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

edited by
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From left to right: A. Omstedt, P. Alenius, S. Hafner, G. Adrian, Z. Kundzewicz, S.-E. Gryning, J. Piechura, M. Alestalo, A. v. Ulden, H. Graßl, C. Simmer, H.-J. Isemer, S. Keevallik, A. Lehmann, D. Jacob, S. Bergström.
A. v. Lammeren behind the camera.

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Action #2: Hans-Jörg Isemer to continue steps towards publishing a special journal issue of "Boreal Environmental Research" (BER) based on the 3rd Study Conference on BALTEX by addressing all conference authors and requesting manuscripts prepared according to BER requirements to be submitted to the BALTEX Secretariat before 15 January 2002 (see item 5 of the agenda).

Action #3: SSG members representing a national Hydro-meteorological Service (**Gerhard Adrian, Mikko Alestalo, Sten Bergström, Petras Korkutis, Piotr Kowalczak, Leif Laursen, Andris Leitass, Ivan Skuratovich, Aad van Ulden, Valery Vuglinsky**) to continue discussions with the General Directors of their Service on the benefits the Service gains from the BALTEX programme, and to remind the General Directors to responding to a related letter sent recently by the BALTEX SSG chairman, Hartmut Graßl (see item 6 of the agenda), if not done already.

Action #4: Hartmut Graßl to maintain continuous contacts to Hydro-meteorological Services in Europe at the General Directors level informing them on progress of the BALTEX programme and on the planned future extension of BALTEX objectives, in particular stressing the importance of climate research for weather forecasting purposes and other operational duties of the Services (see item 6 of the agenda).

Action #5: Hans-Jörg Isemer to establish a list of those BALTEX-projects and initiatives which are dealing with remote sensing data, as an initial response to suggestions put forward as part of the BALTEX mid-term review with the aim to strengthen the exploitation of remote sensing data in BALTEX (see item 6 of the agenda).

Action #6: Hartmut Graßl to suggest concerted model intercomparisons for atmospheric models among GEWEX CSEs, and beyond, to GEWEX and GHP (GEWEX Hydrometeorology Panel) representatives, as a response to suggestions of the BALTEX mid-term review (see item 6 of the agenda).

Action #7: Anders Omstedt, Andreas Lehmann, Jan Piechura, Pekka Alenius and Hans-Jörg Isemer to compile a summary on performed actions as part of the *BRIDGE* Ocean Programme (see item 7 of the agenda).

Action #8: Hans-Jörg Isemer to take steps towards the regular publishing of a BALTEX Newsletter with the first issue to appear in early 2002 (see item 7 of the agenda).

Action #9: Hans-Jörg Isemer and Anders Omstedt to take steps to transform the earlier *BRIDGE Management Group* into a *BRIDGE Evaluation Team* by (i) arranging for the *BRIDGE* Evaluation Team membership, (ii) fine-tuning the objectives of this team, and (iii) initiating steps to meeting these objectives, along the lines suggested by the SSG (see item 7 of the agenda).

Action #10: Hartmut Graßl to inform the General Directors of Hydro-meteorological Services on CEOP objectives, CEOP-related activities in BALTEX, CEOP requirements for BALTEX, and mutual benefits for BALTEX and CEOP; in particular stressing the role of the Services in these activities (see item 8 of the agenda).

Action #11: Hartmut Graßl to arrange for BALTEX representatives' participation in CEOP working groups at the CEOP SSG and WG levels, and to invite Carl Fortelius and Jürgen Fischer to become members of the CEOP WESP Working Group and CEOP Satellite Working Group, respectively.

Action #12: Mikko Alestalo, Pekka Alenius together with Gerald Geernaert (Danish Environmental Research Institute) to organise a BALTEX workshop on "Eutrophication of the Baltic Sea – Causes and possible solutions, impact on water quality, algal blooms and fishery" with the particular objective to integrate potential users (such as HELCOM, fisheries organisations, tourism managers), as has been suggested as part of workpackage 2, task 2.2 of the *BALTNET* proposal (see item 9 of the agenda).

Action #13: Hartmut Graßl to undertake steps to enhance efficiency of the BALTEX SSG by a balanced number of new members, taking into account the broadened scientific scope envisaged for BALTEX phase 2.

Action #14: Jarmo Koistinen (chairman of BALTEX WG on Radar) to inform Hartmut Graßl on burning problems (technical and/or financial, or others) concerning present gaps in the radar coverage needed for BALTEX purposes; and, as an immediate follow-up, **Hartmut Graßl** to write letters to national Services as a measure to start solving the reported Radar problems, whenever possible (see item 11 of the agenda).

Action #15: Daniela Jacob (chair of BALTEX WG on Water and Energy Cycles) to constitute the membership and objectives of the BALTEX Working Group on Energy and Water Cycles along the lines suggested by the SSG, and initiate steps towards meeting the objectives (see item 11 of the agenda).

Action #16: The BALTEX Data Centres and the BALTEX Secretariat (**Sabine Haffner, Bengt Carlsson, Daniel Michelson, Pekka Alenius, Hans-Jörg Isemer**) to take steps, as part of the general BALTEX Data Exchange Policy, towards a permanent and effective monitoring of scientific results obtained using BALTEX data by e.g. urging BALTEX data users to submit copies of published BALTEX articles to the Secretariat or Data Centres, as required by the BALTEX data license agreement (see item 12 of the agenda).

Action #17: Hans-Jörg Isemer to update the BALTEX Publication Library established at the International BALTEX Secretariat along the lines suggested by the SSG (see item 12 of the agenda).

Action #18: Hans-Jörg Isemer to identify long climate records relevant for the Baltic Sea basin and compile information on these data at the Secretariat (see item 12 of the agenda).

Action #19: Sten Bergström to provide detailed technical information for users on a 1 degree meteorological data set for the BALTEX region established at SMHI (see item 12 of the agenda).

Action #20: Anders Omstedt, Andreas Lehmann, Jan Piechura, Pekka Alenius, Jouko Launiainen, Sten Bergström (i) to take immediate actions for a vitalisation of the BALTEX Oceanographic Data Centre, with the option to install the Data Centre at the Göteborg branch of the Swedish Meteorological and Hydrological Institute (SMHI), (ii) to re-consider and define the objectives of the BALTEX Oceanographic Data Centre including in particular the definition of data types to be stored at the Data Centre (see item 12 of the agenda).

Action #21: Hans-Jörg Isemer and Clemens Simmer to investigate whether a dedicated BALTEX Data Centre for satellite data is required for BALTEX and prepare related information for final discussion at the next BALTEX SSG meeting (see item 12 of the agenda).

Action #22: Hans-Jörg Isemer to publish a note on the BALTEX projects funded by national German sources (DEKLIM, AFO2000) in the next issue of the BALTEX Newsletter (see item 13 of the agenda).

Action #23: Sirje Keevallik and Hans-Jörg Isemer to prepare for the BALTEX SSG meeting No 13 to be held in Tallinn, Estonia, 17 to 19 June 2002.

Action #24: Hans-Jörg Isemer (with the support of Sirje Keevallik, selected SSG members and *BALTNET* participants) to prepare for a scientific workshop prior to the BALTEX SSG meeting No 13 with the tentative topics on nutrients, pollutants, metals and eutrophication issues of the Baltic Sea basin, including related management and policy measures.

The summary list of action items was established and approved by the BSSG meeting participants prior to finalising the complete meeting minutes, as follows:

Draft version
Hans-Jörg Isemer
28 November 2001

Approved
Hartmut Graßl
10 December 2001

Approved by BSSG meeting participants
10 January 2002

Introduction

The 12th meeting of the BALTEX Science Steering Group (BSSG) was hosted by the Royal Netherlands Meteorological Institute (KNMI) in De Bilt, The Netherlands. Prior to the BSSG meeting a science workshop on "Climate Variability and Change in the Baltic Sea Area" was held at KNMI on 12 November 2001, 14.00 to 18.00 hours. Hartmut Graßl, the chairman of the BSSG opened the BSSG meeting on 13 November 2001 at 9.00 hours. The meeting was closed on Wednesday, 14 November 2001 at noon.

The agenda of the science workshop is given in Appendix 1. Summaries of workshop presentations are collected in Appendix 2. The agenda of the BSSG meeting and the list of BSSG meeting participants including their full addresses may be found in Appendix 3 and Appendix 4, respectively.

The structure of the minutes follows chronologically the items numbered as given in the meeting agenda (see Appendix 3).

Item 1: Welcome by the host and the BSSG Chairman

Reinout Boers, head of the Atmospheric Research Division at KNMI, welcomed the BSSG meeting participant and expressed KNMI's both honour and satisfaction for being the host of this 12th BSSG meeting. Although being not located inside the Baltic Sea catchment he expressed KNMI's strong support for the BALTEX research programme the objectives of which are in line with KNMI's interest to continuously improve weather forecast and climate models being used at KNMI for various research and operational purposes. He wished the meeting all success.

Hartmut Graßl, in his capacity as the Chairman of the BSSG opened the meeting and welcomed the BSSG members and participants to this meeting. He firstly expressed his appreciation, also on behalf of the meeting's participants, to Reinout Boers and also to Aad van Ulden, member of the BSSG and former head of KNMI's Atmospheric Research Divison, for all the excellent arrangements made for this BSSG meeting. The Chairman also thanked R. Boers and A. van Ulden for hosting and supporting the climate workshop which was held the day before as part of the BSSG meeting. He acknowledged the substantial scientific contributions of KNMI's scientists to the BALTEX programme. In this context the Chairman welcomed André van Lammeren as a participant to the meeting. A. van Lammeren is a lead scientist at KNMI's Atmospheric Research Division and the co-ordinator of the EU-funded project CLIWA-NET (BALTEX cloud liquid water network), which is a major contribution to BALTEX/*BRIDGE*. The Chairman also welcomed Sirje Keevallik of Estonian Business School at Tallinn, Estonia, who had been invited to attend this meeting for Peeter Karing, who had resigned from his position as Director General of the Estonian Meteorological and Hydrological Institute and also from the BSSG.

The Chairman continued by stressing his view that this BSSG meeting is of particular importance. After more than 8 years of successful research BALTEX is entering into its second phase. The Chairman mentioned the external review which BALTEX has passed at its 3rd Study Conference in July 2001 which will have carefully to be considered and analysed by the BSSG. He further mentioned the network funding proposal *BALTNET* which has recently been submitted to the 5th Framework Programme of the European Commission (EC) for which first ideas of revised objectives for BALTEX Phase 2 had been worked out. Next steps

towards BALTEX Phase 2 need to be determined. In this context the 6th Framework Programme of the EC might be of major importance as an important funding source for the entire BALTEX programme. Also, guidance for an adequate exploration of the data material collected during the central BALTEX observational period *BRIDGE*, which is going to be completed in early 2002, will have to be provided by the BSSG. The Chairman finished his short introduction by re-calling BSSG's attention to the upcoming Coordinated Enhanced Observing Period (CEOP) within GEWEX for which BALTEX needs to continue defining and preparing contributions.

Item 2: Amendment and approval of the agenda

The agenda of the meeting was approved with the following additional issues to be discussed under item 15 (other business):

1.) Summer school on BALTEX planned in Riga, Latvia (suggested by Mikko Alestalo);

2.) BALTEX representation at GHP (GEWEX Hydrometeorology Panel) meetings (suggested by Sten Bergström).

Item 3: Approval of minutes of earlier BSSG meetings

The minutes of the 11th BSSG meeting were finally approved. They are published as Report No. 21 of the International BALTEX Secretariat Report Series.

The minutes of the informal BSSG meeting held 5 July 2001 at Mariehamn, Finland, were finally approved. These minutes are included as Appendix 5.

Item 4: Report of the BSSG Chairman

The following noteworthy events since the preceding SSG meeting were noted by the Chairman and discussed by BSSG members. Several of these events (such as the *BRIDGE* activities) are only briefly mentioned here but are discussed in more detail as subject of other items of this meetings.

4.1 The 3rd Study Conference on BALTEX, held 2 to 6 July 2001 in Mariehamn, Finland, provided an impressive overview on BALTEX results during the preceding three years. The Conference was attended by more than 150 participants from 20 countries. BALTEX results were presented through 93 oral presentations and 43 posters covering all aspects of BALTEX research. The Conference was partially funded by the European Commission (contract EVK2-CT-2001-60003, project BALCON) and several other institutions including the Finnish Meteorological Institute Helsinki (FMI), Finnish Institute of Marine Research Helsinki (FIMR), Max-Planck-Institute for Meteorology Hamburg (MPIfM), Swedish Meteorological and Hydrological Institute Norrköping (SMHI), and GKSS Research Centre Geesthacht (GKSS). The Chairman again thanked all institutions and individuals having provided support for the successful conduction of the Conference. The conference proceedings are available as No. 20

of the International BALTEX Secretariat Report Series. A special journal issue on selected conference papers is being prepared (see item 5).

4.2 Together with the Conference, and largely based on the Conference's presentations, a mid-term review of the entire BALTEX programme was performed by an pre-established evaluation team. Results of this review and actions based on suggestions in this review are discussed in detail under item 6.

4.3 The year 2001 is the second full calendar year of the central BALTEX observation and modelling period *BRIDGE*. Three dedicated enhanced observational periods (EOPs 2, 3 and 4 of *BRIDGE*) were planned for 2001. The discussion on *BRIDGE* was taken up under item 7.

4.4 A group of 37 BALTEX scientists, led by Ehrhard Raschke, published a comprehensive overview article on BALTEX in the Bulletin of the American Meteorological Society (BAMS). The full reference to this article reads: E. Raschke, J. Meywerk, K. Warrach, U. Andrae, S. Bergström, F. Beyrich, F. Bosveld, K. Bumke, C. Fortelius, L.P. Graham, S.-E. Gryning, S. Halldin, L. Hasse, M. Heikinheimo, H.-J. Isemer, D. Jacob, I. Jauja, K.-G. Karlsson, S. Keevallik, J. Koistinen, A. van Lammeren, U. Lass, J. Launiainen, A. Lehmann, B. Liljebladh, M. Lobmeyr, W. Matthäus, T. Mengelkamp, D. B. Michelson, J. Napiórkowski, A. Omstedt, J. Piechura, B. Rockel, F. Rubel, E. Ruprecht, A.-S. Smedman, and A. Stigebrandt, 2001: *BALTEX (Baltic Sea Experiment): A European Contribution to Investigate the Energy and Water Cycle over a Large Drainage Basin.* BAMS, 82 (11), 2389-2413.

4.5 A thematic network proposal *BALTNET* was submitted to the European Commission's Fifth Framework Programme (FP5) Energy, Environment and Sustainable Development Programme (EESD) before 15 October 2001. Details of *BALTNET* and implications for future actions are described and discussed at item 9. It was further noted that several other funding proposals with relevance for BALTEX were submitted to the same EC-FP5-EESD call deadline of 15 October 2001. In particular, two proposals (MONSAI, co-ordination Sven Halldin, Uppsala University, Sweden; and CID, co-ordination Zbigniew Kundzwewicz, Research Centre of Agricultur and Forrest Environment, Poland) were mentioned. The SSG asked **Hans-Jörg Isemer (Action #1)** to compile information on EU funding proposals with relevance for BALTEX which have been submitted to the EC-FP5-EESD on the 15 October 2001 deadline.

4.6 The Chairman continued mentioning the recently confirmed German Climate Research Programme (DEKLIM) funded by the German Research Ministry (BMBF) which includes a sub-programme entirely devoted to BALTEX. The total national German funding allocated to BALTEX-related projects through DEKLIM is distinctly in excess of 10 million Euros for a 3-years period (see also item 13).

4.7 BALTEX has recently strengthened efforts to prepare for contributions to the Coordinated Enhanced Observing Period (CEOP) of the Global Energy and Water Cycle Experiment (GEWEX). In particular confirmations of two national Weather Services in Europe, the German Weather Service (DWD) and the Royal Dutch Weather Service (KNMI), to provide reference site data of one national observing site each (Lindenberg in Germany and Cabauw in the Netherlands) to CEOP were mentioned. More details on CEOP are discussed under item 8.

4.8 With pleasure, the SSG took notice that Anders Omstedt, a founder member of the BSSG, recently accepted a call as research professor in the Department of Earth Sciences - Oceanography, Göteborg University, Göteborg, Sweden. A. Omstedt had been senior oceanographer at the research division of SMHI in Norrköping, Sweden, for several years before he now left for his new position at Göteborg University. His future research topics connected to his new position include geosphere dynamics, especially the Baltic Sea water and mass transport and are hence closely related to the ob-

jectives of the BALTEX research programme. Anders Omstedt is currently also acting as the chairman of the Swedish BALTEX research groups. The BSSG congratulated Anders Omstedt on his new position and expressed appreciation for his year-long significant contributions to BALTEX.

4.9 Also, the BSSG congratulated Ehrhard Raschke, the BALTEX SSG's former, now retired, vice-chairman for having recently received the *Georgi* Award of the German Alfred-Wegener-Foundation in recognition of his particular accomplishments in satellite meteorology, cloud-radiation interaction and atmospheric radiative transfer processes studies and *for his initiation and promotion of BALTEX as a GEWEX family member and an international research programme at the European level.*

4.10 Finally, the Chairman welcomed Hans-Jörg Isemer, again back in his position as the head of the International BALTEX Secretariat, effective 15 October 2001. H.-J. Isemer had been head of the IBS already during 1994 to 1999, hence, he is well known to the majority of BALTEX groups and individual researchers. The Chairman continued re-calling that Jens Meywerk, the former head of the IBS during 1999 to 2001, left IBS in July 2001 and that the IBS has been vacant for several months since then. The Chairman noted that, in early October 2001, he received an official offer of GKSS Research Centre Geesthacht to maintain the IBS with Hans-Jörg Isemer as head, Silke Köppen as a half-time secretary and an additional scientist to be allocated at the IBS in the nearest future. This offer of GKSS was immediately forwarded to BSSG members and approved. The Chairman pointed out that the present support for the IBS is now entirely and exclusively originating from GKSS budgets. The BSSG welcomed this development again and particular appreciation was given to GKSS's engagement as a substantial support for maintaining the BALTEX infrastructure.

Item 5: BALTEX special issue of 'Boreal Environmental Research'

Hans-Jörg Isemer reviewed earlier plans of the Scientific Organising Committee for the 3rd Study Conference on BALTEX to publish a subset of conference presentations in a special issue of the Finnish journal 'Boreal Environmental Research' (BER). Unfortunately, action steps towards publishing a special BALTEX issue have not been undertaken so far. H.-J. Isemer reported on his recent discussion with the editor of BER who still indicated his interest in having a special BALTEX issue of BER published, and who offered a dedicated volume with about 100 pages free of extra print charges with a typical page number of 5 to 8 per individual article. H.-J. Isemer continued to note that immediate action is required because the time, which has already passed since the conference, is already at a critical limit with the danger, that significant conference results might have been published elsewhere.

The BSSG immediately agreed to go for a special BALTEX conference issue despite the unfortunate time delay and discussed two options of further steps: One option would be to directly contact authors of *selected* conference presentations to submit their papers to BER where the selection criteria (i) should provide for a balanced representation of the scientific issues addressed in BALTEX, and (ii) would have in mind the page limitations of BER for a charge-free volume. Such a candidate list has tentatively been set up by H.-J. Isemer with the help of some members of the conference's Scientific Organising Committee. The other option discussed was to invite the authors of *all* conference presentations to submit a paper to BER and thus leaving a selection of publishable papers to the BER-internal review process.

The BSSG decided for the latter option and asked **Hans-Jörg Isemer (Action #2)** to continue steps towards publishing a special journal issue of 'Boreal Environmental Research' (BER)

based on 3rd Study Conference on BALTEX presentations by addressing all conference authors and requesting manuscripts prepared according to BER requirements to be submitted to the International BALTEX Secretariat (IBS) before 15 January 2002. The IBS will collect all submitted papers and will forward them in one package to BER in order to support the BER editor in initiating quick steps for the further review process.

Item 6: Analysis of the BALTEX mid-term review

Introducing this item, the Chairman recalled that Members of the BSSG had considered that an independent mid-term review of the BALTEX programme would be helpful to assess BALTEX achievements and support future steering actions for the whole programme. The review was performed by an external Review Panel, consisting of four distinguished scientists, who have not been involved in the BALTEX programme and Mikko Alestalo, member of the BSSG, as a BALTEX-internal Panel member. It was performed during the 3rd Study Conference on BALTEX, held at Mariehamn, Aland, Finland between 2 and 6 July 2001, based on the research results presented at the Conference. During the Conference, the Panel held discussions with members of the BSSG, the Secretariat and participating scientists. Following these discussions the Panel met to consolidate its views and presented its findings to the ad-hoc meeting of the BSSG held at the Conference. A review document was provided by the Panel including a list of strengths and weaknesses of BALTEX and a number of suggestions for future actions were formulated. The Panel members are given in Appendix 6, the full review report of the Panel is given as Appendix 7, and a short list of the Panel's recommendations for improvements are summarised in Appendix 8. The latter was part of the handout for this BSSG meeting and will be used here to summarise the BSSG's discussion and actions initiated.

The BSSG generally considered the review as a positive support and confirmation of how BALTEX has developed during recent years and of the results and achievements obtained. The BSSG thanked again the Panel for having conducted the review. The BSSG went on discussing the main 10 recommendations of the Panel (Appendix 8), as follows:

6.1 Recommendation #8: ***Hydromet Services and all BALTEX institutions to clearly express their past and expected future gains acquired through BALTEX***. This recommendations was unanimously supported by the SSG. It was noted that the national weather services of almost all countries having their territories or part of it in the Baltic Sea catchment (referred to as "BALTEX countries" in the following) are represented in the BSSG, mostly through the heads or senior scientists of the Services' research divisions. The Chairman noted that he had recently written letters to the Director General of all Hydromet Services in the BALTEX countries asking for their views on how BALTEX has contributed - or may better contribute in the future – to solving problems related to energy and water cycle processes with relevance for the Services' operational activities. The Chairman also noted that only a part of the Services addressed had answered so far. The BSSG discussed the involvement of National Services also in the context of the possible extension of BALTEX objectives – in particular climate and climate variability issues as well as pollution problems related to the Baltic Sea and its catchment - as has recently been suggested in the *BALTNET* proposal to the European Commission (see item 9). **Action #3** was given to those BSSG members representing a national Hydro-meteorological Service (**Gerhard Adrian, Mikko Alestalo, Sten Bergström, Petras Korkutis, Piotr Kowalczak, Leif Laursen, Andris Leitass, Ivan Skuratovich, Aad van Ulden, Valery Vuglinsky**) to

continue discussions with the Director General of their Service on the benefits the Service gains from the BALTEX programme, and to remind the Director General to respond to a related letter sent recently by the BSSG Chairman, if not done already. Members of the BSSG noted in this context that the importance of climate research for weather forecasting purposes, and requirements of the BALTEX science community to National Services (e.g. related to data, infrastructure support, or information on modelling issues) need intensively to be pointed out to National Services. **Hartmut Graßl** took the **Action #4** to maintain continuous contacts to Hydro-meteorological Services in Europe at the Director General level informing them on progress of the BALTEX programme and on the planned future extension of BALTEX objectives, in particular stressing the importance of climate research for weather forecasting purposes and other operational duties of the Services.

6.2 Recommendation #6: ***Make more quantitative use of remote sensing data***. The BSSG discussed this recommendation controversially. BSSG members noted various BALTEX projects where remote sensing data have been explored and used for e.g. verification and validation purposes with considerable outreach for e.g. model improvement. A rough inspection of the 3rd BALTEX Conference proceedings volume yielded more than 30 papers making use of both ground based and air-borne remote sensing systems and products, including for example the BALTRAD precipitation radar network; ground based and space borne GPS data; ground based windprofiler/RASS, SODAR, LIDAR, cloud radar and micro-wave radiometers at various measurement sites; data from NOAA-AMSU, NOAA-AVHRR, ERS-1/2 ATSR and SAR; and the ISCCP products, in particular the DX data set. Also BALTEX studies on future satellite products such as AMSR-E on the planned AQUA satellite, MSG (Meteosat Second Generation) using e.g. the GERB and SEVIRI sensors, and EPS/NOAA have been performed in the recent past. BSSG members noted that remote sensing data are – and have been – frequently used for *validation* purposes. On the other hand, *assimilation* of remote sensing data has not been explored and studied frequently in the BALTEX context and the latter was clearly identified as an area where future concerted action is needed. The BSSG noted, that a comprehensive overview on past and running BALTEX projects exploiting remote sensing data is lacking. The BSSG concluded to give **Action #5** to **Hans-Jörg Isemer** to establish a list of those BALTEX projects and initiatives which are dealing with remote sensing data, as an initial response to suggestions put forward as part of the BALTEX mid-term review with the aim to strengthen the exploitation of remote sensing data in BALTEX.

6.3 Recommendation #2: ***Extend model intercomparison initiatives to atmospheric and ocean models (such as PILPS for hydrological and land surface models)***; and Recommendation #5: ***Strengthen transferability measures (e.g. examine the relevance of BALTEX models for other European and global regions, such as the GEWEX CSEs)***. Both recommendations were supported by the BSSG. It was noted that a model intercomparison for eight regional atmospheric circulation models based on data collected for the BALTEX-PIDCAP (Pilot Study for Intensive Data Collection and Analysis of Precipitation, August to October 1995) has been conducted as part of a BALTEX project funded by the European Commission (NEWBALTIC2, contract ENV4-CT97-0626, see e.g. Jacob et al., 2001, Meteorol. Atmos. Phys. 77, 9-17). The BSSG took the view that further atmospheric model intercomparison studies should incorporate other models being used for example in other GEWEX Continental Scale Experiments (CSE) such as MAGS or GAPP. The GEWEX Hydrometeorology Panel (GHP) level was considered suitable for organising model intercomparison initiatives

among GEWEX CSEs, which would at the same time contribute to transferring models to other regions on the Globe. The Chairman noted in this context that such a model intercomparison and transferability project has recently been suggested at the GHP meeting held in Paris, France, and that the PIDCAP data sets were suggested to form the base for implementing such a study. **Hartmut Graßl** took the **Action #6** to suggest concerted model intercomparisons for atmospheric models among GEWEX CSEs, and beyond, to GEWEX and GHP (GEWEX Hydrometeorology Panel) representatives, as a response to suggestions of the BALTEX mid-term review. A comparison of ocean models (applied in BALTEX to the Baltic Sea and North Sea) was considered a difficult logistical task without having access to specific financial support for such an initiative, as was the case with the NEWBALTIC2 project for the atmospheric model study. Also, ocean models used in BALTEX are relatively few in number with quite different objectives and design, which would make a meaningful intercomparison quite difficult. The BSSG decided to postpone the issue of an ocean model intercomparison.

6.4 Recommendation #1: ***Identify "core" versus "supporting" projects***. This recommendation recalls the major weakness in BALTEX as identified by the Review Panel (see Appendix 7 for details). The BSSG considered this recommendation in detail and acknowledged the need for keeping BALTEX projects in focus to meeting the basic science objectives of BALTEX. An ad-hoc decision on how to better meet this recommendation was not yet taken. The BSSG members considered BALTEX now being in a transition from phase 1 to phase 2 (as suggested and detailed in the *BALTNET* proposal, see item 9). A re-definition of BALTEX objectives, enlarging the science scope of BALTEX phase 2, will be considered during the year 2002. A division of running and future BALTEX projects into "core" and "supporting" projects, as suggested by the Review Panel, shall be re-considered after the objectives for the second phase of BALTEX will have finally be agreed upon by the BSSG, GHP and GEWEX bodies, and the science community.

6.5 Recommendation #3: ***Strengthen rapid knowledge exchange between field experiments and the modelling community***. A controversial debate was held on this suggestion. Several BSSG members noted examples where projects within BALTEX were in particular designed to allow for interactions between field experimentalists and modelling groups (such as PEP in BALTEX, and BASIS). It was also noted that the recently started BALTEX projects funded through the German DEKLIM Programme include project clusters (such as BALTIMOS), where both field and modelling studies will be performed in close interaction hopefully providing for an improved rapid feedback mechanisms between field experiments and modelling groups. The BSSG however considered this suggestion to be taken up again in the course of the planned science state-of-the-art review on BALTEX phase 1 (see both items 9 and 11).

6.6 Recommendation #4: ***Improve data exchange policy (towards unrestricted and comprehensive exchanges within the entire science communities.*** The BSSG considered the data exchange policy as a sensible issue. The general *BALTEX data exchange policy* had to be implemented to protect the interest of data providers for the BALTEX Data Centres. An essential implementation element of this policy is the need for all data users wishing to use those data, which are archived in the BALTEX Data Centres, to be formally endorsed in writing by at least one SSG member and to be subsequently registered at both the International BALTEX Secretariat and at the BALTEX Data Centres. Further releases of BALTEX data to any third party is not allowed. As a con-

sequence, for example, BALTEX data collected into one of the BALTEX Data Centres, may at present not be provided to other Data Centres which operate with a more unrestricted data release policy (such as the Global Runoff Data Centre). While principally stating that a less restricted data exchange, based on WMO Resolution 40, is desired, the BSSG considered it impossible to change the present policy ad-hoc without having negotiated the issue with the data providers involved. It was additionally stressed that other data and data products originating from BALTEX research projects, which are not distributed via BALTEX Data Centres, are endorsed to be freely distributed to users providing that project-internal rules or other protection measures allow to do so. – The BSSG identified a weakness of BALTEX concerning oceanographic data because the BALTEX Oceanographic Data Centre has so far not reached a full data centre status but has mainly dealt with meta data. The discussion on improving the availability of marine data related to the status of the BALTEX Oceanographic Data Centre was held under item 12.

6.7 Recommendation #7: ***The SSG to identify two or three "big issues" relevant to users***. This recommendation was discussed to considerable extent and depth. As with recommendation #1 the SSG strongly felt that a final decision should be taken after having completed the transition process into the second phase of BALTEX. As a preliminary big issue list the following key words were noted: (i) "severe weather" issues, i.e. extremes with a focus on floods; (ii) "water quality" as relevant for the society, including the Baltic Sea; (iii) validation of ECMWF forecasts on time scales of weeks to seasonal.

6.8 Recommendation #9: ***Go for EU financial support in FP5 (network) and FP6 (integrated project(s)***. Immediate actions to fully respond to this Panel recommendation had been taken. A FP5 thematic network funding proposal was submitted to the EC-FP5-EESD programme before the 15 October 2001 deadline (see item 9).

6.9 Recommendation #10: ***Strengthen co-ordination measures (BALTEX Secretariat, project manager, chief scientist)***. The recent decision of GKSS Research Centre Geesthacht to fully take over the financial support for the International BALTEX Secretariat (IBS, see item 4) and the implementation of Hans-Jörg Isemer, Silke Köppen and an additional scientist position at the IBS was considered as a very positive response to this Panel recommendation.

Item 7: *BRIDGE*

BRIDGE is the central observational and modelling period in BALTEX, covering the period October 1999 to February 2002. Five Enhanced Observation Periods (EOPs) had been planned within the *BRIDGE* period. See the minutes of the 11th BSSG meeting (IBS Report No. 21) for preliminary summaries on the start of *BRIDGE* and EOP1.

Several contributions to *BRIDGE* or to individual EOPs within *BRIDGE* were noted by BSSG members.

Major measurement activities were conducted in the frame of the EC-funded project CLIWA-NET ("BALTEX Cloud Liquid Water Network"; co-ordination André van Lammeren, KNMI; EC-contract EVK2-CT-1999-00007, see also the CLIWA-NET website at

http://www.knmi.nl/samenw/cliwa-net/main.html). André van Lammeren briefed the BSSG members on the objectives and preliminary results of CLIWA-NET (see Appendix 9).

Additional *BRIDGE* activities reported include:

A HIRLAM-BALTEX data assimilation project uses a special version of the HIRLAM system for quantifying the water and energy budgets of the area relevant to the BALTEX experiment through variational data assimilation. A reanalysis of one year of the *BRIDGE* period (October 1999 - October 2000) with special emphasis on the quality of the reanalysis and the components crucial for the water and heat budgets. This project is a joint undertaking of FMI, SMHI and ECMWF (see also http://hirlam.fmi.fi/bridge/introduction.html).

The BALTEX Radar Data Centre at SMHI is continuously providing several radar products covering the entire BRIDGE period (see item 12 for details and the BRDC website at http://www.smhi.se/brdc/blthome.html).

Additional (to what is performed in the course of the routine operations of national weather services) radio soundings were conducted at several stations during *BRIDGE* EOPs.

Troposheric and atmosphere boundary layer measurements according to the "Lindenberg column" monitoring concept have become almost operational during *BRIDGE* for a variety of measurements performed at the Meteorological Observatory Lindenberg of DWD.

Several field measurements were conducted during part of the *BRIDGE* period in the course of the EC-funded project "PEP in BALTEX" (Pilot study of Evaporation and Precipitation in the Baltic Sea, co-ordination Ann-Sofi Smedmann, Uppsala University; see the PEP website at http://www.met.uu.se/cirrus/airsea/pep/pep.htm#methodology).

The *BRIDGE* Ocean Programme did not materialise to the extent as originally scheduled, because of a major lack of funding at most of the institutions involved in the planning stages. However, several specific research vessel cruises were conducted during *BRIDGE* EOPs. Jan Piechura showed examples of repeated cross-sections during EOP1 and EOP2, which had captured an event of salt water inflow in the Stolpe Channel region in the western Baltic Sea (see also item 13). Also, Andreas Lehmann reported on conducted, and still planned ship cruises. It was however noted, that a comprehensive overview on activities performed as part of the Ocean Programme in *BRIDGE* was lacking, and the BSSG gave the A**ction #7** to **Anders Omstedt, Andreas Lehmann, Jan Piechura, Pekka Alenius and Hans-Jörg Isemer** to compile a summary on performed actions as part of the *BRIDGE* Ocean Programme.

The BSSG was pretty aware that the reported activities do most probably not provide for a complete coverage of *BRIDGE* activities. A lack of comprehensive information on *BRIDGE* activities in general was noted. In this context, several BSSG members suggested to revitalise the regular publication of a BALTEX Newsletter. Such a regularly published print medium would be helpful to rapidly inform the BALTEX community on obtained results or conducted activities. It was noted that two issues of a BALTEX Newsletter had been published in earlier times, however, a regular publication could not be maintained at that time. The BSSG took the view that a regular BALTEX Newsletter would be highly beneficial and gave the **Action #8** to **Hans-Jörg Isemer** to take steps towards the regular publishing of a BALTEX Newsletter with the first issue to appear in early 2002.

The BSSG discussed the set-up of a specific working group with the general objectives to

1) establish a summary catalogue on all activities conducted during *BRIDGE*, and
2) to stimulate and supervise necessary evaluation, exploitation and modelling activities based on the data collected during *BRIDGE*.

It was finally decided to give the **Action #9** to **Hans-Jörg Isemer and Anders Omstedt** to take steps to transform the earlier *BRIDGE Management Group* into a *BRIDGE Evaluation Team* by (i) arranging for the *BRIDGE Evaluation Team* membership, (ii) fine-tuning the objectives of this team, and (iii) initiating steps to meeting these objectives, along the lines suggested by the BSSG.

Item 8: CEOP

The Chairman summarised the main objectives and the status of the Co-ordinated Enhanced Observational Period (CEOP) of GEWEX (for the recently approved CEOP Implementation Plan see http://www.gewex.com/ceop.htm, and further information on CEOP at http://monsoon.t.u-tokyo.ac.jp/ceop/index.html). CEOP is the major upcoming observing period of GEWEX with benefit also to other WCRP projects, such as CLIVAR. It will be built around various products of new satellites (such as TRMM, TERRA, ENVISAT, ADEOS-2, and AQUA), global model output, and high-quality *in-situ* data taken at selected reference sites located in various climate regions on the Globe. A significant input of GEWEX CSEs, such as BALTEX, is to provide *in-situ* data taken at reference sites in order to build up the envisaged central CEOP reference site data archive. At present, some 15 reference sites were already approved and options for another 15 stations are being investigated. The Chairman noted with pleasure, that the German and Dutch Weather Services (DWD and KNMI) have officially confirmed the participation of their measurement sites at Lindenberg (DWD) and Cabauw (KNMI) for CEOP. The Finnish Meteorological Institute (FMI) is currently investigating whether FMI's Arctic Research Centre at Sodankylä shall become the third BALTEX reference site for CEOP.

The Chairman introduced the recently adjusted time plan for CEOP, which constitutes a shift in time of the planned two full annual cycle periods, which had to be postponed because of the delay of several satellite launches. The new CEOP time plan is as follows:

1 July 2001-30 Sep 2001:	Preliminary data period (*unchanged to earlier plans*)
1 Oct 2001-30 Sep 2002:	Build-up phase (*new*)
1 Oct 2002-30 Sep 2003:	1st CEOP Annual Cycle Period (*post-poned compared to earlier plans*)
1 Oct 2003-30 Sep 2004:	2nd CEOP Annual Cycle Period (*post-poned compared to earlier plans*)

The present activities towards establishing reference site data sets is mainly focussed on receiving final approval for several sites and the establishment of sample data sets from each site in the central CEOP data archive in Boulder, Colorado, USA.

The Chairman informed the BSSG that CEOP has recently been endorsed as the first component of the IGOS (Integrated Global Observing Strategy) Integrated Global Water Cycle Observation (IGWCO) activities. IGOS is a strategic international planning process, involving a number of global partners (such as CEOS, WCRP, IGBP, IOC, WMO, GCOS, GTOS,

GOOS), that links research, long-term monitoring and operational programmes, as well as data producers and users, in a structure that helps determine observation gaps and identify the resources to fill observation needs. The importance for CEOP being endorsed is e.g. that IGOS is a framework for decisions and resource allocation by individual funding agencies, providing governments with improved understanding of the need for global observations through the presentation of an overarching view of current system capabilities and limitations. The Chairman continued emphasising that CEOP is expected to receive higher attention and acceptance at national and international levels through this endorsement.

Several members of the BSSG, representing national meteorological Services, noted that the objectives of CEOP, the benefits this international effort may have for the Services, and possible future requirements may not be well enough known at the Services's Director General levels and **Hartmut Graßl** was asked (**Action #10**) to take steps to inform the General Directors of Hydro-meteorological Services on CEOP objectives, CEOP-related activities in BALTEX, CEOP requirements for BALTEX, and mutual benefits for BALTEX and CEOP; in particular stressing the role of the Services in these activities.

The BSSG discussed how BALTEX may be adequately represented in CEOP organisational bodies. H. Graßl is a already chairman of the CEOP Scientific Steering Group. At present, four CEOP Working Groups are either already implemented or the implementation is planned. The BSSG suggested the following BALTEX representatives to join CEOP WGs:
- **Carl Fortelius** (FMI) for the CEOP WG on Water and Energy-cycle Simulation and Prediction (WESP);
- **Jürgen Fischer** (University of Berlin) for the CEOP WG on Satellite Remote Sensing;
- **Hans-Jörg Isemer** (GKSS) for the CEOP WG on Data Management.

No BALTEX representative was suggested for the CEOP WG on Monsoon System Studies.

Both Carl Fortelius' and Jürgen Fischer's CEOP WG membership still need approval by the respective CEOP WG chairs, hence, **Hartmut Graßl** was given the **Action #11** to arrange for BALTEX representatives' participation in CEOP working groups at the CEOP SSG and WG levels, and to invite Carl Fortelius and Jürgen Fischer to become members of the CEOP WESP Working Group and CEOP Satellite Working Group, respectively.

The Chairman finally announced that planning steps have recently been initiated for the official CEOP kick-off meeting, to be held in Tokyo, Japan, during 6 to 8 March 2002, where all CEOP WGs shall meet jointly for the first time. It is in particular planned to gather all reference site station managers around one table in order to jointly discuss steps to build up the central CEOP reference site data archive.

Item 9: *BALTNET* and the revision of the BALTEX science plan

Hans-Jörg Isemer briefed the BSSG on the thematic network funding proposal *BALTNET* which was submitted to the European Commission's (EC) Fifth Framework Programme (FP5) Energy, Environment and Sustainable Development (EESD) programme for the 15 October 2001 deadline. The proposal entitled **Global Change, Natural Variability and Anthropogenic Influences in the Baltic Sea Basin - *Towards a Baltic Research Area*** is a joint initiative of 52 institutions from 14 European countries requesting financial support for establishing the basis for an European research area with the ultimate objective to initiate, and continue, co-ordination of research on global change, natural variability and anthropogenic influ-

ences in the Baltic Sea basin in an integrated manner. The major deliverable of *BALTNET* will be an integrated European science agenda for the Baltic Sea basin including – as a central deliverable - a future science and implementation plan. Based on the recently improved understanding of physical processes governing the water and energy cycles of the Baltic Sea basin, obtained in the frame of the BALTEX programme, *BALTNET* is designed to integrate research on climate variability and change and on budgets of nutrients and pollutants in both air and water. Studies on impacts of global change on natural and society/economic systems shall be included as well as studies on related policy measures based on retrospective analyses, mitigation and adaptation scenarios. Figure 1 gives a graphic sketch of the major science themes of *BALTNET*. Users and stakeholders will be participants in *BALTNET* and have a platform to meet and communicate with the research community.

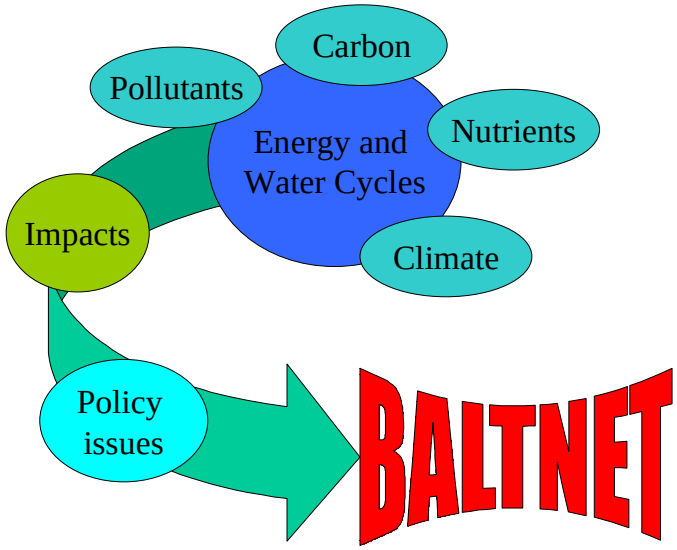

Figure 1: Sketch of the main science themes of *BALTNET*

H.-J. Isemer continued to note that the rationale behind the *BALTNET* proposal is basically the need for a substantially intensified application of the achievements obtained in BALTEX (but also in other ongoing programmes or projects related to the Baltic Sea basin, such as NOPEX and BASYS) to other fields where knowledge on water and energy cycles is of fundamental importance: Climate variability and climate change studies including scenarios of potential future climate, and environmental investigations, in particular on transport and deposition of nutrients and pollutants. In these latter areas, new knowledge recently generated by BALTEX and NOPEX has so far not adequately been recognised and applied in the user communities and other science sectors. A co-ordinated initiative at the European level is required in order to i) create cross-discipline linkages with mutual benefits within the natural sciences, and ii) support decision makers on the political level in environmental issues related to the Baltic Sea basin. H.-J. Isemer pointed out that *BALTNET* (where no funding for real research work shall be funded, but support for accompanying and co-ordination activities such as conferences and workshops was requested) shall lay the base for phase 2 of the BALTEX programme and is envisaged to provide financial means for the transition of phase 1 (1993-2002) into phase 2 (2002 and beyond) of the BALTEX programme.

H.-J. Isemer explained details of the *BALTNET* proposal. The proposal is structured into the following seven work packages:
WP1: Co-ordination and network management
WP2: User identification, stimulation and integration
WP3: Natural science assessment
WP4: Impacts
WP5: Policy Issues
WP6: Science agenda for global change in the Baltic Sea Basin
WP7: Training and education, dissemination of results.

Central to *BALTNET* is WP6, where – as part of the envisaged science agenda for global change in the Baltic Sea Basin – both a science and an implementation plan for phase 2 of BALTEX shall be established. WP2 to WP5 are preparatory for WP6, providing for essential input for the science agenda.

Details of WP2 and WP3 were explained in more detail by H.-J. Isemer. **The objectives of WP2 of *BALTNET*** read as follows:

1) To identify end users and stake holders relevant for *BALTNET* results and establish user groups in the Baltic Sea basin; to integrate users as active participants to *BALTNET* work-shops and activities;
2) To provide feedback from user groups to the research community on topics relevant to global change and sustainable development in the Baltic Sea basin;
3) To help disseminate *BALTNET* results to user groups via reports, internet and workshops, in close co-operation with WP7.

WP2 has been divided into the following five different tasks according to those themes which were considered essential in particular for the relations between the science community on the one side and potential users and stake holders on the other side:

Task 2.1: Forecasting hazardous events (severe weather, floods etc);
Task 2.2: Eutrophication of the Baltic Sea – causes and possible solutions, impact on water quality, algal blooms and fisheries;
Task 2.3: POPs and heavy metals – fluxes, impact and possible solutions;
Task 2.4: Climate variability and climate change - long-term drivers of ecological, environmental and societal adaptation and change;
Task 2.5: Baltic Sea 2100 –Strategies for sustainable development in the Baltic Sea Region.

For each of these five themes several candidate user and user groups were already identified.

The 3rd WP of *BALTNET* aims at a comprehensive state-of-the-art review of BALTEX and other science areas which are envisaged to be included in BALTEX phase 2. Three objectives were defined for WP3:

1) To review the state of the art of natural sciences in five specific disciplines (see below), with particular focus on the Baltic Sea basin:
2) To identify knowledge gaps in, overlap and mutual benefits among the science disciplines involved and suggest research projects to fill these gaps;
3) To provide an integrated natural science state-of-the-art review including suggestions for research needs as input for a science agenda on global change in the Baltic Sea basin.

The natural science review shall include the following five disciplines, the latter are organisationally included as individual tasks in WP3 of *BALTNET*:

Task 3.1: Physics of energy and water cycles;
Task 3.2: Heat, water and carbon exchange between sea and land surfaces and the atmosphere;
Task 3.3: Input and air-sea exchange of bio-reactive elements [N, P, C] and pollutants [SO_2, metals, POPs] to the Baltic Sea;
Task 3.4: Internal transformations and fluxes of C, N, P (ecosystem models) and pollutants in the Baltic Sea, and net export through the Danish Straits;
Task 3.5: Climate variability and climate change.

Hans-Jörg Isemer continued his overview on *BALTNET* by giving details on participants at the *BALTNET* proposal and the foreseen attachment of leading functions, such as work package leaderships and co-ordination functions. The majority of the attending BSSG members' institutions are participants to *BALTNET*. Roughly 2/3 of all *BALTNET* participants are in some way participating – or have participated in the past - in BALTEX projects, 1/3 are "newcomers" in the traditional BALTEX context.

H.-J. Isemer finished his overview on *BALTNET* by emphasising the importance of *BALTNET* as a preparatory step for writing future funding proposals to the forthcoming 6th Framework Programme (FP6) of the EC.

The BSSG thanked H.-J. Isemer for his report and for his efforts and contributions to establishing the *BALTNET* proposal. A lively and intensive discussion on the *BALTNET* proposal followed during which a particular focus was given to the question to what extent BALTEX shall "open" its science objectives to the new disciplines mentioned. Several BSSG members mentioned the importance of steps towards a full opening as suggested in the *BALTNET* proposal while others indicated preference for a more conservative attitude. Arguments brought forward in favour of the latter opinion included the concern of a too diverse science programme and a related too large community involved. Arguments in favour of a rapid and full enlargement of BALTEX's objectives, as suggested in the *BALTNET* proposal, included the expectation that BALTEX would distinctly increase its attractiveness also for funding agencies both at the EU and national levels. It was clearly pointed out that, with unchanged objectives, BALTEX may decrease the likelihood of getting future projects substantially funded. BALTEX would urgently need a dynamical program development in order to establish further skill and results with a closer orientation towards user needs and requirements. It was also noted that the draft funding policy for FP6, as visible at present, will change towards new funding instruments, including so-called *integrated projects*, which are likely to require an integrated research approach, along the lines as suggested in the *BALTNET* proposal.

The BSSG finally concluded to decide on the steps to be taken for initialising phase 2 of BALTEX after the evaluation result for the *BALTNET* proposal will be available (which is expected for early 2002). Measures and actions, how *BALTNET* objectives (and, hence steps towards implementing phase 2 of BALTEX) will be reached, will to some extent be dependent on whether the *BALTNET* proposal will be retained for funding. The BSSG, however, stressed that several steps based on suggestions made as part of the *BALTNET* proposal will be initiated in any case.

Firstly, to meet the objectives of WP3 of *BALTNET* for task 3.1, a critical state-of-the-art review on what the achievements of BALTEX are so far, shall be conducted. A draft report on

the findings shall be presented at the next BSSG meeting. This task was given to the BALTEX Working Group on Energy and Water Cycles (WGEW) chaired by Daniela Jacob (see item 11 below).

Secondly, the **Action #12** was given to **Mikko Alestalo, Pekka Alenius together with Gerald Geernaert** (Danish Environmental Research Institute) to organise a BALTEX workshop on (working title) "Eutrophication of the Baltic Sea – Causes and possible solutions, impact on water quality, algal blooms and fishery" with the particular objective to integrate potential users (such as HELCOM, fisheries organisations, tourism managers, as required), as has been suggested as part of Work Package 2, task 2.2, of the *BALTNET* proposal.

Thirdly, the BSSG suggested to conduct a scientific workshop prior to the next BSSG meeting with the tentative topics on nutrients, pollutants, metals and eutrophication issues of the Baltic Sea basin, including related management and policy measures, as a step towards meeting part of the objectives of the *BALTNET* proposal. This issue was given a particular action item later during this meeting when discussing the next BSSG meeting's date and location (see item 13 below).

It was also noted in this context that the theme of the workshop held prior to this BSSG meeting had been determined in close agreement with the *BALTNET* suggestion to enlarge BALTEX objectives towards including science on *climate and climate variability issues related to the Baltic Sea basin*.

Item 10: Composition and size of the BSSG

With the recent retirement of Ehrhard Raschke in summer 2001, the vice-chair position of the BSSG had become vacant. Upon suggestion of the Chairman the BSSG unanimously voted for Anders Omstedt to become the new vice-chairman of the BSSG. A. Omstedt approved his election with pleasure and thanked the BSSG for bestowing its confidence on him.

The BSSG discussed its own role in the overall decision and working processes within the BALTEX structure. It was noted that the BSSG is a rather large group (21 members at present) compared to other steering bodies within GEWEX and WCRP. This large size is basically the result of the BSSG founders' intention to have all countries in the BALTEX region (principally at least through one representative of a national Service) and all major disciplines relevant for BALTEX (presently Meteorology, Hydrology, and Oceanography) represented in the BSSG. It was also noted that not all of the BSSG members are regularly participating at BSSG meetings. The BSSG has no maximum term defined for its members, hence fluctuations in the BSSG membership occur at rather irregular intervals. A further discussion point was the new broadened scope of BALTEX phase 2 (see item 9) which was considered to have consequences for the future composition of the BSSG and possibly other BALTEX bodies.

The BSSG members concluded that the BSSG shall be maintained as the highest decision board in the BALTEX structure. It was also agreed that the present mixture of national representatives and science representatives has been highly beneficial in many situations, and shall be continued. It was also noted that a clear distinction into "national" and "science" representatives would anyway be difficult to apply for the majority of the BSSG members.

The BSSG decided to introduce a 3 year term for the BSSG. This means that members of the BSSG will have to be confirmed in 3 year intervals by the majority of the members of the

BSSG, or new members shall be suggested and confirmed by BSSG's majority. Details on how this procedure may be implemented will be finally confirmed at the next BSSG meeting. **Hartmut Graßl** took the **Action #13** to undertake steps to enhance efficiency of the BALTEX SSG by a balanced number of new members, taking into account the broadened scientific scope envisaged for BALTEX Phase II. Hartmut Graßl will also supervise steps towards implementing the new rules for the BSSG membership.

Whether a limited membership term is to be applied to BALTEX WGs and other bodies as well, shall be discussed internally in these groups and bodies.

The BSSG also concluded that a new **BALTEX Executive Group (BEG)** shall be installed at a level "between" the BALTEX Working Groups and the BSSG. This group shall basically be composed of the BSSG Chairman, the BSSG vice-chairman, and the BALTEX WG chairpersons. The main objective of the BEG is to quickly respond to scientific questions, which require a rapid action within the BALTEX programme. The BEG will have to report to the BSSG at the latter's regular meetings. The BEG's detailed objectives will have to be set up and be finally confirmed at the next BSSG meeting, respectively. The present composition of the BEG is as follows:

Hartmut Graßl (as the BSSG Chairman),
Anders Omstedt (as the BSSG vice-chairman),
Daniela Jacob (as the chairperson of the WG on Energy and Water Cycles),
Jarmo Koistinen (as the Chairman of the WG Radar).

The BEG members may decide to include other scientists, if required.

Item 11: Working Group reports

At present, two BALTEX Working Groups are existing: the BALTEX Working Group on Radar (BWGR), and the BALTEX Working Group on Energy and Water Cycles (WGEW).

The report of the **BALTEX Working Group on Radar (BWGR)** was given by Mikko Alestalo for the chairman of the BWGR, Jarmo Koistinen, who was unfortunately unable to attend this BSSG meeting. His written BWGR report was made available to the BSSG and is attached in Appendix 11. Also, the minutes of the 6th meeting of BWGR are attached as Appendix 12. The report was very well received and the BSSG applauded Jarmo Koistinen and the BWGR for the success in establishing the BALTRAD radar network. The BALTEX Radar Data Centre (BRDC) at SMHI, operated by Daniel Michelson, was included in BSSG's appreciation. It was in particular noted that the establishment of BALTRAD and BRDC has been a successful example for installing a highly useful research infrastructure built upon frontier scientific research embedded in international research programmes and initiatives. The BSSG acknowledged that BALTRAD is among the World's most "comprehensive" research networks of weather radars, considering the number of countries, contributing institutes, and heterogeneity of the radars themselves along with their data. It is a major BALTEX achievement that this network, together with the BRDC, has now continuously provided high quality datasets during the entire BRIDGE period on a quasi-operational base. The BALTRAD products were in particular noted as a candidate BALTEX product to be provided for CEOP. Establishing BALTRAD and BRDC in its present design was acknowledged as the result of year-long efforts of numerous individuals and institutions, in particular national weather services, involved. The BSSG also noted that the BWGR report points to some still

existing gaps, both in geographical coverage and scientific evidence for further minimizing uncertainties and errors in the BALTRAD products. An evident geographical gap in radar coverage was identified in the eastern part of the BALTEX area, and the BSSG took note on possible technical, infrastructure, personal and logistic problems with some radars in that region, as noted in the BWGR report and the BWGR meeting minutes (Appendix 10 and 11). The BSSG considered it useful to address the involved national Services in eastern Europe making them aware of the potential benefit a rapid closing of the existent gaps in radar coverage would mean for both scientific and operational applications, and at the same time requesting the Service's suggestions on how BALTEX may be helpful to solve existing problems. The BSSG gave the **Action #14** to **Jarmo Koistinen** (chairman of BWGR) to inform Hartmut Graßl on burning problems (technical and/or financial, or others) concerning present gaps in the radar coverage needed for BALTEX purposes; and, as an immediate follow-up and part of the same action, **Hartmut Graßl** to write letters based on Jarmo Koistinen's information to national Services as a measure to start solving the reported radar problems, whenever possible.

The BALTEX WG on Water and Energy Cycles (WGEW) is chaired by Daniela Jacob. She reported on a preliminary meeting of the WGEW, held during the 3rd Study Conference on BALTEX in Mariehamn, Finland (see also Appendix 5). Unfortunately, no extra funding could be made available so far to support writing the planned textbook on achievements of the BALTEX programme. Respective action of the WGEW are hence delayed, and not all candidate members of WGEW have so far confirmed their participation. The BSSG encouraged the WGEW to continue steps towards establishing the planned textbook on BALTEX achievements. It was further suggested that the WGEW shall provide for a comprehensive state-of-the-art science review on the present achievements of BALTEX, and assess the BALTEX achievements critically versus the objectives of BALTEX, as has recently been planned as part of the *BALTNET* proposal (see item 9). The objectives for WGEW in this respect were hence defined as follows:

> 1) To review the scientific achievements which have been made with respect to processes of water and energy cycles in the climate system during the last decade (since BALTEX is ongoing), and to assess the BALTEX contribution to these achievements;
> 2) To assess BALTEX achievements in the light of the original BALTEX objectives: Has BALTEX met its objectives ?
> 3) To identify existing gaps in our knowledge on water and energy cycles in the Baltic Sea catchment, and suggest research projects to fill these gaps;
> 4) To identify potential linkages to climate and climate variability research, and to research on transport and deposition of nutrients and pollutions, as has been suggested in work package 3 of the *BALTNET* proposal (see item 9).

The BSSG asked **Daniela Jacob (Action #15)** to constitute the membership and finalize establishing detailed objectives of the BALTEX Working Group on Energy and Water Cycles (WGEW) along the lines suggested by the BSSG, and initiate steps towards meeting WGEW's objectives.

Item 12: Data Centre reports

The report for **the BALTEX Meteorological Data Centre** (BMDC) operated by the German Weather Service (DWD) was given by Sabine Hafner, responsible head of BMDC. The recently published BMDC Report No.5 was handed out to the BSSG which contains a compre-

hensive overview and statistics on activities of the BMDC during the year 2000. The BMDC Report No.5 may be obtained directly from DWD (see also http://www.dwd.de/research/baltex/e_baltex.html) or also at the International BALTEX Secretariat (see http://w3.gkss.de/baltex).

Sabine Hafner explained that BMDC is continuing to further extend its data bases, which may basically be divided into the Baltic Sea basin data base (BACAR) and the BALTEX modelling area data base (BAMAR). While the majority of data archived in the BAMAR section of BMDC includes SYNOP observations from stations and ships and aerological data (RS ascents), the BACAR archive is more comprehensive including additional observations and measurements such as precipitation, surface radiation components, soil and snow data. An example for BMDC's data availability is given in Appendix 12. All data are thoroughly processed including formatting and error checking. BMDC has also started to archive specific BALTEX products such as precipitation fields (daily, 1/6 degree resolution) for the BALTEX region, precipitation measurements made onboard especially equipped ships from the Baltic Sea, and, to a limited extent, products from data assimilation runs performed at DWD. BMDC has also initiated steps to get access to and archive climate records from some stations and for selected parameters in the BALTEX region (see Appendix 12 for some details).

S. Hafner noted that additional (to what is available routinely on the GTS) data from Russia have not been delivered since 1998, for the Kaliningrad Region even since 1995. She recalled that additional data delivery from all East-European Services is still dependent on extra funding, which has been assured primarily through national German sources (through the German Education and Research Ministry, BMBF), the International BALTEX Secretariat, and DWD) during recent years. The funding contract for the Russian Service could unfortunately not be prolonged in 1998, and other contracts with Services in other East-European countries will most probably have to be terminated in the nearest future because of a lack of national funding possibilities in Germany. Several BSSG members pointed out that, while funding support for the initialisation of additional (to routine) data delivery for research programmes such as BALTEX is justified, a continuous funding of data deliveries to BALTEX data centres might be difficult to defend. Sten Bergström noted that SMHI, as the holder of the BALTEX Hydrology Data Centre (BHDC) is not paying for any data provision in support of the BHDC but expects data delivery to BHDC as a contribution of National Services to BALTEX. As several BSSG members representing Hydro-meteorological Services were unable to attend this meeting, the BSSG concluded to discuss this important issue on its next meeting.

Sabine Hafner continued mentioning that although data requests are continuously received at BMDC, and the number of data users is steadily increasing, only very few of registered data users have provided feedback on obtained research results by e.g. submitting copies of publications as is requested as part of the BALTEX Data Exchange Policy. Hence, documentation on what achievements are being made using data archived and distributed via BMDC is rather incomplete, which may endanger future continuous engagement of DWD for BMDC. Discussion within BSSG revealed that a lack of the data users' feedback on science achievements based on BALTEX data is also a complaint of other BALTEX Data Centres. The BSSG gave the **Action #16** to the BALTEX Data Centres and the BALTEX Secretariat (**Sabine Haffner, Bengt Carlsson, Daniel Michelson, Pekka Alenius, Hans-Jörg Isemer**) to take steps, as part of the general BALTEX Data Exchange Policy, towards a permanent and effective monitoring of scientific results obtained using BALTEX data by e.g. urging BALTEX data users to submit copies of published BALTEX articles to the Secretariat or Data Centres, as required by the BALTEX data license agreement. In this same context, it was noted that the electronic

BALTEX Library, which is maintained at the BALTEX Secretariat and is accessible through the BALTEX website (http://w3.gkss.de/baltex) had been established e.g. for monitoring BALTEX publications. It was noted that, at present, a mixture of publications of both BALTEX results and other studies were entered into the Library without proper discriminating between them. The BSSG concluded to limit the entries in the Library to true BALTEX results in the future, and suggested to introduce an indicator to provide a clearly visible division into BALTEX result entries, and others. The Library is most probably not up-to-date and needs further updating. **Hans-Jörg Isemer** accepted the **Action #17** to update the BALTEX Publication Library established at the International BALTEX Secretariat along the lines suggested by the BSSG.

Finally, the future inclusion of long-term instrumental climate records (time scale of decades to centuries) into the archives of BMDC (and other BALTEX Data Centres, if appropriate) was discussed. It was noted that in particular in Scandinavia several of these records exist (for example surface air-temperature at Stockholm, which extends back to the early 18th century). The BSSG suggested to initiate building up an inventory on existing long-term climate records for the BALTEX area and gave **Action #18** to **Hans-Jörg Isemer** to identify long climate records relevant for the Baltic Sea basin and compile information on these data at the Secretariat.

Sten Bergström summarised the status of **the BALTEX Hydrological Data Centre** (BHDC) which is operated by the Swedish Meteorological and Hydrological Institute (SMHI) in Norrköping, Sweden, with Bengt Carlsson being the head of the BHDC. The BHDC is continuously enlarging its archives collecting both daily and also monthly runoff data from the BALTEX area, as has been defined as BHDC's objectives. BHDC is maintaining its own website at http://www.smhi.se/sgn0102/bhdc/bhdc.htm where detailed information on the actual status of the data base is made available. Among specific BHDC actions in 2000 and 2001 was the preparation and distribution of both hydrological and meteorological data of the Thorne and Kalix river basins in northern Scandinavia which were used as input and validation data in the frame of the GEWEX PILPS-2e Arctic model intercomparison project.

BSSG members noted a specific gridded 1 degree meteorological data set covering the BALTEX area and much of northern Europe established at SMHI which is now frequently used for various purposes in the BALTEX modelling community. It was also noted that information on technical details of this data set have not yet completely been made available to the science community, and **Sten Bergström** took the **Action #19** to provide detailed technical information for users on this data set.

S. Bergström continued giving the summary report of the **BALTEX Radar Data Centre** (BRDC) which is also operated by SMHI (responsible head is Daniel Michelson, see the BRDC's website at http://www.smhi.se/brdc/blthome.html). A particular challenging current task at BRDC is the continuous establishment and distribution (via CD-ROM) of several BALTRAD products during the entire BRIDGE period (October 1999 to February 2002). The BALTRAD network currently comprises 30 radars (7 in Finland, 12 in Sweden, 2 in Norway, 3 in Denmark, 5 in Germany, and 2 in Poland, see also Appendix 11 and Appendix 12 for more details on BRDC). The following products are being provided during BRIDGE:

1) DBCZ composites of radar reflectivity factor, 2x2 km horizontal resolution, BALTRAD coverage every 15 minutes;
2) Gauge-adjusted accumulated precipitation, 2x2 km horizontal resolution, BALTRAD coverage every 3 hours;

3) Gauge-adjusted accumulated precipitation, 2x2 km horizontal resolution, BALTEX region coverage every 12 hours;
4) Vertical profiles of wind speed and direction at selected BALTRAD radar stations, 1 hour time resolution.

Sten Bergström finished by noting that BRDC has now adopted the HDF5 data format. As of 1 July 2001, BRDC data sets are being stored and distributed using HDF5. The NCSA's HDF5 software has been made available to data users on one of the BRDC data CD-ROMs.

The BSSG appreciated again with pleasure the continuous successful work made at BRDC and acknowledged the continuous product delivery for BRIDGE as a highlight achievement for BRIDGE and of the entire BALTEX programme (see also item 11).

The report for **the BALTEX Oceanographic Data Centre** (BODC) was given by Pekka Alenius of the Finnish Institute of Marine Research (FIMR). In contrast to the other BALTEX data centres, the BODC acted so far as a meta data centre. P. Alenius reported that user requests on this meta information has been rather scarce ever since and was even going down in recent times. He however mentioned that this is most probably not an indication for BALTEX not being in need of a central oceanographic data archive, but that the BALTEX marine research groups and individuals have instead used either other archives, or established individual archives and data bases at their individual research institutes. This view was strongly supported by BSSG members. The BSSG members representing the oceanographic BALTEX community and research unanimously stated the need for a real central BALTEX Data Centre for oceanographic data. Pekka Alenius continued noting that FIMR will unfortunately have no financial means available to continue to act as the holder of the BODC, even in its current status as a meta data centre. The BSSG discussed various options how a BALTEX data centre for oceanographic data could be operated and which candidate institutions might be capable of maintaining such a data centre. Sten Bergström indicated that he will explore SMHI's possibilities to establish and maintain an oceanographic data centre for BALTEX at the Göteborg Branch of SMHI, and the BSSG appreciated Sten Bergström's initiative. The BSSG concluded to give the **Action #20** to **Anders Omstedt, Andreas Lehmann, Jan Piechura, Pekka Alenius, Jouko Launiainen, and Sten Bergström** (i) to take immediate actions for a vitalisation of the BALTEX Data Centre for oceanographic data, with the option to install the Data Centre at the Göteborg Branch of the Swedish Meteorological and Hydrological Institute (SMHI), and (ii) to re-consider and define the objectives of the oceanographic data centre including in particular the definition of data types to be stored at the data centre.

Finally on this item, the question whether BALTEX should maintain a specific data centre for satellite data was raised by BSSG members. This issue was discussed also in the context of one of the suggestions of the BALTEX mid-term review, where a lack of visible uses of satellite - and, in general - remote sensing data within the BALTEX programme had been diagnosed. BSSG members argued that a BALTEX central satellite data centre may help to stimulate the application of satellite products, to make access to satellite data easier for interested users, and also the use of such data more visible. **Action #21** was given to **Hans-Jörg Isemer and Clemens Simmer** to investigate whether a dedicated BALTEX Data Centre for satellite data is required for BALTEX and to prepare related information for final discussion at the next BALTEX SSG meeting.

Item 13: Reports from countries

Only countries with a representative available at the time of the discussion are included in this reporting section.

Sweden
Anders Omstedt re-called that a Swedish national BALTEX group has been implemented and is regularly conducting meetings in order to co-ordinate the Swedish contributions to the BALTEX programme. A. Omstedt acts as the chairman of this group. He shortly summarised the major institutions which contribute to BALTEX via several projects, which are funded either on the national level (e.g. the Swedish Regional Climate Modelling Programme SWECLIM), through EU-funded projects, as well as through various institutional contributions. Major contributions to BALTEX are currently originating from the Swedish Meteorological and Hydrological Institute (SMHI), the Rossby Centre as the Swedish Climate Computing Centre, Chalmers University, Lund University, Uppsala University and Göteborg University. These institutions provide contributions to almost all science components of the BALTEX programme in all three major BALTEX disciplines, meteorology, hydrology and oceanography.

Finland
Major contributions in Finland are presently originating from the Finnish Meteorological Institute (FMI), the Finnish Institute for Marine Research (FIMR), Helsinki University, and the Finnish Environment Institute (SYKE). SYKE is currently being re-structured and will cover marine aspects in the future as well. Mikko Alestalo mentioned a new Finnish research funding programme for the Baltic Sea, which is seen as a potential funding source for national BALTEX contributions. The most important science topics related to BALTEX covered at present by the mentioned Finnish institutions include a data assimilation project for *BRIDGE*, weather radar issues, air-ice-sea interaction field studies, and sea-ice modelling activities. It was noted that efforts in Finland are strengthened towards developing 3d hydrodynamic ecosystem models of the entire Baltic Sea. It was finally noted, that there is currently a somewhat low profile concerning BALTEX research topics at most Finnish universities (except Helsinki University), and it was suggested to further stimulate Finnish Universities to join activities for preparation of phase 2 of BALTEX.

Denmark
Sven-Erik Gryning briefly noted that, to his knowledge, there are only few BALTEX activities ongoing in Denmark at present, with the exceptions of the Risö National Laboratories and the Technical University of Denmark (DTU). Activities at Risö and DTU concentrate on hydrological modelling and atmospheric boundary layer studies and modelling. The low Danish profile in BALTEX is at least partly caused by a lack of a suitable national funding programme from where BALTEX-related projects may receive financial support.

The Netherlands
KNMI is the major Dutch contributor to BALTEX through the co-ordination of and contributions to the EU-funded BALTEX *BRIDGE* cloud liquid water network project CLIWA-NET, contributions to climate and regional model validation and intercomparison studies using different BALTEX data sets (such as the PIDCAP GPS products, and others), and contributions to improving land surface schemes in weather forecast models (such as ECMWF models).

Poland
Polish contributions to BALTEX originate from the Institute of Oceanology at the Polish Academy of Sciences (IOPAS) in Sopot, the Wroclaw branch of the Institute of Meteorology and Water Management (IGMW, the Polish Hydro-Met Service), the University of Szczecin, and the Maritime Institute in Gdansk. Jan Piechura noted that IOPAS conducted several research vessel cruises as part of the *BRIDGE* ocean programme. He showed preliminary results of field surveys obtained with IOPAS's RV Oceania which documented a particular inflow event in the Bornholm Deep - Stolpe Channel Region during EOP1 and EOP2 of BRIDGE in 1999 and 2000 (see Appendix 14). J. Piechura noted the expected outstanding value of these data for e.g. model validation purposes.

Germany
Hartmut Graßl briefed the BSSG on a recently approved German national Climate Research Programme (DEKLIM), funded by the national Ministry for Education and Research (BMBF), which includes a specific section of project clusters related to the BALTEX programme. These projects were started at slightly varying times in the second half of the year 2001, and will be funded for three (some even for four) years. Together with other BALTEX-related projects (e.g. funded by the German national Atmospheric Research Programme, AFO2000, again funded by BMBF), a total amount of distinctly more than 10 Mill € are presently allocated to BALTEX projects in Germany. See Appendix 15 for some details. BSSG members acknowledged these national efforts as an important contribution to maintaining BALTEX research for the years to come. The **Action #22** was given to **Hans-Jörg Isemer** to publish a note on the BALTEX projects funded by national German sources (DEKLIM, AFO2000) in the next issue of the BALTEX Newsletter.

Item 14: Date and place of the next BSSG meeting

The BSSG decided to reconvene for its next meeting already in early summer of 2002 having in mind the important steps and decision to be taken in the context of preparing for BALTEX Phase II. Sirje Keevallik offered to host the 13th BALTEX Science Steering Group meeting at the Estonian Business School (EBS) in Tallinn, Estonia during June 2002. The BSSG unanimously agreed with pleasure to follow this invitation. **Sirje Keevallik and Hans-Jörg Isemer** agreed to take **Action #23** to prepare for the 13th BALTEX SSG meeting to be held at the **Estonian Business School in Tallinn, Estonia, during 17 to 19 June 2002**.

Following the decision made under item 9 of this meeting, **Hans-Jörg Isemer** (with the support of Sirje Keevallik, selected SSG members and *BALTNET* participants) was given the **Action #24** to prepare for a scientific workshop prior to the 13th BALTEX SSG meeting with the tentative topic 'nutrients, pollutants, metals and eutrophication issues of the Baltic Sea basin, including related management and policy measures'.

Item 15: Any other business

Mikko Alestalo re-called earlier plans of Dan Rosbjerg to prepare for a major summer school on BALTEX during 2002 or 2003 in Riga, Latvia. As Dan Rosbjerg was unable to attend this meeting, Hans-Jörg Isemer was asked to contact Dan Rosbjerg on this issue and report to the BSSG Chairman. The BSSG expressed its general support for a BALTEX summer school and encouraged Dan Rosbjerg to continue any preparations in this context.

As Ehrhard Raschke, the former vice-chairman of the BSSG and BALTEX representative to the GEWEX Hydrometeorology Panel (GHP), had resigned from both these functions, a new BALTEX representative to GHP needed to be assigned. The BSSG unanimously agreed that Hartmut Graßl, as the BSSG Chairman, will act as the new BALTEX representative to GHP.

Closing of the meeting

The Chairman thanked all participants for their constructive contributions to this meeting, and to the steering process of BALTEX in general. For the whole group, he heartily appreciated the excellent environment for and support to this meeting provided by KNMI as the meeting's host. The Chairman closed the meeting at noon on Wednesday, 14 November 2001.

Acronyms and Abbreviations

ADOES-2	Advanved Earth Observing Satellite
AFO2000	Atmosphere Research Funding Programme of BMBF
AMS	American Meteorological Society
AMSR-E	Advanced Microwave Scanning Radiometer
AQUA	Earth Observing Satellite
BACAR	Baltic Sea Catchment Area data base at BMDC
BALINEX	BALTEX Land Surface Experiment at Lindenberg, Germany
BALTEX	Baltic Sea Experiment
BALTNET	Thematic network proposal for BALTEX to FP5
BALTRAD	BALTEX Radar Network
BAMAR	BALTEX modelling area data base at BMDC
BAMS	Bulletin of the Amercan Meteorological Society
BASIS	Baltic Air-Sea-Ice Study
BASYS	Baltic Sea System Study, EU-FP4 project
BEG	BALTEX Executive Group
BER	Boreal Environmental Research
BHDC	BALTEX Hydrological Data Centre
BMBF	Bundesministerium für Forschung und Technologie, Bonn, Germany
BMDC	BALTEX Meteorological Data Centre
BODC	BALTEX Oceanographic Data Centre
BRDC	BALTEX Radar Data Centre
BRIDGE	The Main BALTEX Experiment, 1999-2002
BSSG	BALTEX Science Steering Group
BWGR	BALTEX Working Group on Radar
CARPE DIEM	Critical assessment of Available Radar Precipitation Estimation techniques and Development of Innovative approaches for Environmental Management (EU-FP5 project)
CEOP	Coordinated Enhanced Observing Period
CEOS	Committee on Earth Observation Satellites
CLIVAR	Climate Variability and Predictability Programme
CLIWA-NET	BALTEX Cloud Liquid Water Network (EU-FP5 project)
CSE	Continental Scale Experiment
DEKLIM	German Climate Research Programme
DIAMIX	Diapycnal Mixing in the stratified ocean; Field experiment in BALTEX
DMI	Danish Meteorological Institute, Copenhagen, Denmark
DNMI	The Norwegian Meteorological Institute
DTU	Technical University of Denmark
DWD	Deutscher Wetterdienst, Offenbach / Germany
EBS	Estonian Business School
EC	Executive Committee
ECMWF	European Centre for Medium Range Weather Forecast, Reading / UK
EESD	Energy, Environment and Sustainable Development Programme
EMHI	Estonian Meteorological and Hydrological Institute, Tallinn / Estonia
ENVISAT	Environmental Satellite, ESA
EOP	Enhanced Observational Period
ERS-2 ATSR	Along-Track Scanning Radiometer on ERS-2 satellite
EU	European Union
FIMR	Finnish Institute of Marine Research, Helsinki / Finland
FMI	Finnish Meteorological Institute, Helsinki / Finland

FP5	Fifth Framework Programme of the EU
GAPP	GEWEX Americas Prediction Project
GCOS	Global Climate Observing System
GERP	Geostationary Earth Radiation Budget Radiometer
GEWEX	Global Energy and Water Cycle Experiment
GHP	GEWEX Hydrometeorology Panel
GKSS	GKSS Research Centre, Geesthacht / Germany
GOOS	Global Ocean Observing System
GPS	Global Positioning System
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunication System
HELCOM	Helsinki Commission
HIRLAM	High Resolution Limited Area Model
IBS	International BALTEX Secretariat
IfMK	Institut für Meereskunde Kiel, Germany
IGBP	International Geosphere-Biosphere Programme
IGMW	Polish National Hydro-Met Service
IGOS	Integrated Global Observing Strategy
IGWCO	Integrated Global Water Cycle Observation
ImoU	Interim Memorandum of Understanding
IOC	Intergovernmental Oceanographic Commission of UNESCO
IOW	Institute for Baltic Sea Research Warnemünde, Warnemünde, Germany
IPCC	Intergovernmental Panel on Climate Change
ISCCP	International Satellite Climatology Project
KNMI	Royal Netherlands Meteorological Institute, De Bilt / The Netherlands
LHM	Latvian Hydrometeorological Agency, Riga, Latvia
MAGS	Mackenzie River GEWEX Study
MONSAI	EU-FP5 project proposal
MPI	Max-Planck-Institute
MPIfM	Max-Planck-Institute for Meteorology, Hamburg, Germany
MSG	Meteosat Second Generation
NCSA	National Centre for Supercomputing Applications, USA
NEWBALTIC	EU-FP4 project for BALTEX: Full-scale studies on the energy and water cycle of the Baltic Sea catchment region
NOAA-AMSU	National Oceanic and Atmospheric Administration-Advanced Microwave Sounding Unit
NOAA-AVHRR	National Oceanic and Atmospheric Administration Advanced Very High Resolution Radiometer
NOPEX	Nordic Pilot Experiment
NORDRAD	Nordic Weather Radar Network
NWP	Numerical Weather Prediction
PEP	Pilot Study of Evaporation and Precipitation in BALTEX
PIDCAP	Pilot Study for Intensive Data Collection and Analysis of Precipitation
PILPS	Project for Intercomparison of Land Surface Parameterisation Schemes
POP	Persistent Organic Pollution
QJRMS	Quarterly Journal of the Royal Meteorological Society
RASS	Radio Acoustic Sounding System

SEVIRI	Spinning Enhanced Visible and Infra-Red Imager
SMHI	Swedish Meteorological and Hydrological Institute, Norrköping/Sweden
SSG	Science Steering Group
SWECLIM	Swedish Regional Climate Modelling Programme
TERRA	Earth Observing Satellite
TRMM	Tropical Rainfall Measuring Mission
WCRP	World Climate Research Program
WESP	Water and Energy-cycle Simulation and Prediction
WGEW	BALTEX Working Group on Energy and Water Cycles
WMO	World Meteorological Organization