Denmark
23 May 2004

edited by
Hans-Jörg Isemer

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Participants at the 16th BALTEX Science Steering Group Meeting



From left to right:

J. Piechura, A. van Ulden, D. Jacob, C. Simmer, V. Vuglinsky, T. Vihma, S. Keevallik, D. Rosbjerg, J. Nilsson, S. Meyer, S.- E. Gryning, M. Rummukainen, A. Omstedt, A. Lehmann, H. Graßl. Behind the camera: H.-J. Isemer.

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Summary of Action Items

Action #1: Hartmut Graßl to write a thank-you letter to S. Bergström on behalf of the BSSG.

Action #2: Dan Rosbjerg and Sven-Erik Gryning to explore DMI's intention and possibilities to further contribute to BSSG activities, and include **Hartmut Graßl** in any necessary action to stimulate DMI to return to BSSG with a strengthened profile.

Action #3: Dan Rosbjerg and Hans-Jörg Isemer with support of all members of the Conference Committee to prepare and conduct the publication of a dedicated issue of *Nordic Hydrology* along the lines discussed and suggested by the BSSG.

Action #4: Jörgen Nilsson to explore ECOMET versus WMO data exchange policies in the context of Poland, Estonia, Latvia and Lithuania being now EU Member States, and to report on possible benefits for BALTEX data exchanges and data deliveries at the next BSSG meeting.

Action #5: Hartmut Graßl to write letters to the Directors of the National Meteorological Services (NMS) in Estonia, Latvia, Lithuania and Poland asking these NMSs for a future permanent free-of-charge data delivery to BALTEX Data Centres particularly against the background of these countries' recent accession to the EU.

Action #6: Andreas Lehmann to chair the Implementation Plan Writing Team and undertake necessary steps for its constitution and further development as suggested by the BSSG.

Action #7: Andreas Lehmann and Sigrid Meyer to collect further project and implementation ideas for BALTEX Phase II by e.g. distributing a specific one-page-project summary form to relevant scientists. Part of this action for **Andreas Lehmann** is to further develop BALTIC GRID and to undertake appropriate means to assure the adequate participation of other than modelling groups and organisations at BALTIC GRID and BALTEX Phase II in general.

Action #8: The Implementation Plan Writing Team to meet for a dedicated Implementation Plan workshop scheduled for 13 to 15 September 2004 at Risø National Laboratory, Denmark.

Action #9: The Implementation Plan Writing Team to present an Implementation Plan draft for discussion at the next BALTEX SSG meeting in November 2004.

Action #10: Hans-Jörg Isemer and Piotr Kowalczak to assess the exact dates for the 17th BSSG meeting in calendar week 48 (22 to 26 November 2004) and undertake all necessary preparations for this meeting.

Introduction

The 16th meeting of the BALTEX Science Steering Group (BSSG) was held in conjunction with the 4th Study Conference on BALTEX. The meeting had been organised by the BALTEX Secretariat together with the local Bornholm Organising Team for the 4th Study Conference on BALTEX. It was scheduled as a short, half-day event and had the character of an interim meeting with a limited number of topics. An important objective of this meeting included the decision on concrete steps towards establishing an Implementation Plan for BALTEX Phase II.

Hartmut Graßl, the chairman of the BSSG, opened the BSSG meeting on Sunday, 23 May 2004 at 14:00 hours. The meeting was closed at 18:00 hours the same day. The agenda of the BSSG meeting and the list of BSSG meeting participants can be found in Appendix 1 and Appendix 2, respectively.

Item 1: Welcome by the Chairman

In his opening address, Hartmut Graßl, the BSSG chairman, welcomed the participants and emphasized the importance of this meeting in the light of the Implementation Plan for BALTEX Phase II to be discussed. He also expressed his pleasure and satisfaction that this meeting is being held together with the 4th BALTEX Conference, both events thus taking place at an important point of time for the development of the BALTEX programme.

The Chairman also reminded the participants of the first official BALTEX SSG meeting which was held at GKSS Research Centre in Geesthacht, Germany, on 16 and 17 January 1994. Therefore, the present meeting means the 10th birthday of the BSSG and may be viewed at the same time as the official 10th birthday of the entire programme. BSSG members noted however, that first steps including preparatory workshops for BALTEX date back to at least 1992, or earlier. A review of the BSSG membership at that first BSSG meeting in May 1994 versus the present one revealed the following BSSG members having been on the group continuously since its foundation: S. Bergström, A. Omstedt, I. Skouratovich and V. Vuglinsky. On behalf of the BSSG the Chairman appreciated the long-term contributions of the four persons celebrating this jubilee, and closed the welcome session by including all past and present members of the BSSG in his acknowledgement.

Item 2: Amendment and Approval of the Agenda

Anders Omstedt suggested a short report on activities related to BALTEX Phase II conducted under his guidance at Göteborg University, to be given under item 5 of this meeting's agenda. With this addition, the agenda of the meeting (see Appendix 1) was approved.

Item 3: Approval of the 15th BSSG Meeting Minutes

The minutes of the 15th BSSG meeting were unanimously approved.

Item 4: BALTEX SSG Membership

The BSSG approved the following changes to the BSSG membership:

4.1: Prof. Dr. Sten Bergström resigned from the BSSG. The Chairman recalled that S. Bergström was among the founding members of the BSSG, see also item 1 of this meeting. With his significant contributions to the programme's science leadership, BALTEX has developed a strong hydrology component, and the HBV model, which was developed by S. Bergström and further adapted by him and colleagues at SMHI for BALTEX purposes, is one of the major hydrological modelling tools presently used in BALTEX. The BSSG expressed its appreciation to S. Bergström's long-term outstanding contributions to BALTEX.

Hartmut Graßl will write a thank-you letter to S. Bergström on behalf of the BSSG (**Action #1**).

4.2: Upon suggestion by S. Bergström prior to this meeting, **Jörgen Nilsson** was welcomed and approved as a new member of the BSSG. He is a hydrologist by education and has served as director at the Swedish Meteorological and Hydrological Institute (SMHI) in different positions. At present he also has a special assignment as adviser to SMHI's Director General on international matters.

4.3: BSSG members raised concern that the Danish Meteorological Institute (DMI), as the National Meteorological Service of Denmark, has been contributing less in the recent past to the steering process of BALTEX. Leif Laursen, the representative of DMI in the BSSG, has unfortunately not participated in several previous BSSG meetings. BSSG members suggested approaching the Climate Group at DMI in order to identify a new BSSG member. Other BSSG members noted that it is desirable to include also a person from the operational forecast section at DMI into the BSSG.

Action #2 was given to **Dan Rosbjerg and Sven-Erik Gryning** to explore DMI's intention and possibilities to further contribute to BSSG activities, and include **Hartmut Graßl** in any necessary action to stimulate DMI to return to BSSG with a strengthened profile.

Item 5: Important Developments since the Previous BSSG Meeting and Future Events

5.1 4th Study Conference on BALTEX

Hans-Jörg Isemer briefed the BSSG on the Conference including a summary on the preparation phase, statistics on the size of the Conference (see Appendix 3) and information related to a special Conference Volume planned to be published in *Nordic Hydrology*.

With 112 registrations this 4th BALTEX Conference has less participants compared to earlier conferences, but shows continuing high international attraction and collaboration expressed both in terms of participating countries and multi-national authorship (Appendix 3). More than 30 % of all papers to be presented are already addressing objectives of BALTEX phase II, which was considered as an encouraging signal by the BSSG

The BSSG appreciated the offer of *Nordic Hydrology* to publish a dedicated special issue with papers originating from presentations given at the Conference. Dan Rosbjerg in his capacity as the chief editor of *Nordic Hydrology* was in particular commended for his activities in this

context. All interested authors shall submit manuscripts firstly to the BALTEX Secretariat, which will assist *Nordic Hydrology* with the organisation and conduction of the review process. Special guest editors shall be appointed preferably to be recruited from the Conference Committee, and each manuscript should also be evaluated by at least one “BALTEX-independent” reviewer, if possible. The deadline for manuscripts to arrive at the BALTEX Secretariat was suggested to be postponed to 31 August 2004. The BSSG further recommended to avoid setting an a priori maximum number of papers to be published in the special Conference issue. BSSG instead strongly suggested to foresee means (e.g. in terms of page number limitations per publication and other instructions to both authors and reviewers) that an appropriate number of high-quality papers get the chance to be published.

Action #3 was given to **Dan Rosbjerg and Hans-Jörg Isemer** with support of all members of the Conference Committee to prepare and conduct the publication of a dedicated issue of *Nordic Hydrology* along the lines discussed and suggested by the BSSG.

5.2 BALTEX Activities at Göteborg University

Anders Omstedt gave a summary of research activities at Göteborg University, which are particularly addressing BALTEX Phase II objectives. These activities, which were initiated and are guided by A. Omstedt, are embedded in the Geosphere Dynamics Programme at Göteborg University and are dedicated to Baltic Sea waters, energy and mass transports. See Appendix 4 for details as presented by A. Omstedt.

5.3 EU – Enlargement and International Data Exchange

Since May 2004, Estonia, Lithuania, Latvia and Poland are EU Member States. Jörgen Nilsson pointed out that the National Meteorological Services of these countries may therefore join the Economic Interest Group of the National Meteorological Services (NMS) of the European Economic Area (ECOMET). ECOMET has established specific data exchange policies, which – in some areas- constitute an enlargement to other international policies such as the WMO (World Meteorological Organization) resolutions. J. Nilsson suggested to explore whether either the EU membership or a possible future accession of the above countries to ECOMET may be beneficial for the BALTEX data exchange and in particular the data delivery of the NMS to BALTEX Data Centres. The past restricted policy of the NMS of the above countries related to a free-of-charge delivery of observational data to BALTEX Data Centres was particularly mentioned in this context.

Action #4 was given to **Jörgen Nilsson** to explore ECOMET versus WMO data exchange policies in the context of Poland, Estonia, Latvia and Lithuania being now EU Member States, and to report on possible benefits for BALTEX data exchanges and data deliveries at the next BSSG meeting.

Participants recalled that the data delivery of the above NMS to BALTEX Data Centres was stopped in the recent past after completion of funded contracts, and future data delivery without specific funding has not yet been confirmed. BSSG suggested that a written BSSG communication to the Directors of the NMS in the above countries should emphasize again the importance of a continuous data delivery free of charge.

Action #5 was accepted by **Hartmut Graßl** to write letters to the Directors of the NMS in Estonia, Latvia, Lithuania and Poland asking these NMS for a future permanent free-of-

charge data delivery to BALTEX Data Centres particularly against the background of these countries's recent accession to the EU.

Item 6: Towards Implementing BALTEX Phase II

6.1 BALTIC GRID – A proposal by Andreas Lehmann

Item 6 was central to this BSSG meeting. It was introduced by Andreas Lehmann in his capacity as the leader of the writing team of the Implementation Plan for BALTEX Phase II (In the following, this document will be referred to simply as the *Implementation Plan*). He suggested and explained BALTIC GRID as one implementation component of BALTEX Phase II. A BALTIC GRID outline document written by A. Lehmann had been submitted to BSSG members prior to this meeting, it is reproduced here in Appendix 5. Appendix 6 gives the presentation material which A. Lehmann used for his introduction to BALTIC GRID.

The BSSG entered into a lively and partially controversial discussion on BALTIC GRID. These minutes firstly summarize main statements put forward by BSSG members in the course of the discussion and secondly review BSSG conclusions and action items related to BALTIC GRID and the planned implementation plan for BALTEX Phase II in general.

Comments on BALTIC GRID by BSSG members:

- BALTIC GRID is considered a useful approach for implementing BALTEX Phase II, it is however understood that it shall be only one component of BALTEX Phase II with other components to be defined. Further, BALTIC GRID requires a clear separation of those parts of the Science Plan for Phase II which are addressed by GRID versus those which need other implementation measures.
- COSMOS (see <http://cosmos.enes.org>) is an international project to develop a community global earth system model. It should be carefully explored whether BALTIC GRID could be a component – either within or additional to COSMOS – with particular regional focus on the Baltic Sea basin. It was noted that several organisations active in BALTEX are also contributors to COSMOS (e.g. MPIfM, FIMR, FMI, KNMI, SMHI).
- The European dimension of BALTIC GRID, and BALTEX Phase II in general, should be kept in mind in particular with regard to future funding possibilities at the EU level. Hence, BALTIC GRID shall have the potential and flexibility to be easily extended to other regions in Europe.
- The present BALTIC GRID document has a strong focus on technical aspects while the scientific questions to be addressed in BALTIC GRID need more detailed elaboration.
- If BALTIC GRID is seen as a mere modelling tool, the concept of a „distributed tool“ should be followed, where for each of the model components to be coupled (or to be used jointly, e.g. for the atmosphere, ocean, sea ice, land surface, ...) more than one candidate model should be included in BALTIC GRID.
- BALTIC-GRID should include a forecast capability. Also, for the study of actual events data assimilation should be included in BALTIC GRID.
- BALTIC GRID should not be seen as a mere data centre, but as a network of interested scientists for accessing both model and observational data and thus for cooperating in joint projects.
- The potential and possibilities for modelling groups seems to be clear, however, it must be assured that groups in other research areas (e.g. field experiments, monitoring,

remote sensing, climate observational data analysis) can take part at BALTIC GRID. Their potential roles need to be clearly defined.

- An early commitment of at least some organisations to provide basic support for necessary infrastructure of BALTIC GRID seems necessary. It should be assured that national Services and other organisations, with a strong profile in research areas important for BALTEX Phase II commit themselves to actively support BALTEX Phase II.
- It was not entirely clear, how hydrology as an important research discipline in BALTEX may contribute to BALTIC GRID. More general, the role of the individual disciplines contributing to BALTEX needs to be spelled out more clearly for BALTIC GRID.
- A clear definition of the scales to be addressed in BALTIC GRID is needed. It was pointed out that model horizontal resolutions well below current regional model resolutions (down to less than 2 km) will be necessary to address some of the objectives in BALTEX, in particular with respect to user requirements. This may require the further development and inclusion of other than hitherto used models in BALTIC GRID. Non-hydrostatic atmospheric models were mentioned in this context.

Conclusions of the BSSG concerning BALTIC GRID:

- BSSG welcomed the BALTIC GRID initiative of Andreas Lehmann as *one* useful implementation component of BALTEX Phase II. BSSG stressed that other implementation measures shall be explored.
- The implementation of BALTEX Phase II needs a carefully balanced approach supported by all involved disciplines and necessary research areas. The present BALTIC GRID is considered to be largely influenced by a modeller's approach or point of view. BSSG strongly suggested to assure that views from other research areas (such as field experiments, monitoring, remote sensing, climate observational data analysis, and others) are adequately considered when defining details of BALTIC GRID and possible other research components of BALTEX Phase II beyond BALTIC GRID.

6.2 Further Steps and Actions towards the Implementation of BALTEX Phase II

BSSG discussed general aspects of the structure of the Implementation Plan. It was noted that objectives 2 to 4 (see Appendix 7 for the objectives of BALTEX Phase II as given in the Phase II Science Plan) are the core new science topics. These three objectives were suggested to build the major structuring elements of the Implementation Plan. Reference to objective 1 (which merely alludes to BALTEX Phase I objectives and related existing important gaps) shall only be made in the Implementation Plan to the extent necessary to adequately address the new science objectives 2 to 4.

The mandate for Andreas Lehmann to continue necessary steps to establish the Implementation Plan and his role as the leader of the Implementation Plan Writing Team (IPWT) was reaffirmed. The following responsibilities and IPWT membership were suggested:

Markku Rummukainen, Hans von Storch:	Objective 2
Dan Rosbjerg, Clemens Simmer:	Objective 3
Sven-Erik Gryning, Roland Doerffer, Berit Arheimer:	Objective 4
Anders Omstedt, Daniela Jacob:	Objective 1

It was considered important that representatives of NMS shall contribute to the Implementation Plan, in particular to aspects of objective 5. BSSG suggested both Jörgen Nilsson and

Mikko Alestalo to proactively support the IPWT in this respect. Hans von Storch and Roland Doerffer (both at GKSS Research Centre Geesthacht, Germany), as well as Berit Arheimer (SMHI Norrköping, Sweden) shall be contacted as soon as possible to receive their IPWT membership confirmation. BSSG recommended to include further specialists as required in the process of establishing the Implementation Plan, individual steps in this context are at the responsibility of the above IPWT members. The BALTEX Secretariat support for the IPWT will be mainly through Sigrid Meyer.

Action #6 was given to **Andreas Lehmann** to lead the Implementation Plan Writing Team and undertake necessary steps for its constitution and further development as suggested by the BSSG.

BSSG recommended that more project ideas either additional to BALTIC GRID or as a contribution to BALTIC GRID shall be collected as a preparatory step for the Implementation Plan. A one-page-project-summary form was suggested to be developed and distributed to selected scientists both within and beyond the BALTEX community with the offer to return project ideas for the Implementation Plan.

Action #7 is for **Andreas Lehmann and Sigrid Meyer** to collect further project and implementation ideas for BALTEX Phase II by e.g. distributing a specific one-page-project summary form to relevant scientists. Part of this action for **Andreas Lehmann** is to further develop BALTIC GRID and to undertake appropriate means to assure the adequate participation of other than modelling groups and organisations at BALTIC GRID and BALTEX Phase II in general.

A workshop of the IPWT dedicated to writing a draft Implementation Plan was suggested to take place at Risø National Laboratory during 13 to 15 September 2004. The aim of this workshop is to produce as much of a draft Implementation Plan as possible. Project summaries collected so far shall be considered thoroughly for the Implementation Plan. The draft Implementation Plan shall be further developed and presented for discussion at the next BALTEX SSG meeting scheduled for November 2004.

Action #8 is for **the Implementation Plan Writing Team** to meet for a dedicated workshop scheduled for 13 to 15 September 2004 at Risø, Denmark. This workshop shall be a milestone to fulfil **Action #9**, again for **the Implementation Plan Writing Team**, to present an Implementation Plan draft for discussion at the next BALTEX SSG meeting in November 2004.

Item 7: Date and Place of the Next BSSG Meeting

Upon invitation by the BSSG member Piotr Kowalczak, the 17th BSSG meeting will be held in Poznan, Poland, at the facilities of the Institute of Meteorology and Water Management (IMGW), as concluded already at the preceding BSSG meeting. A suitable time window for the participants of this meeting would be the 48th calendar week (22 to 26 November 2004).

Action #10 was given to **Hans-Jörg Isemer and Piotr Kowalczak** to confirm the exact dates for the 17th BSSG meeting in calendar week 48 (22 to 26 November 2004) and undertake all necessary preparations for this meeting.

Item 8: Closing of the BSSG Meeting

The Chairman thanked the participants for a lively and constructive discussions and the BALTEX Secretariat for all arrangements made for this meeting.

Acronyms and Abbreviations

BALTEX	Baltic Sea Experiment
BSSG	BALTEX Science Steering Group
COSMOS	International project to develop a Community Global Earth System Model
DMI	Danish Meteorological Institute
ECOMET	Economic Interest Group of the National Meteorological Services of the European Economic Area
EU	European Union
FIMR	Finnish Institute of Marine Research, Helsinki / Finland
FMI	Finnish Meteorological Institute, Helsinki / Finland
GKSS	GKSS Research Centre, Geesthacht / Germany
IMGW	Institute for Meteorology and Water Management, Poznan / Poland
IPWT	Implementation Plan Writing Team
KNMI	Royal Netherlands Meteorological Institute, De Bilt / The Netherlands
MPIfM	Max-Planck Institute for Meteorology, Hamburg / Germany
NMS	National Meteorological Service
SMHI	Swedish Meteorological and Hydrological Institute, Norrköping / Sweden
SSG	Science Steering Group
WMO	World Meteorological Organization

Appendix 1: BSSG Meeting Agenda**16th BALTEX SSG Meeting**

at
Gudhjem Bibliotek
Åbogade 7
Gudhjem, Bornholm, Denmark
23 May 2004

PROVISIONAL AGENDA AND EXPLANATORY MEMORANDUM

The 16th BALTEX SSG (BSSG) meeting will be held in conjunction with the 4th Study Conference on BALTEX. It is scheduled as a short, half-day meeting prior to the Conference. The major objective of the meeting is to conclude and initiate actions towards establishing a revised Implementation Plan for BALTEX Phase II.

Sunday, 23 May 2004

14.00 **Item 1: Welcome by the Chairman (H. Graßl)**

Item 2: Amendment and Approval of the Agenda

Item 3: Approval of the 15th BSSG Meeting Minutes

Item 4: BALTEX SSG Membership

A change of the BSSG membership was recently suggested as follows: Member *Sten Bergström* (SMHI) has submitted his request to leave the BSSG. Sten Bergström suggested *Jörgen Nilsson* (SMHI) to become a new member of the BSSG.

Item 5: Important Developments since the Previous BSSG Meeting and Future Events

This agenda item shall inform BSSG members on recent developments and future events essential for the development of the programme. Particular foci shall be issues related to Phase II of BALTEX. Participants wishing to report under this item are asked to indicate their contributions to the BALTEX Secretariat prior to the meeting.

15.00 **Item 6: Towards Implementing BALTEX Phase II (A. Lehmann)**

Based on the recently published Science Plan for BALTEX Phase II decisions will have to be concluded on concrete actions towards establishing a revised Implementation Plan for BALTEX Phase II. A. Lehmann, who was appointed as the responsible focal person for writing the Implementation Plan at the previous BSSG, has recently distributed a first discussion paper (attached as Annex 1 to this agenda). Dr Lehmann will introduce this item based on his discus-

sion paper and further considerations. Part of the aim of this discussion is to confirm a writing team for the revised Implementation Plan for BALTEX Phase II and a distinct mandate for the team of the BALTEX SSG.

18.00 Closing of the BSSG Meeting

Appendix 2: Participants List

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Appendix 3: Conference Statistics**Fourth Study Conference on BALTEX**

Gudhjem, Bornholm, Denmark, 24 - 28 May 2004

Some Statistics:

Registered Participants:	112
Papers:	114 (78 oral, 36 posters)
Authors:	213
Countries:	18
Multi-Institution Papers:	39 (35%)
Multi-National Papers:	24 (21%)
BALTEX Phase II Papers :	35 (32%)

Appendix 4: BALTEX Phase II Activities at Göteborg University

by

Anders Omstedt

Earth Sciences: Oceanography

Göteborg University

Geosphere dynamics, especially the Baltic sea water, energy and mass transport

•Better understanding... (BALTEX Phase II Objective 1)

- BALTEX phase I review
- BALTEX/Bridge and present climate
- Atmosphere and ocean coupling (with Uppsala University)
- Dense bottom currents (with Oslo University and Sopot)
- Strait flows (Northern Quark Strait)
- Deep water mixing

•Climate 1800-2100 (BALTEX Phase II Objective 2)

- 1800-2000, 1500-2000 (with NOAA-Seattle)
- Salinity and water balance
- Collecting/digitizing old observations (with ODCB)
- 0-2000 (MUSCAD)

•Improved tools for .. (BALTEX Phase II Objective 3)

- PROBE-Baltic (with SMHI)

•Gradual extension... (BALTEX Phase II Objective 4)

- Oxygen and Carbon cycling (with Uppsala University)
- Pelagic ecosystem and biochemical modelling (EUR-Ocean)

•Education and outreach... (BALTEX Phase II Objective 6)

- Ph D Courses
- MUSCAD Göteborg Oct 25-26
- Sea ice climate Hamburg 2005

Appendix 5: BAL TIC GRID – A Contribution to BALTEX Phase II

This document was distributed as Annex 1 to the Provisional Agenda of the 16th BSSG meeting to all BSSG members prior to the meeting.

BAL TIC-GRID – A contribution to BALTEX Phase II

by Andreas Lehmann
8 April 2004

The science plan has now been sent to all of you, and as you should know, it is my task to start writing the implementation plan. This is a hard task, and I need support from all of you. So I will take the initiative to start the discussion. The science plan should be the basis of the implementation plan, and I believe that we need at least for the first three objectives:

1. Better understanding of the energy and water cycles over the Baltic basin
2. Analysis of climate variability and change since 1800, and provision of regional climate projections over the Baltic Sea basins for the 21st century
3. Provision of improved tools for water management, with the emphasis on more accurate forecasts of extreme events and long-term changes,

research projects or better ideas of possible projects which are based on these objectives.

In the old implementation plan there was a table which nicely summarized important BALTEX projects:

1. Data Assimilation projects
2. Modelling projects
3. Field experiments - process studies

In this table there was a detailed list of projects, and most of these were realised during BALTEX-Phase I. These projects were something like a red line for the development of BALTEX Phase I. Thus the implementation plan was a real good guide for the development of BALTEX Phase I.

What we need for a successful BALTEX-Phase II is a vision of important research for the BALTEX area. We need innovative ideas (projects) to fulfil the tasks of the science plan. Please help me to find such visions (some ideas of projects would also be a good starting point).

To start the discussion which will be continued during the 4th Study Conference, I will present my 'vision' of a BALTEX research project, which is open to be discussed. Other suggestions and/or criticisms are welcome.

In Germany, but also in other countries, grid computing-initiatives and e-science projects have been launched. The vision of grid computing is that of an infrastructure which will inte-

grate large, geographically distributed computer clusters and data storage facilities, and provide simple, reliable and round-the-clock access to these resources. **Grid technology will allow scientific communities to develop new ways to share and analyse very large data sets, to benefit of both the quality and quantity of scientific output.**

Inspired by these initiatives **I would like to suggest a BALTEX PHASE II project which could be named BALTIC GRID.** This project should take advantage of the BALTEX network. The idea behind BALTIC GRID is:

Accept the Baltic and North Sea area as part of the earth system. This system needs a system approach:

One fully coupled regional Baltic (including at least the North Sea) area model is running on high performance computing facilities (second generation of coupled numerical models with respect to resolution and different modules (atmosphere, ocean, ice, hydrology bio-geochemical etc.). The model is embedded in or coupled to global (at least northern hemisphere) models which provide boundary and forcing conditions. For the atmosphere this is already done, but for the ocean, a coupling to the Atlantic Ocean with shelf sea models is missing.

The idea of the BALTIC GRID (which also could be named BALTIC Network) is that one project partner runs the coupled model and that the model results are distributed to the potential partners with different expertise. The partners analyse the model results and produce validation/forcing data (observational, satellite data etc.). Some partners can be responsible for different modules of the fully coupled system (analysis/validation, model development). Thus, a group of partners is responsible for running the model and for model development and validation. The model is a community model of the project, where process models and sub-domain models contribute to the model development and analysis.

Two types of model runs should be performed:

- (a) semi-operational (present day simulations including process studies and extreme events)
- (b) climate mode (climate change scenarios)

The modelling partners are responsible for model development and to perform the model runs. They provide the essential tool for BALTIC GRID.

The data bank partners are responsible to setup a network (grid) to allow partners of different expertise and background to have free access to the data (model data and observations). The system approach lies in the cooperation of different subprojects (which have to be specified) which focus on the different objectives of the science plan with the modelling and data exchange groups.

This kind of project can incorporate at least objectives 1 to 4 of the BALTEX Phase II science plan.

Tasks of different project partners

All partners: Development of an international data exchange grid (network).

Field experiments and process study partners: collecting validation and forcing data for the fully coupled model, analysis and comparison of model results and measurements, process studies, development of analysis tools (subprojects like BASIS, and BASEWECS can be placed here)

Satellite data partners: Collecting and processing satellite data of various types (infrared, micro wave, gravitational, etc). Subprojects which focus on GOCE (Gravity field and steady state Ocean Circulation Explorer) missions can be included here

High performance modelling partners: Further development of a fully coupled model system, linking different modules to one big system, running the fully coupled model system and in cooperation with modelling partners: development of general interfaces to couple the regional climate model with global models (mainly necessary for the ocean).

Data management partners: Development of a data base which is accessible to project partners, development and management of a project data bank

Modelling partners: Development of an eddy resolving shelf sea model of North and Baltic Sea which might be extended to other shelf sea regions (Mediterranean, Nordic Seas). Development of modules which are embedded in the fully coupled model (hydrology, lakes, sea ice, ocean, land, bio-geochemical, etc.). Analysis of results of different modules of the fully coupled system, development of methods to assimilate observations into the fully coupled model. These partners need to cooperate with high performance modellers and observers.

These tasks cannot be accomplished simultaneously, the development of the grid, model development etc. need different times. One could possibly construct a time schedule for the different tasks.

What is the new idea?


The new idea is that there is only one model running which needs high performance computing facilities. There is a data-exchange grid which links the different partners with each other. Thus, model results as well as observational data are organized in a data bank which is accessible from all partners. All partners work together on the development of the grid and the system approach of the Baltic and North Sea area. The different subprojects take care of the scientific requirements given in the science plan. The project is fully interdisciplinary. Modellers and observers are working together. The synthesis of the results of the different subprojects which has been mainly missing in BALTEX Phase I is directly incorporated in BALTIC GRID.

Appendix 6: BALTIC GRID Presentation by Andreas Lehmann



Towards implementing BALTEX Phase II


- ↳ Implementation Plan BALTEX Phase I
- ↳ BALTEX Phase II Science Plan (Objectives)
- ↳ BALTEX Phase II Research Projects (BALTIC GRID)
- ↳ BALTEX Phase II Implementation Plan Writing Team



Implementation Plan BALTEX Phase I

Table 9 Time schedule for BALTEX Research Projects


Project	Year							
	94	95	96	97	98	99	00	01
1. Data Assimilation Projects								
1.1 Meso-scale Meteorological Re-analysis		****	****	****				
1.2 Oceanographic Data Assimilation	**	****	****	****	****	****	****	
1.3 Hydrological Data Assimilation				****	****	****	****	****
1.4 Transports through the Danish Straits	**	****	****	****	****			
2. Modelling Projects								
2.1 Water and Energy Budgets over the BALTEX Region		****	****	****	****	****	****	****
2.2 Baltic Sea Response to Atmospheric and Hydrological Forcing	****	****	****	****	****	****	****	****
2.3 Development of a Sea Ice Model for the Baltic Sea Model		****	****	****	****	****	****	****
2.4 Thermohaline Circulation and Long-term Variability of the Baltic Sea			****	****	****	****	****	****
2.5 Intercomparison of Atmospheric Models			****	****	****	****		
2.6 Full Hydrological Model for the BALTEX Region	****	****	****					
2.7 Validation of the Hydrological Components of the Meteorological Models			****	****	****	****	****	****
2.8 Development and Intercomparison of Hydrological Models for selected River Basins		****	****	****	****	****	****	****
2.9 Coupled Atmosphere/Ocean/Land Surface Model						****	****	****
3. Field Experiments - Process Studies								
3.1 Cloud/Precipitation/Air-Sea Interaction			**	****	****	**		
3.2 Cloud/Precipitation/Air-Land Surface Interaction				**	****	****	**	
3.3 Atmosphere - Ice - Ocean			**	****	****	**		
3.4 Baltic Sea Vertical Advection and Mixing			**	****	****	**		
3.5 Front Modification						**	****	****
	94	95	96	97	98	99	00	01



**Implementation Plan
BALTEX Phase I**

BALTEX Phase I Research Networks

- ↗ Network A: Full-scale Studies of the Energy and Water Cycle
- ↗ Network B: High-resolution Process Studies with the Emphasis on Hydrological Modelling
- ↗ Network C: Coupled Modelling of the Baltic Sea
- ↗ Network D: Cloud/Precipitation/Air-Sea Interaction Field Experiment
- ↗ Network E: Cloud/Precipitation/Air-Land Surface Experiment
- ↗ Network F: Atmosphere-Ice-Ocean Field Experiment
- ↗ Network G: Baltic Sea Vertical Advection and Mixing Field Experiment



**BALTEX Phase II
Science Plan
(Objectives)**

BALTEX Phase II Science Plan

- ↗ Better understanding of the energy and water cycle over the Baltic Sea catchment
- ↗ Analysis of climate variability and change since 1800, and provision of regional climate projections over the Baltic Sea catchment for the 21st century
- ↗ Provision of improved tools for water management, with an emphasis on more accurate forecasts of extreme events and long-term changes
- ↗ Gradual extension of BALTEX methodologies to air and water quality studies
- ↗ Strengthened interaction with decision-makers, with emphasis on global change impact assessments
- ↗ Education and outreach at the international level



BALTEX Phase II Science Plan (Objectives)

BALTEX Phase II Science Plan

-Goals (projects) with high potential for application-

- Infrastructure adaption
- Sea level variability and change estimates for coastal zone management
- Regional climate change
- Forecasting of floods, snow pack and hydropower potential
- Reduction of eutrophication of the Baltic Sea
- Ground water changes caused by changed water cycle



BALTEX Phase II Research Projects (BALTIC GRID)

BALTIC GRID

Grid technology will allow scientific communities to develop new ways to share and analyse very large data sets, to benefit of both quality and quantify of scientific output. Taking advantage of the BALTEX Network:

- System approach of North and Baltic Sea area
- Fully coupled model of the North and Baltic Sea area (second generation)
- Development of an international data exchange grid (network)
- Setup of international networks:
 - Modelling group
 - Observer group
 - Data Management group
 - Satellite user group
- Integrated synthesis and interaction with decision makers and management



Implementation Plan Writing Team



BALTEX Phase II
Implementation Plan
Writing Team

?

Who will do it?
BALTEX Phase II needs a vision!

Appendix 7: BALTEX Phase II Objectives**The objectives of BALTEX Phase II are:**

1. Better understanding of the energy and water cycles over the Baltic Sea basin
2. Analysis of climate variability and change since 1800, and provision of regional climate projections over the Baltic Sea basin for the 21st century
3. Provision of improved tools for water management, with an emphasis on more accurate forecasts of extreme events and long-term changes
4. Gradual extension of BALTEX methodologies to air and water quality studies
5. Strengthened interaction with decision-makers, with emphasis on global change impact assessments
6. Education and outreach at the international level

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