Minutes of

26th Meeting
of the
BALTEX Science Steering Group

held at

Wallenberg Conference Centre
of the University of Gothenburg, Sweden

24 and 25 November 2010

Edited by

Marcus Reckermann
and Hans-Jörg Isemer

Participants at the 26th BALTEX Science Steering Group Meeting, from left to right: Marcus Reckermann, Andreas Lehmann. Hermanni Kaartokallio, Hans von Storch, Philippe Lucas-Picher, Anders Omstedt, Joakim Langner, Valery Vuglinsky, Michael Lautenschlager, Jari Haapala, Franz Berger. Participants not on the photo: Jüri Elken, Sirje Keevallik, Bernd Schneider, Benjamin Smith, Hans-Jörg Isemer (behind the camera).

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Summary of Decisions

DECISION 1: A Working Group on POSTBALTEX will be established. Detailed tasks will still have to be elaborated, but the final product of the WG should be a Science Plan for the first years of the newly to be named programme. Members of the WG may be candidates for a future POSTBALTEX Science Steering Group, to be established.

DECISION 2: At least three types of upcoming publications out of the BALTEX community to be finalized until 2013 will qualify as BALTEX Phase II wrap-up publications: 1. The BACC II assessment report, 2. The final reports of the BONUS projects Baltic-C, ECOSUPPORT and AMBER; 3. A review paper/final publication of the BALTEX WG on the Utility of Regional Climate Models, 4. A review paper by a yet to be established writing team on BALTEX Phase II objective 1: Water and Energy Cycles. Other publications, e.g. a special journal issue on ECOSUPPORT will also be used to wrap up BALTEX Phase II.

Summary of Action Items

Action Item 1: *Prepare suggestions for potential members of a newly to be installed Working Group on POSTBALTEX. BSSG members can be asked to name candidates in addition to those proposed at BSSG meeting #26.*

Action Item 2: *After a candidate list has been drafted, candidates need to be formally invited, preferably by invitation letters signed by the BSSG chairman (and vice chairs)*

Action Item 3: *Approved members of the WG are to be invited to the next BSSG meeting #27 at the IOW (Baltic Sea Research Institute Warnemünde) on 29 and 30 September 2011*

Action Item 4: *Identify a writing team for a review paper/assessment of BALTEX Phase II Objective 1 : Energy and Water Cycles*

Appendices

Appendix 1: BSSG #26 meeting agenda
Appendix 2: Participants of the meeting

Introduction

The 26th meeting of the BALTEX Science Steering Group (BSSG) was held on 24 and 25 November 2010 in conjunction with the 1st BACC II Lead Author Team Meeting. Meeting venue was the Wallenberg Conference Centre of the University of Gothenburg, Sweden. The meeting had two major items on the agenda: 1. Wrapping-up BALTEX Phase II, and 2. designing the new phase of what is provisionally called "POSTBALTEX".

Opening and welcome

Joakim Langner, BSSG chairman opened the meeting by welcoming the meeting participants (Appendix 2). Jari Haapala of the Finnish Meteorological Institute was present as guest to represent BSSG member Tapani Stipa.

TOPIC 1: Organisational issues

1.1 Approval of the agenda

The agenda for the 26th BSSG meeting (Appendix 1) was approved. The time slot for the presentation by Deliang Chen from the ICSU Secretariat, given via Skype, was brought forward in the agenda to allow ample time for this extensive presentation.

1.2 Approval of the previous BALTEX SSG meeting minutes and action items

The minutes of the 25th BSSG meeting were unanimously approved. Action item 1 concerning a restructuring of data access was unresolved at the time of the meeting, but is now completed. Revised BALTEX Data Management web pages including the description of a simplified access procedure to BALTEX Phase I data are now online at www.baltex-research.eu/data (see section 3.1.1.).

1.3 BALTEX SSG membership changes

Daniela Jacob, Head of Climate System Department of the Climate Service Centre, Hamburg, Germany, resigned from the BALTEX Science Steering Group. Daniela had been a BSSG member since 2005 and co-edited the BALTEX Phase I wrap-up document "BALTEX Phase I 1993-2002 State of the Art Report". The SSG thanked Daniela for her contributions to BALTEX and wished her all the best for her future activities.

TOPIC 2: POSTBALTEX options and activities

This topic was divided into a presentation part (on day 1 of the meeting), and a discussion of initial steps towards an implementation of POSTBALTEX (on day 2). All presentations and other relevant material are available for download at the BALTEX website: www.baltex-research.eu/supplementary

2.1 Reconstructions of current global change programmes and future perspectives of funding agencies (Deliang Chen)

Delian Chen, Executive Director of the ICSU (International Council for Science) Secretariat was connected by Skype to give 3 presentations on potential reconstructions of current global

change programmes which are currently under discussion. This was meant to appraise perspectives for the POSTBALTEX programme in the context of the possible future global environmental programme network. The presentations reflect the current process of reviewing and re-appraising the structure and effectiveness of the current global change research programmes and networks.

a. *The Visioning Process and Institutional Challenges*
   This is an analysis and definition of requirements taken from the review process ICSU has been implementing on the Earth System Partnership Programmes (ESSP). A general conclusion is that priorities, effectiveness and integration should be improved. A "visioning process" was formulated, propagating a holistic approach, encouraging scientific innovation and addressing policy needs. Furthermore, a "transition process" is envisioned towards more interdisciplinary research, and the stronger integration of non-natural sciences, i.e. the human dimension (social sciences). Five "Grand Challenges" were formulated: 1. Forecasting, 2. Observing, 3. Confining, 4. Responding, 5. Innovating.

b. *International Capability to Address the Belmont Challenge*
   The Belmont Forum, a group of major funders of international global change research, in 2009 formulated the "Belmont Challenge" as "the challenge to deliver knowledge to support human action and adaptation to regional environmental change". A peer reviewed report was written by an international group of experts, with the main conclusions being a) the establishment of an international research and educational network for Earth system science as a single integrated and coordinated framework, b) science needing to be pertinent to questions posed by society, c) an enhanced collaboration of natural and social scientists, d) the nurturing of a new generation of researchers, and e. the encouragement of different approaches.

c. *Concept Paper on a Global Sustainability Research Initiative*
   The paper proposes a new 10-year initiative on global sustainability research, termed ESRGS (Earth System Research for Global Sustainability). Primary goals of this initiative are the coordination of research in order to address the "Grand Challenges", the fostering of a new generation of researchers which naturally integrates natural, social, economic, health and engineering sciences, and the delivery of knowledge to allow societies to adequately respond to global change while meeting economic and social goals. A new design of "second generation research networks" is deemed necessary to reach these goals.

The presentations together with supplementary papers on the evaluation and re-structuring process coordinated by ICSU are available at the BALTEX website at www.baltex-research.eu/supplementary.

2.2. Current planning status of CEOP/GHP and GEWEX/GREW (Hans-Jörg Isemer)

In line with the re-structuring and focussing efforts of the global programmes as outlined under topic 2.1, the GEWEX programme is currently undertaking major planning efforts for the period 2013 to at least 2020. Major elements of the current planning stage with possible relevance for BALTEX and POSTBALTEX are summarized as follows:

- The follow-up programme to GEWEX is currently named GREW, the Global and Regional Energy and Water project.

- The key mission statement for GREW reads: To develop improved observational, diagnostic and modelling capabilities **focusing on land-atmosphere interactions** to measure and predict global and regional energy and water variations, trends, and extremes such as heat waves, floods and droughts; and provide the science underpinning climate services.
- Headlines of at present 11 so called "**imperatives**" were defined which are designed to describe the overall science activities and goals of GREW. These 11 imperatives are grouped into the following 4 areas:

  I. **Data**
  Imperative 1 (I1): Develop climate data records of atmospheric and land variables, complete with metadata and error bars;

  I2: Provide descriptions and analyses of observed variations, trends and extremes in hydrological and energy-related quantities.

  II. **Analysis**
  I3: Develop advanced diagnostic tools and identify pathways for model improvement;

  I4: Increase understanding of energy and water cycle processes, quantify their contribution to climate feedbacks, and develop improved hydro-meteorological parameterizations;

  I5: Develop and exploit methods of dealing with non-stationarity of hydrological variables, and especially extremes of floods and droughts, associated with climate and global change;

  I6: Contribute to building a comprehensive end-to-end pan-WCRP initiative on climate extremes addressing the compound and nonlinear nature of extreme events, their ubiquity and risk coping issues;

  III. **Modelling**
  I7: Attribute causes of trends, and determine the predictability of energy and water cycles on a global and regional basis in collaboration with the wider WCRP community;

  I8: Accelerate developments in models of the land, atmosphere and entire climate system;

  I9: Improve capabilities for predictions of water and energy cycle variability on all time scales;

  IV. **Applications**
  I10: Develop observational sites, data processing tools, data management and archival systems, model initialization and synthesis capabilities, and other research outcomes for transition to operations;

  I11: Promote and foster capacity building through training of scientists and the user community.

  More details are available in the presentation (see at www.baltex-research.eu/supplementary, or directly at the GEWEX webpage (www.gewex.org). At present, various writing groups are drafting first descriptions and plans according to the above outline with the overall goal to present a first draft Science Plan at the GEWEX Science Steering Group (SSG) meeting in 2011.

- GEWEX is currently structured into 3 panels, one of which is the "home" of the Regional Hydroclimate Projects (RHP), such as BALTEX. This panel, formerly called Coordinated Energy and Water Cycle Observations Project (CEOP), is as of now renamed to **GEWEX Hydroclimatology Panel (GHP).** The future objectives, structure and composition of GHP will have to be reviewed critically in line with the re-focussing of GEWEX into GREW.
- Personnel: The new GEWEX SSG chair is Kevin E. Trenberth at National Center for Atmospheric Research (NCAR), Boulder, USA. The new GHP chair is Dennis P. Lettenmair at Washington University, USA.

2.3 Current BONUS-185 developments (Jüri Elken)

Jüri Elken, member of the BONUS EEIG Steering Committee, gave a short overview over the history and current developments in BONUS. The BONUS programme is developing from an ERANET and ERANET+ type of funding programme to an Article 185 (formerly Article 169) programme. BONUS-185 will be a key funding programme for Baltic Sea related research in the years to come. In 2010 and 2011 the programme is in its strategic phase in preparation for the implementation phase 2012-2016. Four "priorities" will be followed throughout the programme: 1. High excellence and relevance, 2. Cooperation, 3. Human capacity building, and 4. Involvement of policy makers and stakeholders. At least 3 calls will be issued in this phase. The Strategic Research Agenda defines BONUS as "policy driven", "strategically far-reaching and able to accommodate the emerging research needs", and "cutting across the traditional science disciplines, sectors of economy and country borders". At present, calls are scheduled to be published along 5 thematic areas: 1. Sea-coast-catchment continuum; 2: Ecosystem structure and function; 3: Observation and data management; 4: Sustainable coastal and marine goods and services; and 5: Research, policy and management in the Baltic Sea System. The mutual interest between BONUS and the EU Strategy for the Baltic Sea region is demonstrated in the "Annual Forum for the EUSBR and BONUS" in October 2011. A first call for proposals in BONUS-185 is envisaged to open in 2012.

2.4 POSTBALTEX options: Summaries of polls and discussions

The discussions on a BALTEX successor programme after 2012 (temporarily termed "POSTBALTEX") commenced at the 23rd BSSG meeting (12-14 January 2009 in Helsinki). Since then, the BALTEX community has responded in various ways to enquiries on the future of BALTEX. An e-mail questionnaire was sent to BSSG members asking for ideas, and vivid discussions took place at the 24th (Riga) and 25th (Wolin) BSSG meetings. A dedicated open session on POSTBALTEX was held at the 6th BALTEX Study Conference on Wolin. Finally, an official letter was sent to selected scientific institutes in the Baltic Sea basin (which can be regarded as scientific stakeholders of BALTEX), asking for the institutes' views on a BALTEX successor. Although some responses have been published in the minutes of BSSG meetings #24 and #25, the input by the BALTEX scientific community and the institutions are summarized below to allow a complete picture.

2.4.1. E-Mail questionnaire to BSSG members on POSTBALTEX options (from BSSG 24 minutes)

- Continue programme; include intensification of database; new objective: Climate change impacts on Baltic Sea basin ecosystems
- Build on available funding sources, including scientific, and socio-economic aspects

- Continue programme involving EU Strategy for the Baltic Sea region, particularly focussing on ecology, engineering, socio-economy
- Continue with the current Objective 4 (Biogeochemical cycles in the Baltic Sea basin and transport processes within the regional Earth system under anthropogenic influence)
- Form a "Baltic Sea Panel for Climate Change"
- Collaborate with other European RHPs (HyMEX, NEESPI)
- Keep Hydrology (Objective 3) as major topic; modelling biogenic-abiogenic feedback to climate change
- Terminate BALTEX as it is, but options for a follow-up programme
- Define clear profile avoiding overlaps with other programmes
- Climate research, development, validation of RCMs, detection and attribution studies,
- Towards unifying BALTEX, Baltic Sea Science Congress (BSSC), BONUS, HELCOM under one umbrella
- BALTEX Phase II profile is currently too broad, too general, not visible in the Baltic Sea community
- the further concentration on "Earth System Modelling", with a stronger linking of relevant disciplines,
- the promotion of "detection and attribution studies" in the context of regional climate change,
- the stronger involvement in "impacts of human activities on the Baltic Sea system",
- a further investigation on "carbon and nutrient cycles",
- an emphasis on "linkages between the physical and biological systems on the one hand, and between land and marine systems on the other hand", and
- "adaptation to climate change on the regional level", which is also an EU political issue.

2.4.2. Open discussion at BSSG 25 (from BSSG 25 minutes)

- The process of defining POSTBALTEX should be organised both top-down and bottom-up. As a contribution to the latter, questionnaires should be sent out to institutions and individuals prior to defining POSTBALTEX.
- POSTBALTEX should continue including major aspects of the land part of the Baltic Sea region, rather than narrowing its objectives to marine issues exclusively.
- Adapting to climate change is becoming more and more important in all countries of the Baltic Sea region. Related research projects – at both national and international levels - are increasingly being undertaken and POSTBALTEX should include aspects of adaptation to climate change.
- Biogeochemical cycles in the earth system should stay on the POSTBALTEX agenda. In this context, stronger connections to IGBP and relevant regional programs therein should be explored.
- POSTBALTEX should improve its connections and contributions to international/global data bases.
- Scientific assessments, following a well defined and accepted protocol, should become a stronger component in POSTBALTEX. BACC was mentioned as a prototype example. These assessments could be either conducted in a more ad-hoc manner, on limited areas, to be conducted by smaller working groups, or covering a major research area or topic, such as BACC, with the necessary required resources in terms of time and manpower.

- Furthermore, a better collaboration between countries was considered desirable. The attractiveness of the programme for researchers was considered an important issue: the programme must provide a good platform for researchers. This must be further investigated and elaborated for a follow-up programme.

2.4.3. Open discussion at the 6th Study Conference (summarized by Marcus Reckermann)

During the 6th Study Conference on BALTEX, a specific open discussion session was dedicated to POSTBALTEX. The major statements given at this discussion are summarized in bullet points as follows:

POSTBALTEX should …

In general…
- be complementary to BONUS, but not overlapping
- not focus on the Baltic Sea Action Plan (BSAP)
- involve also the larger, global scale climate models
- involve Earth system modelling including nutrient fluxes on land and in the sea
- be more than just a climate variability and change programme
- keep up the tradition of good conferences but allow more flexibility and more room for discussions
- provide an integrating platform between many different disciplines
- ask for topics
- strengthen Working Groups
- extend the air & water quality topic
- be true to its roots in BALTEX, concentrate on water and energy cycles; there are many research needs
- integrate a learning and discussion platform
- keep the scientific core
- act as overlooking tower

Regarding data and observations…
- support observations
- write a cookbook: "How to get data from Regional Climate Models"
- provide data at different time scales for modelling
- provide data and easy access to databases

Regarding stakeholder involvement…
- either be strong in basic research OR approach policy makers, both is not good
- do basic research in connection with WCRP
- clearly define what its stakeholders are, or should be, and their expectations
- incorporate enterprises, ministries
- trigger the subject of climate change in the minds of the stakeholders
- keep its current BALTEX topics and extend to socio-economic dimension
- provide interdisciplinary information to scientists but also for stakeholders
- organize attractive conferences for scientists and stakeholders

2.4.4 Responses to the POSTBALTEX letter sent out to HydroMet Services and prominent research institutions in the Baltic Sea region (Joakim Langner)

At the BSSG Meeting #25, it was decided that relevant Hydro-Met services and research institutes should be contacted to learn about their views concerning a POSTBALTEX programme. In October 2010, a letter was sent to 30 institutions by BSSG chairman Joakim Langner. Institutions which shared their views on POSTBALTEX were HELCOM, the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the Leibniz-Institut für Ostseeforschung Warnemünde (IOW), the Leibniz Institute of Marine Sciences at the University of Kiel IFM-GEOMAR (both Germany), Risø National Laboratory for Sustainable Energy, the DMI Centre for Ocean and Ice (both Denmark), the Hydrometeorological Research Centre Of Russian Federation, Moscow, and the Finnish Environment Institute (SYKE).

a. *HELCOM*

- Impact of climate change on biological component of the Baltic Sea ecosystem
- Ocean acidification and effects on ecosystem
- Current geographical scope is good
- HELCOM foresees continued cooperation with POSTBALTEX

b. *Ministry of Natural Resources and Environmental Protection of the Republic of Belarus*

- Urban climate
- Urban hydrology
- Public health under climate change

c. *The Hydrometeorological Research Centre Of Russian Federation, Moscow, Russia*

- Interested in co-operation
- Ideas regarding the POSTBALTEX as a study of the N. Atlantic/global climatic regimes. N. Atlantics (as well as N. Pacifics) are judged very interesting in terms of weather and climate. The centre is deeply involved in these studies and would appreciate any cooperation in this area.
- Continued integration within CEOP/GEWEX
- Study and assessment of extreme hydrological events in the Baltic Sea basin (spring floods, ice jams, dams, ice jam floodings)
- Study and assessment of various meteorological characteristics caused by climate change
- Publication of Annual Bulletins of changes in climate-related characteristics (snow cover depth, annual runoff, max. ice cover, etc.)
- Sea level data collection and exchange
- Sea level data at the marine station Kronstadt – preparation and issue of water level gauge data for the entire observation period (longest line of observation, now only on paper)
- Completion of HYDROLARE database

d. Risø National Laboratory for Sustainable Energy, Denmark

- With respect to the POSTBALTEX activities, I see a considerable potential for scientific activities in relation to the meteorological and climatological aspects of wind energy, with special focus on the off-shore and coastal environment.
- High on the scientific agenda is research on the wind profile up to several hundreds of meters (modern wind turbines reach beyond 100 meters) over the sea, its temporal and spatial distribution as well as its long-term climatology. Research areas should include environmental influence of large off-shore wind farms such as enhanced precipitation and changes to the marine environment due to changes in the sea current and upwelling that are caused by reduced wind drag.
- The natural study area is the Baltic Sea where several large wind farms are planned or under construction, but it also could be extended to the North Sea which is also a focus area for off-shore wind energy activities.

e. DMI Centre for Ocean and Ice (COI), Denmark

- Modelling platform: BALTEX should be further extended to "Integrated Baltic Sea Earth System Modelling" using coupled atmosphere-hydrological-ocean-wave-ice-biogeochemical models. The research progresses in BALTEX shall be integrated and further developed to strengthen the Baltic Earth System Modelling System.
- Predictability in seasonal and decadal scales for the Baltic Sea: the advancement can be made through ocean data assimilation, Earth System coupling mechanism and combined stochastic-dynamic method.
- Identify and reduce the uncertainty in Baltic Sea climate change study:
    a. Multi-coupled atmosphere-ocean model ensemble for climate modelling
    b. Climate modelling on extreme events: provide quality database and knowledge for local adaptation to climate change. This study needs very high resolution coupled ocean-atmosphere models.
    c. Baltic-North Sea interaction in long-term: this study needs two-way nesting 3D ocean models for climate research, which has been started in recent years.
- Assessment and Optimal design of Baltic Sea Earth System monitoring network: this is an integrated assessment and design, aiming for a sustained and efficient monitoring of Baltic Earth System Indicators

f. *Leibniz-Institute for Baltic Sea Research Warnemünde (IOW), Germany*

Fields of research

- Development and provision of modelling systems for the hydrological system including nitrogen cycles.
- Establish (logistics, validation, providing forcing and boundary data etc) modelling systems for the Baltic Sea ecosystem “ready to use”. They should comprise regional climate models, hydrological models, models for atmospheric deposition, circulation and biogeochemical models for the Baltic Sea. The idea behind is to have a tool/system available which allows quickly to respond to requests concerning the response of the Baltic Sea to changed forcing.
- Including higher trophic levels in Baltic Sea models. This should provide “end to end” models for the Baltic Sea which allow investigating the response of higher trophic levels e.g. fish to external pressure.

- Reconstruction and understanding of the Baltic Sea ecosystem 2000-4000 years back in time including changes due to sea level change and change of the bathymetry (e.g. uplift).
- Water exchange between the Baltic and the North Sea, with changing forcing due to climate change
- Mixing of water masses and related fluxes of matter due to natural forcing and artificial structures.

International framework
- POSTBALTEX should be complementary to the BONUS programme as well. BONUS seems to develop towards stakeholders driven and applied research. POSTBALTEX could be a basic research oriented activity in this framework.

Important stakeholders
- HELCOM, EU commission, national authorities, the public

Own contributions, activities
- Research on the response of the Baltic Sea to different forcing conditions
- Develop "end to end" models for the Baltic Sea
- Investigation of long term changes, based on running monitoring activities
- Studies on small scale physical processes at key locations in the field

g. *Lebniz-Institute of Marine Sciences(IFM-GEOMAR), Germany*

Fields of research
We need a careful revision of BALTEX Phase II objectives, a wrap up. Has BALTEX fulfilled the scientific requests? What is missing? Has BALTEX been successful at all?

- *Objective 1: Improved understanding of energy and water cycles under changing conditions.* I guess this objective has become a bit unfashionable. For my knowledge there is not much progress.
- *Objective 2: Analysis of climate variability and change, and provision of regional climate projections over the Baltic Sea basin for the 21st century.* Still in progress, quite well on the way. Most of the potential activities have been fulfilled or are in progress.
- *Objective 3: Provision of improved tools for water management, with emphasis on extreme hydrological events and long-term changes.* I am not hydrologist, I really can not assess how much of the Potential Activities have been processed.
- *Objective 4: Biogeochemical Cycles in the Baltic Sea basin and transport processes within the regional Earth system under anthropogenic influence.* Thank to BONUS+ this objective is well in progress. More or less all potential activities are touched.
- *Objectives 5 and 6* also progressed quite well.

In summary BALTEX Phase II could be regarded as successful for most of the objectives. The question is whether POSTBALTEX should continue with the objectives and take care of what is missing or should there be something new.

International framework
BALTEX has moved away from GEWEX and CEOP. As there is a planning for GEWEX post-2013, it could be an option to link at least partly POSTBALTEX to the draft Mission statement of GEWEX which means a continuation of objectives 1 and 2. A second phase of BONUS will come, and that is the primary international funding possibility. BONUS will probably continue in those lines it has been started, maybe do more fishery biology and management. A stronger coupling to other programs which focus on other marginal and shelf seas such as North Sea, Mediterranean and Black Sea would increase funding possibilities by the EU.

Geographical scope
POSTBALTEX should stick to the Baltic Area, also in consideration of BONUS 169. If we like to step deeper into the climate business it would be good to include the North Sea or to set up links to programs which are focusing on the North Sea, Mediterranean and Black Sea. Anyhow an intercomparison of those marginal seas would be very interesting

Mode of operations
- Initiation of assessments/reviews of climate variability and change (BACC), water and energy budget, specific processes
- Summer schools
- Workshops and conferences

h. *Finnish Environment Institute (SYKE), Finland*

Fields of research and specific issues to be targeted
The most important single issue would be a holistic systemic-oriented view on climate warming impacts in the Baltic Sea Region. Include both the physical, and the biogeochemistry system, and preferably also adaptation and social science issues relevant for the society. The form of the activity could rather be a multifocal and physically distributed centre of excellence rather than a project. Many of the objectives in BALTEX phase II could be continued within this framework but the mode of action would rather be inclusive and integrative within the society than a separate project that would provide outreach and education to the society outside.

International framework.
BONUS-programme or possibly other related EU/Baltic Sea states funding a realistic alternative for international framework

Geographical scope
Baltic Sea hydrological drainage basin still is the most relevant geographical area for POSTBALTEX activity. However, it would be natural to link the above mentioned strongly to development taking place in the natural, scientific and societal systems in the Arctic area.

Mode of operation.
Primarily networking, and scientific exchange and discussion in the first phase, also possibility for small project funding (if funding scheme allows). At a later stage possibly also more targeted research funding.

Stakeholders.
Broad: Governments, academia, decision makers in public and private sectors, industry (climate relevant economic issues)

Fields of research

- Fields - Meteorology-physical oceanography needs to kept in the foreground as other programmes stress applied and policy-relevant approach. The key factor however is, that this information is being efficiently channelled to decision-making and coordinative (e.g. HELCOM) processes. Another possible theme would be to co-ordinate and facilitate "research hardware" (ships, facilities etc) use in the Baltic Sea region. It is important to keep the scientific background in the climate change research solid. Important questions would be e.g. Climate change impacts in the ecosystem (ecosystem functioning, food web dynamics, nuisance blooms, fish stocks, invasive species). Need to avoid overlap with other actors (e.g. BNI).
- Framework - BONUS, possibility for HELCOM-MSFD co-operation (important issues e.g. in monitoring development)? POSTBALTEX could be possibly used as a launch platform for co-ordinated BONUS calls or developed towards "joint programming" between the Baltic Sea research institutes (see also comment concerning research infrastructure in the point 1). The essential question regarding viability is the ability to form strong consortia for EU funding calls. The question concerning "shifting baseline" which refers to the effects of climate change is relevant for both HELCOM and MSFD.
- Geographical - In addition to the Baltic Sea, north-east Atlantic is important in the climate change and water exchange perspective.
- Mode - Symposia, seminars, activities around BACC II assessment and the CC theme beyond that.
- Stakeholders - No limitations in stakeholder participation- the same as for marine science in general.
- Holistic view on CC effects on the Baltic Sea physical system is still lacking- e.g. how stratification patterns and internal loading will change- this however is central for the entire ecosystem as well as mitigation/adaptation strategies.

2.4.5. Synopsis of POSTBALTEX polls and discussions (Marcus Reckermann)

While it is difficult to make a synopsis of the many different opinions on where a BALTEX successor should head in the future, some statements were more common than others so that the following general conclusions were drawn from the community feedback.

The clear message was that the BALTEX programme should be continued under slightly different priorities. The interdisciplinary aspect should be pursued, and the networking through regular workshops and conferences should be fostered; the further development of the education and outreach aspect by seminars and summer schools would also be desirable. The POSTBALTEX programme should include the human dimension (socio-economic aspects, urban areas and infrastructure). Relevant stakeholders mentioned were HELCOM, the EU, and national and regional governments and administrations.

Strategically, it was recommended to follow a complementary approach to the BONUS programme. While BONUS is rather stakeholder- and policy-, hence “applied”-driven, it may be worthwhile for POSTBALTEX to foster basic research.

The scientific focus mentioned several times was the application of an Earth system approach, with a holistic, system-oriented view and further efforts to develop regional coupled models integrating atmosphere-hydrology-ocean-ice-biogeochemistry models, with the explicit inclusion of biogeochemical processes. Connected with this, a further emphasis to be followed would be the engagement in regional climate and impacts research including detection and attribution studies, and efforts to increase predictability on seasonal and decadal scales, as well as the reduction of uncertainties.

The establishment of regular assessment reports of the BACC-type on various topics related to the Earth System of the region was considered a good complement to the scientific basic research topics. This would add an outreach dimension to the basic research agenda and would provide the scientific community with regular basic science-grounded overview and inventory, facilitating the identification of knowledge gaps.

Concerning international embedment of the programme, a subsistence in a global programme like GEWEX/GREW was recommended, and collaborations with similar programmes in other regions (North Sea, Mediterranean, Black Sea) were also deemed helpful.

2.5. Initial POSTBALTEX activities

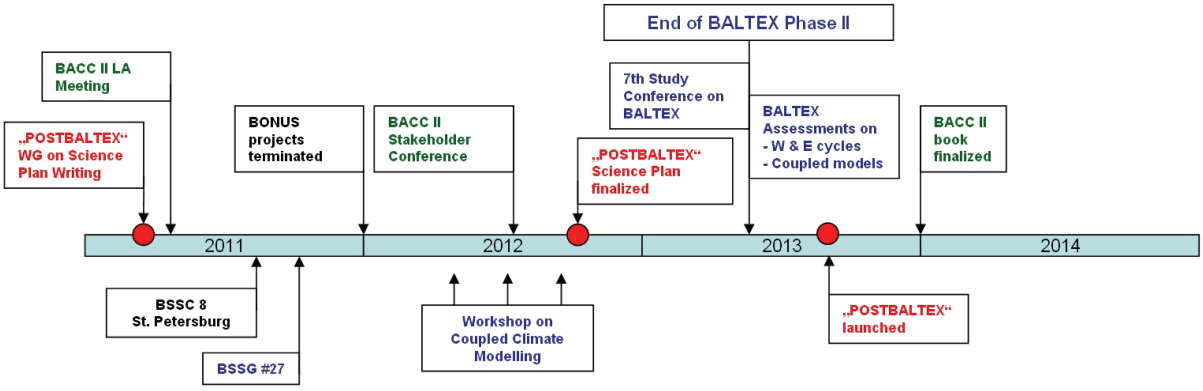
Concrete steps towards the realization of a POSTBALTEX programme after 2012 were decided to consist of a science plan which should be drafted by a newly to be established Working Group, consisting of "new" people; i.e. young established scientists from within or without the BALTEX research network; not necessarily attracting, but also not excluding current members of the existing BALTEX Science Steering Group. It was also noted that candidate members of the science plan drafting team would optimally include individuals who are largely interested in pursuing the suggested research with at least some resources available. This Science Plan would define relevant research questions of the next 10 years, taking into account the above summarized community response to the extent possible and feasible.

DECISION 1: A Working Group on POSTBALTEX will be established. Detailed tasks will still have to be elaborated, but the final product of the WG should be a Science Plan for the first years of the newly to be named programme. Members of the WG may be candidates for a future POSTBALTEX Science Steering Group, to be established.

Based on the above, it was proposed that two lines of preparatory publications for POSTBALTEX should be elaborated: 1. Assessments of BALTEX research areas (resp. BALTEX Phase II objectives), and 2. A Science Plan. The assessments should summarize the current state of knowledge in the respective research field, and pinpoint research or knowledge gaps. Based on this analysis, a science plan for the next decade or so would be written.

This scheme (scientific assessments plus basic research) could become the core for the POSTBALTEX programme. The research could be focussed on basic research (science driven) rather than the more applied "policy driven" direction of research promoted by BONUS and partly also by ICSU (see synopsis of the community response (2.4.5.) and Deliang Chen´s (2.1.) and Jüri Elken´s (2.3.) presentations). This emphasis on basic research questions may represent a niche for a POSTBALTEX programme. Regular workshops and conferences should be part of the programme, accompanying and helping to prepare the assessments and research projects. As in BALTEX, there would be no regular funding except

possibly for the funding of a secretariat and a budget to support workshops and conferences, as well as topic-related funded projects. Key elements of research could be the basic interrelated BALTEX components "Climate change and variability in the Baltic Sea basin"; Regional Earth System Modelling in the Baltic Sea basin", and "Regional climate and impact models for the Baltic Sea basin".



Tentative timeline for BALTEX- and BALTEX-related events as well as intended POSTBALTEX milestones

Action Item 1: *Prepare suggestions for potential members of a newly to be installed Working Group on POSTBALTEX. BSSG members can be asked to name candidates in addition to those proposed at BSSG meeting #26.*

Action Item 2: *After a candidate list has been drafted, candidates need to be formally invited, preferably by invitation letters signed by the BSSG chairman (and vice chairs)*

Action Item 3: *Approved members of the WG are to be invited to the next BSSG meeting #27 at the IOW (Baltic Sea Research Institute Warnemünde) on 29 and 30 September 2011*

TOPIC 3: Concluding BALTEX Phase II 2011-2012

3.1 Reports of BALTEX Working Groups (WGs)

3.1.1. WG on Data Management

Michael Lautenschlager presented the current status of the BALTEX data bases and concluded that they are completed, i.e. no new data was added since 2006, so they can be regarded as closed. Still, these data are located on servers at SMHI and WDCC/DKRZ and may be accessed by interested scientists. It was concluded that a facilitated access to these data should be implemented via the BALTEX Data Management website by the BALTEX Secretariat in collaboration with Michael Lautenschlager. Other data bases relevant to BALTEX research are currently distributed at various institutions. Relevant links are available through the BALTEX website; this page is constantly being updated, and new links are welcome.

Note: a new BALTEX web site on "BALTEX Data Bases" has now been implemented at www.baltex-research.eu/data. Access to BALTEX data is now locally regulated via the respective data centres at SMHI and WDCC.

3.1.2. WG on the Utility of Regional Climate Models

Joakim Langner (representing WG chairman Markus Meier) briefly reported on current and future activities if the WG. Lars Bärring is currently working on a *User Guide* on how to use RCM model data for impact studies. In 2 years, a review paper is aimed to be published on the added value of coupled sea-ice-atmosphere models. A workshop on "Coupled Modelling" is planned for 2012.

3.1.3. WG on the BACC II

The WG on BACC II is effectively the BACC II Science Steering Committee, which on the day preceding this BSSG meeting had held the 1st BACC II Lead Author Team meeting. Hans von Storch shortly summarized the meeting which almost all BACC II Lead Authors attended. The minutes to the meeting are available on the BALTEX website at www.baltex-research.eu/BACC2

3.2 Discussion on concluding BALTEX Phase II

The discussion showed that a number of publications from BALTEX WGs and projects planned for the next 2 years would qualify as final BALTEX Phase II documents. These documents may either be seen as stand-alone BALTEX wrap-up documents, or be incorporated into thematic assessments. Firstly, the Working Group on the Utility of Regional Climate Models is planning a review paper on the subject which would summarize the state of art in regional climate modelling in the Baltic Sea area. Regional climate and impact modelling is a cross-cutting BALTEX Phase II activity, relevant for the four scientific objectives of BALTEX Phase II. A comprehensive overview on this topic could thus represent a good assessment for an important BALTEX Phase II aspect. Secondly, the BONUS projects ECOSUPPORT, Baltic-C and AMBER will be terminated by the end of 2011; their final reports may thus be incorporated in a BALTEX Phase II wrap-up document. For ECOSUPPORT, a special journal issue is envisaged. Thirdly, an assessment on Water and Energy Cycles would be an important document, summarizing the state of knowledge in this BALTEX flagship objective. Authors for this assessment will have to be identified. Fourthly, the BACC II book is expected to be published in late 2013, and is expected to qualify as BALTEX assessment on BALTEX Phase II Objective 2.

DECISION 2: At least three types of upcoming publications out of the BALTEX community to be finalized until 2013 will qualify as BALTEX Phase II wrap-up publications: 1. The BACC II assessment report, 2. The final reports of the BONUS projects Baltic-C, ECOSUPPORT and AMBER; 3. A review paper/final publication of the BALTEX WG on the Utility of Regional Climate Models, 4. A review paper by a yet to be established writing team on BALTEX Phase II objective 1: Water and Energy Cycles. Other publications, e.g. a special journal issue on ECOSUPPORT will also be used to wrap up BALTEX Phase II.

Action Item 4: *Identify a writing team for a review paper/assessment of BALTEX Phase II Objective 1 : Energy and Water Cycles*

TOPIC 4: Place and time of the next BSSG meeting

The next BSSG meeting (BSSG #27) will take place at the **Baltic Sea Research Institute Warnemünde, Germany (IOW), on 29-30 September 2011**.

TOPIC 5: Any other business

None.

Some Abbreviations and Acronyms

AMBER	Assessment and Modelling of Baltic Ecosystem Response
BACC	BALTEX Assessment of Climate Change for the Baltic Sea basin
Baltic-C	Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen systems
BONUS	Baltic Organisations Network for Funding Science EEIG
BSAP	Baltic Sea Action Plan
BSSG	BALTEX Science Steering Group
BSSC	Baltic Sea Science Congress
CEOP	Coordinated Water and Energy Cycle Observations Project
COI	DMI Centre for Ocean and Ice
DKRZ	Deutsches Klimarechenzentrum (German Climate Computing Centre)
DMI	Danish Meteorological Institute
DWD	German Weather Service
ECOSUPPORT	Advanced tool for scenarios of the Baltic Sea ECOsystem to SUPPORT decision making
EEIG	European Economic Interest Grouping
ERANET	Funding Scheme of the EU
ESSP	Earth System Partnership Programme
EMHI	Estonian Meteorological and Hydrological Institute
ESRGS	Earth System Research for Global Sustainability
FMI	Finnish Meteorological Institute
GEWEX	Global Energy and Water Cycle Experiment
GHP	GEWEX Hydroclimatology Panel
GREW	Global and Regional Energy and Water project
HELCOM	Helsinki Commission
HYDROLARE	International Data Centre on the Hydrology of Lakes and Reservoirs
HyMex	HYdrological Cycle in the Mediterranean EXperiment
ICSU	International Council for Science
IfM/GEOMAR	Instutute for Oceanograpy/GEOMAR, Kiel, Germany
IGBP	International Geosphere-Biosphere Programme
IMGW	Institute of Meteorology and Water Management, Poland
IOW	Baltic Sea Research Institute Warnemünde, Germany
LOICZ	Land Ocean Interactions in the Coastal Zone
MSFD	Marine Strategy Framework Directive of the EU
NCAR	NationalCentre for Atmospheric Research, Boulder, Colorado, USA
NEESPI	The Northern Eurasia Earth Science Partnership Initiative
POSTBALTEX	The potential BALTEX successor after 2012
RCM	Regional Climate Model
SSC	Science Steering Committee
SMHI	Swedish Meteorological and Hydrological Institute
SYKE	Finnish Environment Institute
WCRP	World Climate Research Programme
WDCC	World Data Centre for Climate

Appendix 1: BSSG #26 meeting agenda

26th BALTEX SSG Meeting

Wallenberg Centre
Gothenburg, Sweden

24-25 November 2010

AGENDA AND EXPLANATORY MEMORANDUM
(As of 19 November 2010)

This BALTEX Science Steering Group (BSSG) meeting is held following the 1st BACC II Lead Author Team meeting. At this meeting it is envisaged to decide on first concrete activities towards the conclusion of BALTEX Phase II and to discuss concrete options for POSTBALTEX.

Wednesday, 24 November 2010

14:00 **Welcome by the Host of the Meeting**
Anders Omstedt

14:05 **Introduction by the BALTEX Science Steering Group Chairman**
Joakim Langner

14:10 **TOP 1: Organisational issues**

1.1 Approval of the agenda
1.2 Approval of the previous BALTEX SSG meeting minutes
1.3 Review of previous BALTEX SSG meeting action items

14:20 **TOP 2: POSTBALTEX options and activities**

2.1 Summary of POSTBALTEX discussions held at Wolin
Marcus Reckermann and Hans-Jörg Isemer (10 min)

2.2 POSTBALTEX Letter sent out to HydroMet Services and prominent research institutions in the Baltic Sea region - Responses
Joakim Langner (10 min)

2.3 Current planning status of CEOP/GHP and GEWEX/GREW
Hans-Jörg Isemer (15 min)

2.4 Current BONUS-185 activies and plans
Jüri Elken/Andris Andrusaitis (15 min)

2.5 Reconstructions of current global change programmes and future perspectives of funding agencies
Deliang Chen, ICSU (via skype) (20 min)

15:30 ***Health Break***

16:00 **TOP 3: Concluding BALTEX Phase II 2011-2012**

Following the discussion at the 25th BSSG meeting, different options for a concluding comprehensive document compiling the current state of the art in research in the four core BALTEX Phase II topics should be discussed and decided. The final product may be individual reports reflecting the four scientific objectives of BALTEX Phase II, a series of overview articles in a relevant journal or even a book.

The BALTEX Working Groups contribute to the final product of BALTEX Phase II. BALTEX Working Group chairs should briefly report on activities, developments and options for contributions to the final BALTEX Phase II product.

a. BALTEX WG on Radar, *Jarmo Koistinen*
b. BALTEX WG on Data Management, *Michael Lautenschlager*
c. BALTEX WG on the Utility of Regional Climate Models, *Markus Meier*
d. BALTEX WG on BACC II*, Hans von Storch*

A roadmap towards "**Concluding BALTEX Phase II 2011-2012**" should be established at the meeting, including the time and location for the 7th and final Study Conference on BALTEX. Responsible actors for individual actions (e.g. lead and contributing authors) should be identified.

18:00 ***End of Day 1***

Thursday, 25 November 2010

9:00 **TOP 2 Discussion and wrap-up; Draft of a road map/time line for concluding BALTEX Phase II**

10:30 ***Health Break***

11:00 **TOP 2 Discussion and wrap-up** *continued*

12:00 **TOP 3: POSTBALTEX options and activities** *continued*

2.6 Discussion of a roadmap towards POSTBALTEX for 2011 and 2012
- Type of actions (workshops, meetings, discussions)
- Timing of actions

13:00 ***Lunch break***

14:00 **TOP 3: POSTBALTEX options and activities** *continued*

15:45 **TOP 4: Place and timing of next BSSG meeting**

TOP 5: Any other business

16:00 ***Closing of the meeting***

Appendix 2: List of participants

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No. 1: Minutes of First Meeting of the BALTEX Science Steering Group held at GKSS Research Centre in Geesthacht, Germany, 16-17 May, 1994. August 1994.

No. 2: Baltic Sea Experiment BALTEX – Initial Implementation Plan, 84 pages. March 1995.

No. 3: First Study Conference on BALTEX, Visby, Sweden, August 28 – September 1, 1995. Conference Proceedings. Editor: A. Omstedt, SMHI Norrköping, Sweden, 190 pages. August 1995.

No. 4: Minutes of Second Meeting of the BALTEX Science Steering Group held at Finnish Institute of Marine Research in Helsinki, Finland, 25-27 January, 1995. October 1995.

No. 5: Minutes of Third Meeting of the BALTEX Science Steering Group held at Strand Hotel in Visby, Sweden, September 2, 1995. March 1996.

No. 6: BALTEX Radar Research – A Plan for Future Action, 46 pages. October 1996.

No. 7: Minutes of Fourth Meeting of the BALTEX Science Steering Group held at Institute of Oceanology PAS in Sopot, Poland, 3-5 June, 1996. February 1997.

No. 8: *Hydrological, Oceanic and Atmospheric Experience from BALTEX.* Extended Abstracts of the XXII EGS Assembly, Vienna, Austria, 21-25 April, 1997. Editors: M. Alestalo and H.-J. Isemer, 172 pages. August 1997.

No. 9: The Main BALTEX Experiment 1999-2001 – *BRIDGE*. Strategic Plan, 78 pages. October 1997.

No. 10: Minutes of Fifth Meeting of the BALTEX Science Steering Group held at Latvian Hydro-meteorological Agency in Riga, Latvia, 14-16 April, 1997. January 1998.

No. 11: Second Study Conference on BALTEX, Juliusruh, Island of Rügen, Germany, 25-29 May 1998. Conference Proceedings. Editors: E. Raschke and H.-J. Isemer, 251 pages. May 1998.

No. 12: Minutes of 7th Meeting of the BALTEX Science Steering Group held at Hotel Aquamaris in Juliusruh, Island of Rügen, Germany, 26 May 1998. November 1998.

No. 13: Minutes of 6th Meeting of the BALTEX Science Steering Group held at Danish Meteorological Institute in Copenhagen, Denmark, 2-4 March 1998. January 1999.

No. 14: BALTEX – BASIS Data Report 1998. Editor: Jouko Launiainen, 96 pages. March 1999.

No. 15: Minutes of 8th Meeting of the Science Steering Group held at Stockholm University in Stockholm, Sweden, 8-10 December 1998. May 1999

No. 16: Minutes of 9th Meeting of the BALTEX Science Steering Group held at Finnish Meteorological Institute in Helsinki, Finland, 19-20 May 1999. July 1999.

No. 17: Parameterization of surface fluxes, atmospheric planetary boundary layer and ocean mixed layer turbulence for BRIDGE – What can we learn from field experiments? Editor: Nils Gustafsson. April 2000.

No. 18: Minutes of 10th Meeting of the BALTEX Science Steering Group held in Warsaw, Poland, 7-9 February 2000. April 2000.

No. 19: BALTEX-BASIS: Final Report, Editors: Jouko Launiainen and Timo Vihma. May 2001.

No. 20: Third Study Conference on BALTEX, Mariehamn, Island of Åland, Finland, 2-6 July 2001, Conference Proceedings. Editor: Jens Meywerk, 264 pages. July 2001.

No. 21: Minutes of 11th Meeting of the BALTEX Science Steering Group held at Max-Planck-Institute for Meteorology in Hamburg, Germany, 13-14 November 2000. July 2001.

No. 22: Minutes of 12th Meeting of the BALTEX Science Steering Group held at Royal Netherlands Meteorological Institute (KNMI), De Bilt, The Netherlands, 12-14 November 2001. April 2002.

No. 23: Minutes of 13th Meeting of the BALTEX Science Steering Group held at Estonian Business School (EBS), Centre for Baltic Studies, Tallinn, Estonia, 17-19 June 2002. September 2002.

No. 24: The eight BALTIMOS Field Experiments 1998-2001. Field Reports and Examples of Measurements. Editors: Burghard Brümmer, Gerd Müller, David Schröder, Amélie Kirchgäßner, Jouko Launiainen, Timo Vihma. 138 pages. April 2003,.

No. 25: Minutes of 14th Meeting of the BALTEX Science Steering Group held at Lund University, Department of Physical Geography and Ecosystems Analysis, Lund, Sweden, 18 - 20 November 2002. May 2003.

No. 26: CLIWA-NET: BALTEX BRIDGE Cloud Liquid Water Network. Final Report. Editors: Susanne Crewell, Clemens Simmer, Arnout Feijt, Erik van Meijgaard, 53 pages. July 2003.

No. 27: Minutes of 15th Meeting of the BALTEX Science Steering Group held at Risø National Laboratory, Wind Energy Department, Roskilde, Denmark, 8 - 10 September 2003. January 2004.

No. 28: Science Plan for BALTEX Phase II 2003 – 2012. February 2004, 43 pages.

No. 29: Fourth Study Conference on BALTEX, Gudhjem, Bornholm, Denmark, 24 - 28 May 2004, Conference Proceedings. Editor: Hans-Jörg Isemer,

189 pages. May 2004.

No. 30: Minutes of 16th Meeting of the BALTEX Science Steering Group held at Gudhjem Bibliotek, Gudhjem, Bornholm, Denmark, 23 May 2004. October 2004.

No. 31: BALTEX Phase I 1993-2002 – State of the Art Report. Editors: Daniela Jacob and Anders Omstedt, 181 pages, October 2005.

No. 32: Minutes of 17th Meeting of the BALTEX Science Steering Group held at Poznan, Poland, 24 – 26 November 2004. November 2005.

No. 33: Minutes of 18th Meeting of the BALTEX Science Steering Group held at Meteorological Observatory Lindenberg – Richard Aßmann Observatory, Germany, 18 – 20 October 2005. February 2006.

No. 34: BALTEX Phase II 2003 – 2012 Science Framework and Implementation Strategy, 95 pages. April 2006.

No. 35: BALTEX Assessment of Climate Change for the Baltic Sea Basin. Summary. Editors: The BACC lead author group, 26 pages. June 2006.

No. 36: Minutes of 19th Meeting of the BALTEX Science Steering Group held at Ågrenska Villan of Göteborg University Sweden, 23 – 24 May 2006. October 2006.

No. 37: Minutes of 20th Meeting of the BALTEX Science Steering Group held at St. Petersburg, Russia, 6 – 7 December 2006. March 2007.

No. 38: Fifth Study Conference on BALTEX, Kuressaare, Saaremaa, Estonia, 4 - 8 June 2007. Conference Proceedings. Editor: Hans-Jörg Isemer, 209 pages. May 2007.

No. 39: Minutes of 21st Meeting of the BALTEX Science Steering Group held at Kuressaare, Saaremaa, Estonia, 3 June 2007. September 2007.

No. 40: Minutes of 22nd Meeting of the BALTEX Science Steering Group held at SMHI, Norrköping, Sweden, 23-25 January 2008. May 2008.

No. 41: 2nd International Lund RCM Workshop: 21st Challenges in Regional-scale Climate Modelling. Lund University, 4-8 May 2009. Workshop Proceedings. Editors: Burkhardt Rockel, Lars Bärring and Marcus Reckermann. 292 pages, April 2009.

No. 42: International Conference on Climate Change – The environmental and socio-economic response in the southern Baltic region. University of Szczecin, 25-28 May 2009. Conference Proceedings. Editors: Andrzej Witkowski, Jan Harff and Hans-Jörg Isemer. 140 pages, May 2009.

No. 43: Minutes of 23rd Meeting of the BALTEX Science Steering Group held at Finnish Meteorological Institute, Helsinki, Finland, 12 - 14 January 2009. July 2009.

No. 44: BALTEX Phase II 2003 – 2012 Revised Objectives. A Summary Amendment to the BALTEX Phase II Science Framework and Implementation Plan. 23 pages. November 2009.

No. 45: Minutes of 24th Meeting of the BALTEX Science Steering Group held at the University of Riga, Riga, Latvia, 16 - 18 November 2009. March 2010.

No. 46: Sixth Study Conference on BALTEX, Miedzyzdroje, Wolin, Poland, 14 - 18 June 2010. Conference Proceedings. Editor: Marcus Reckermann and Hans-Jörg Isemer, 182 pages. June 2010.

No. 47: Minutes of 25th Meeting of the BALTEX Science Steering Group held at the Hotel Amber Baltic, Międzyzdroje, Poland, 13 June 2010. September 2010.

No. 48: SurBACC 2010. A survey of the perspectives of climate scientists concerningclimate change and climate science in the Baltic Sea basin. Author: Dennis Bray. 82 pages, October 2010.

No. 49: Minutes of 26th Meeting of the BALTEX Science Steering Group held at the University of Gothenburg, Sweden, 24-25 November 2010. March 2011.

Copies are available upon request from the International BALTEX Secretariat.