BALTEX

Baltic Sea Experiment

World Climate Research Programme / Global Energy and Water Cycle Experiment

WCRP GEWEX

Minutes of

Third Meeting of the BALTEX Science Steering Group

at
Strand Hotel
in Visby, Sweden
September 2, 1995

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List of Acronyms and Abbreviations

ACSYS	Arctic Climate System Study
AMSU	Advanced Microwave Sounding Unit
ASCAP	Air/Sea Interaction, Cloud and Precipitation Experiment
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung, Bremerhaven / Germany
AVHRR	Advanced Very High Resolution Radiometer
BALTEX	Baltic Sea Experiment
BASIS	Baltic Air-Sea-Ice Study
BHDC	BALTEX Hydrological Data Centre
BMBF	Bundesministerium für Forschung und Technologie, Bonn / Germany
BMDC	BALTEX Meteorological Data Centre
BODC	BALTEX Oceanographic Data Centre
BSH	Bundesamt für Seeschiffahrt und Hydrologie, Hamburg / Germany
BSSG	BALTEX Science Steering Group
CLIVAR	Climate Variability and Predictability Programme
CETP	Centre Environnement Terrestre et Planétaires, Vélizy / France
CSE	Continental Scale Experiment
CUT	Chalmers University of Technology, Onsala / Sweden
DHI	Danish Hydraulic Institute, Hørsholm / Denmark
DM	Deutschland Modell
DMI	Danish Meteorological Institute, Copenhagen / Denmark
DMSP	Defense Meteorological Satellite Programme
DWD	Deutscher Wetterdienst, Offenbach / Germany
DTU	Denmarks Technical University, Lyngby / Denmark
ECHAM	European Climate Model - Hamburg Version
ECMWF	European Center for Medium Range Weather Forecast, Reading / United Kingdom
EGS	European Geophysical Society
EM / DM	Europa Modell / Deutschland Modell
ENVCLI	Environment and Climate Programme
EU	European Union
FIMR	Finnish Institute of Marine Research, Helsinki / Finland
FMI	Finnish Meteorological Institute, Helsinki / Finland

GAME	GEWEX Asian Monsoon Experiment
GCIP	GEWEX Continental-scale International Project
GEWEX	Global Energy and Water Cycle Experiment
GHP	GEWEX Hydrometeorological Experiments Panel
GESIMA	Geesthachter Simulations Modell der Atmosphäre
GKSS	GKSS Research Centre, Geesthacht / Germany
GIS	Geographical Information System
GOES	Geostationary Operational Environmental Satellite
GRIB	Grid in Binary Format
GPCP	Global Precipitation Climatology Centre, DWD Offenbach / Germany
GPI	GOES Precipitation Index
GRIB	Grid in Binary Format
GTS	Global Telecommunication System
HDF	Hierarchical Data Format
HBV	Swedish Conceptual Hydrological Model for Runoff Simulation
HIRLAM	High Resolution Limited Area Model
HYACINT	Hydrological-Atmospheric Integrated Modelling at Subgrid Scale
IfMK	Institut für Meereskunde, Kiel / Germany
IGBP	International Geosphere Biosphere Programme
IMG	Institut für Meteorologie und Geophysik, Vienna / Austria
IOW	Institut für Ostseeforschung, Rostock-Warnemünde / Germany
LAMBADA	Large-scale Atmospheric Moisture Balance of Amazonia using Data Assimilation
LANDSAT	Land (Remote Sensing) Satellite
LITFASS	Lindenberg Inhomogeneous Terrain Fluxes between Atmosphere and Surface - a long-term Study 1995 - 2000
MAGS	Mackenzie River GEWEX Study
MAST III	Marine Science and Technology
METEOSAT	European Meteorological Satellite Series of EUMETSAT
MGO	Main Geophysical Observatory, St. Petersburg / Russia
MOHp	Meteorological Observatory Hohenpeissenberg / Germany
MPIfM	Max Planck Institut für Meteorologie, Hamburg / Germany
NASA	National Aeronautics and Space Administration
NEWBALTIC	Numerical Studies of the Energy and Water Cycle of the Baltic Region
NOAA	National Oceanic and Atmospheric Administration
NOPEX	Nordic Pilot Experiment

NORDRAD	Nordic Weather Radar Network
NWA HMS	North-West Administration of Hydrometeorological Service
NWF	Numerical Weather Forecast Model
NWP	Numerical Weather Predciction
PIDCAP	Pilot Study for Intensive Data Collection and Analysis of Precipitation
PIK	Potsdam Institut für Klimafolgenforschung, Potsdam / Germany
REMO	Regional Model
SHE	Systemè Hydrologique Européen
SHI	State Hydrological Institute, St.Petersburg / Russia
SMHI	Swedish Meteorological and Hydrological Institute, Norrköping / Sweden
SILMU	Finnish Research Programme on Climate Change
SSM/I	Special Sensor Microwave/Imager
SSG	Science Steering Group
SST	Sea Surface Temperature
SYNOP	Synoptical Surface Observation
SPBSOI	St. Petersburg Branch of the State Oceanographic Institute / Russia
TEMP	Upper-level Temperature, Humidity and Wind Report from a Radiosonde Station
UKMO	United Kingdom Meteorological Office
WCRP	World Climate Research Programme
WG	Working Group
WGN	Working Group on Numerical Experimentation
WGP	Working Group on Process Studies
WGR	Working Group on Radar
WMO	World Meteorological Organization
ZALF	Zentrum für Agrarlandschafts- und Landnutzungsforschung, Müncheberg / Germany

Summary

- The First Study Conference on BALTEX gave a stimulating state-of-the-art description of meteorological, hydrological and oceanographic research related to the water catchment area of the Baltic Sea.

- Two BALTEX funding applications submitted to the EU were successful. Network A will receive funds through the Environment and Climate . Network C will receive funds through the MAST III programme.

- Further BALTEX applications for Networks B, C and D, which were submitted to EU, have not been accepted for funding. Revised proposals will be submitted to the second call of the respective programmes after an additional BALTEX-internal review.

- Additional proposals for Networks F and G are currently being prepared and are planned to be submitted to EU in 1996.

- Implementation of BALTEX-related activities in some of the eastern countries is limited by a lack of funding. Financial support on both the national and international level is needed.

- The BALTEX Meteorological Data Centre (BMDC) specified its status and the future data exchange for BALTEX between the different national services and BMDC. A respective status report was accepted by BSSG.

- The BALTEX Pilot Study for Intensive Data Collection and Analysis of Precipitation (PIDCAP) started in August 1995. It is the first Intensive Observational Period in BALTEX.

- During a joint meeting of H.Graßl, the Director of WCRP, GHP (GEWEX Hydrometeorological Experiments Panel) and BSSG, H.Graßl and members of GHP expressed their satisfaction about the rapid progress in the development of BALTEX. BALTEX issues, plans and recommendations for further improvement of the BALTEX observational strategy were discussed.

- BSSG concluded to hold the next BSSG meeting in Sopot, Poland, on 3-5 June, 1996.

Summary of Action Items

1. The Chairman asked all BSSG members and the BALTEX Secretariat to identify a suitable meeting place and -time for the second Study Conference on BALTEX until the next BSSG meeting (see section 3).

2. The Secretariat is asked to write letters of invitation to new members of the BALTEX WG on Numerical Experimentation (see section 4.2.2).

3. BSSG asked E.Raschke to nominate 2 or 3 scientists to form a drafting group with the task to draft a document on the potentials of radar measurements for BALTEX (see section 4.3).

4. BSSG recommended to re-submit the proposals for networks B and D, after a thorough consideration of the written evaluations. BSSG further suggested to perform a BALTEX - internal review of the proposals before their re-submission to the second programme calls. This review should be performed by members of the BALTEX community which are not involved in the respective proposal work. BSSG suggested to extend the next proposal for Network E to the real experimental field phase. BSSG encouraged the co-ordinators of networks F and G to go ahead with the preparation of these projects and work for funding applications on the EU level (see section 5.8).

5. The Chairman of BSSG is asked to contact FMI and DMI in order to ask for more engagement of these institutions in BALTEX (see section 6).

6. The Chairman asked the BSSG members to forward the BMDC report on data exchange in BALTEX to the respective national meteorological and hydro-meteorological services. He asked the BSSG members to use their influence to convince the national services and data centres on the respective national levels to support the work of the BALTEX Data Centres in providing for an as easy as possible data exchange in the framework of BALTEX, and to urgently request the national services in the BALTEX area to provide free access to all data necessary for BALTEX (see section 9).

7. The Secretariat is asked to prepare for the next BSSG meeting and a parallel workshop, in close co-operation with the hosting Institute of Oceanology (see section 12).

Introduction

The BALTEX Science Steering Group (BSSG) had its third meeting at Hotel Strand in Visby, Sweden. The meeting opened on 2 September, at 8 am, and closed at 1.30 pm the same day. It followed immediately the First Study Conference on BALTEX held in Visby from 28 August to 1 September 1995.

Participants of the meeting are listed in Appendix 1. The agenda is given as Appendix 2.

1 Opening of the Meeting

The Chairman of the BALTEX Science Steering Group, Lennart Bengtsson, opened the meeting and welcomed the participants. He pointed out that the present meeting is aiming at a short review of the BALTEX activities since the preceeding BSSG meeting in Jannuary 1995. Problems should be identified, but the tight time table for this meeting might not allow for extensive discussions, which will be postponed to the fourth BSSG meeting (see section 12).

The Chairman notified the meeting of the GEWEX Hydrometeorological Experiments Panel (GHP) which convened at the time in Visby. He announced a short joint meeting of the members of BSSG and GHP in the course of the present BSSG meeting. A summary of this joint meeting is given in section 11.

2 Approval of Second BSSG Meeting Minutes

The following changes to the minutes of the second BALTEX SSG meeting were approved:

2.1

Carl Fortelius of the University of Helsinki, Finland, was nominated as additional member of the BALTEX Working Group on Numerical Experimentation. This is not mentioned in the minutes of the second BSSG meeting (see also section 4.2).

2.2

The name of BALTEX network E is *Cloud / Precipitation / Air - Land Surface Field Experiment.*

2.3

In Appendix 15 of the minutes of the second BALTEX SSG meeting, the period for the Cloud/Precipitation/Air-Land Surface field experiment around Lindenberg should read : Summer 1998 and later.

Item 2.2 will be harmonized in the final version of the minutes of the Helsinki-meeting of BSSG. Items 2.1 and 2.3 are given here as supplementary additions.

3 Review of the First Study Conference on BALTEX

BSSG made a very positive review on the First Study Conference on BALTEX. The Conference was very important because scientists from all countries presently involved in BALTEX joined the Conference and contributed to it. The Conference turned out to be a state-of-the-art description in meteorological, hydrological and oceanographic research related to the water catchment area of the Baltic Sea, and it gave a unique possibility for the participants to exchange exciting new results and views. It became obvious that many research activities important for BALTEX have been started in different countries.

BSSG took the view that the Conference was a stimulating starting point for the intensive research period of BALTEX.

BSSG thanked the Swedish Organizing Committee for the excellent organization and realization of the Conference. Especially, the initiatives and enthusiasm of Sten Bergström, Anders Omstedt and their colleagues and co-workers at SMHI, Norrköping, in the preparation and accomplishment of the Conference were gratefully acknowledged.

BSSG discussed the future strategy for scientific conferences and workshops in BALTEX. BSSG agreed to plan for comprehensive BALTEX conferences as follow-ups to this first study conference in three-years cycles. In between smaller workshops dedicated to limited research areas will be conducted. Hence, the next BALTEX Study Conference is scheduled to take place in 1998.

Action : The Chairman asked all BSSG members and the BALTEX Secretariat to identify a suitable meeting place and -time for the second BALTEX Study Conference until the next BSSG meeting.

4 Report of BALTEX Working Group Chairmen

4.1 Working Group on Process Studies (WGP)

WGP held its third meeting at the University of Uppsala in Sweden, on March 9 and 10, 1995, and its fourth meeting at Visby, Sweden, during the First Study Conference on BALTEX, on August 29, 1995. The minutes of these meetings are given in Appendices 3 and 4.

The main focus of the work of WGP has been the preparation and development of the BALTEX field experiments (BALTEX research networks D, E, F, and G, see the BALTEX Initial Implementation Plan). For networks D and E, funding applications have been already submitted to EU at the end of April 1995. The status of these field experiments was shortly summarized by E.Ruprecht, the chairman of WGP. For details, see Appendices 3 and 4. Parts of the report of the WGP chairman are merged with the reports of the network co-ordinators and are noted in section 5 of the present minutes.

4.2 Working Group on Numerical Experimentation (WGN)

4.2.1 Report of the Chairman

WGN had its second meeting just one day before the BSSG meeting, on 1 September in Visby. On that meeting the present status of modelling research within BALTEX was re-

viewed. J.Willebrand, the chairman of WGN, summarized WGN's second meeting, a detailed report is given as appendix 5 to the present minutes.

The most important conclusions from this WGN meeting are summarized as follows :

- Baltic Sea modelling results (as obtained e.g. at IfMK, Kiel, Germany) for the winter 1992/93 are quite satisfactory. Efforts are still necessary for the winter 1986/87, the other BALTEX target period determined in the BALTEX Initial Implementation Plan.

- The presently used ice model, based on a Hibler-type model, has a number of deficiencies leading to inaccurate simulation of freezing and melting processes. The ice model should therefore be included into the data assimilation procedure.

- First results of the water balance of the land phase for the whole BALTEX region, computed from conceptual hydrological models, will soon be available.

- It is not clear at present, which Baltic Sea model should be used in a fully coupled atmosphere/ocean/land surface model. A project for intercomparison of different Baltic Sea models should be added to the BALTEX research projects.

- The present target periods for atmospheric mesoscale re-analysis projects are
  - December 1986 to February 1987 (SMHI),
  - December 1992 to February 1993 (SMHI),
  - May and June 1993 (MPIfM, GKSS)
  - the PIDCAP period, August to October 1995 (e.g. DMI, GKSS, MPIfM).

- WGN supported the idea of organizing a special workshop addressing problems in shelf sea modelling, including data assimilation in ocean and ice models. This workshop should address a wide spectrum of issues and will not be limited to BALTEX only.

In summary, J.Willebrand pointed out that the modelling work in BALTEX is in a good shape. This is especially the case for the atmospheric models. Those groups, which are working on ocean models, are still too much diversed, a stronger focus on the objectives of BALTEX seems desirable. The next meeting of WGN, which is tentatively scheduled for summer 1996, will concentrate on
i) atmosphere model intercomparison,
ii) development of ocean/ice circulation models, and
iii) development of coupled atmosphere/ocean models for the Baltic Sea.

4.2.2 Membership

BSSG recommended the following scientists to be asked to become new members of WGN :

C. Fortelius of the University of Helsinki, Finland,
W.Fennel of the Institut für Ostseeforschung Warnemünde, Germany,
V.P.Meleshko of the Main Geophysical Observatory, St.Petersburg, Russia.

Action : The Secretariat is asked to write respective letters to the nominated scientists.

4.3 Working Group on Radar (WGR)

S.Bergström gave the report for J.Svensson, the chairman of WGR, who could not attend. A summary is given in Appendix 6.

BSSG took the view that, besides solving the technical radar problems, a stronger input in the field of radar scientific research is expected from WGR in future. Especially, the potential of radar data for validation and initialization of models in the framework of BALTEX should urgently be explored. BSSG recommended to draw on the experience which might have been gathered in other GEWEX regional experiments. BSSG suggested to add 2 or 3 persons with additional experience in these fields to WGR. Together with the chairman of WGR, they should form a drafting group with the task to prepare a document on the potentials of radar measurements for BALTEX.

Action: BSSG asked E.Raschke to nominate 2 or 3 additional scientists with the necessary background in radar science and to implement a drafting group, as mentioned above.

5 Reports of BALTEX Network Co-ordinators

The BALTEX Initial Implementation Plan defines seven research networks. A co-ordinator was nominated to each network at the last BSSG meeting in January this year, or later. The tasks of the network co-ordinators include the organisation and preparation of funding applications for the research networks. Although the period of time for submission of applications to the EU was considerably short, five proposals for funding for four BALTEX research networks could be prepared and submitted to the EU / MAST-III and *Environment and Climate* (ENVCLI) programmes.

The network co-ordinators shortly summarized the status of the networks as follows.

5.1 Full-scale Study of the Energy and Water Cycle (Network A)

For network A, a funding proposal NEWBALTIC (Numerical Studies of the Energy and Water Cycle of the Baltic Region) was submitted to the EU - Environment and Climate (ENVCLI) programme (first call, deadline April 27, 1995) by L.Bengtsson, the co-ordinator of this network. The central scientific issue of this proposal is the assessment of the water balance of the Baltic Sea and its catchment area by combining large-scale hydrological and atmospheric models. Institutions from Austria (IMG Vienna), Denmark (DMI Copenhagen), Finland (Helsinki University), Germany (DWD Offenbach, GKSS Geesthacht, IfMK Kiel, MPIfM Hamburg), Sweden (CUT Onsala, SMHI Norrköping), and the United Kingdom (The Meteorological Office Bracknell) are contributing to this modelling study.

L.Bengtsson recently received information that this proposal was accepted by EU for funding. The granted funds, however, will be reduced to about 60 percent of the requested amount.

5.2 High-resolution Process Studies with the Emphasis on Hydrological Modelling (Network B)

Network B is co-ordinated by J.C.Refsgaard (DHI Hörsholm). A model proposal BALTEX-HYACINT (BALTEX - Hydrological-Atmospheric Integrated Modelling at Subgrid Scale) for network B was prepared under his co-ordination and submitted to the EU / ENVCLI pro-

gramme. The overall aim of BALTEX-HYACINT is to develop a full coupling between a high resolution atmospheric model and an integrated hydrological model. Existing models, namely the HIRLAM atmospheric model and the MIKE SHE and HBV hydrological models, will be further developed. This project contains the first full coupling between a high resolution atmospheric model and a very advanced hydrological model of the distributed physically-based type. It constitutes a link to the NOPEX programme, because it will make full use of existing high quality data sets from the NOPEX land surface experiment. Institutions from Denmark (DHI Hörsholm, DTU Lyngby), Sweden (SMHI Norrköping, Lund University), Germany (PIK Potsdam), and France (CETP Vilizy) contribute to this proposal.

A preliminary information obtained from EU indicates that this proposal will not be funded by EU.

5.3 Coupled Modelling of the Baltic Sea (Network C)

Two applications for funding of projects of network C were submitted by the co-ordinator, W.Krauß of IfMK Kiel, to the EU / MAST III (first call, deadline 15 March, 1995) programme.

The first proposal deals with ice formation and the influence of ice-coverage on the circulation in the Baltic Sea. Its central strategy foresees the coupling and systematic improvement of an eddy resolving general circulation model of the Baltic Sea with an ice model. Results of this model experiment will be compared with observations from field cruises and satellite data. Institutions in Finland (Helsinki University), Germany (IfMK Kiel), and Sweden (SMHI Norrköping) contribute to this project.
W.Krauß received confirmation that this project will be funded by EU / MAST-III.

The second proposal included investigations on the response of a Baltic Sea model to different atmospheric forcing conditions. Preliminary information from EU indicate that this project will not be funded by EU / MAST-III.

5.4 Cloud/Precipitation/Air-Sea Interaction Field Experiment (Network D)

A.S.Smedman of Uppsala University, Sweden, the co-ordinator of the BALTEX Cloud / Precipitation / Air-Sea Interaction Field Experiment submitted a proposal for funding of network D to the EU / ENVCLI programme. The short title of this funding application is ASCAP (Air/sea interaction, cloud and precipitation experiment over the Baltic Sea). Six research institutions in Sweden (SMHI Norrköping, Uppsala University), Denmark (Risö National Laboratory), Germany (IfMK Kiel, MPIfM Hamburg), and Great Britain (The Meteorological Office, Bracknell) are planning to contribute to this programme. The nucleus of this programme is an air-sea heat flux measurement campaign at the coast of the small island of Östergarnsholm east of Gotland, which has started already in early summer 1995. This campaign is conducted by Uppsala University. An extension to this field campaign, with contributions from other institutions, is planned during PIDCAP around the island of Gotland, in early September 1995.

Unfortunately, preliminary oral information from EU indicate that ASCAP, although scientifically rated A, has failed to receive funding through the first call of ENVCLI.

5.5 Cloud/Precipitation/Air-Land Surface Interaction Field Experiment (Network E)

G.Tetzlaff of Leipzig University, Germany, agreed to co-ordinate network E. He submitted an application for funding of a model pre-study for this field experiment to the EU / ENVCLI programme. Five research institutions in Denmark (DHI Hörsholm), Germany (GKSS Geesthacht, Leipzig University, ZALF Müncheberg), and The Netherlands (Groningen University) are planning to contribute to this study. The emphasize of this study is on a preparatory model experiment in order to gain evidence for the design of the later experimental field phase. The development of models is not the focus of this pre-study.

Unfortunately, preliminary oral information from EU indicate that this application has failed to receive funding through the first call of ENVCLI.

The German Weather Service (DWD) is planning a measurement campaign LITFASS in the area of Lindenberg east of Berlin. Lindenberg is an observational base station of DWD. Although primarely a DWD project, LITFASS includes measurement components and strategies important for the planned BALTEX field experiment. A close co-operation with BALTEX is planned for the intensive field phase of the BALTEX field experiment.

5.6 Atmosphere-Ice-Ocean Field Experiment (Network F)

J.Launiainen (FIMR Helsinki), the co-ordinator of this field experiment, together with A.Omstedt (SMHI Norrköping) and P.Lemke (IfM Kiel) prepared a draft experimental plan BASIS (Baltic Air-Sea-Ice Study) for the BALTEX Atmosphere-Ice-Ocean Field Experiment (Network F). BASIS will serve as a draft for an EU funding proposal at the same time. BASIS foresees the central experimental phase for the winter 1997/98. The main scientific objective is to create and analyse experimental data sets for the optimization and verification of coupled atmospheric and ocean models, with special emphasize on the air-ice, air-sea and sea-ice boundaries. At present institutions in Finland (FIMR Helsinki), Sweden (SMHI Norrköping, Uppsala University) and Germany (IfMK Kiel, Hamburg University, Hannover University) are planning to contribute to BASIS. The future time schedule foresees completion of the final version of BASIS until March 1996 and submission of a funding proposal for BASIS to the second call of the EU / MAST III programme in June 1996.

5.7 Baltic Sea Vertical Advection and Mixing Field Experiment (Network G)

A subgroup, consisting of A.Stigebrandt (Göteborg University), the co-ordinator of this field experiment, B.Hakanson (SMHI Norrköping), H.U.Lass (IOW Warnemünde), and P.Mälkki (FIMR Helsinki) has been constituted in order to draft an experimental plan for this field experiment.

5.8 Recommendations

BSSG thanked all co-ordinators for their intensive efforts.

BSSG noted with satisfaction the EU confirmation for funding of two of the BALTEX proposals.

Unfortunately, the written evaluations of those proposals, which have not been accepted for funding at the first calls of the respective EU programmes, were not yet available at present.

Action: BSSG recommended to re-submit the proposals for networks B and D, after a thorough consideration of the written evaluations. BSSG further suggested to perform a BALTEX-internal review of the proposals before their re-submission to the second programme calls. This review should be performed by members of the BALTEX community which are not envolved in the respective proposal work. BSSG suggested to extend the next proposal for Network E to the real experimental field phase. BSSG encouraged the coordinators of networks F and G to go ahead with the preparation of these projects and work for funding applications on the EU level.

6 Reports from BALTEX Countries

Due to the tight time table, only short oral reports from the countries participating in BALTEX were given. From some countries written reports were distributed to the BSSG members (see Appendices 7, 8, 9, 10 and 11).

Several institutions in **Denmark** contributed to the BALTEX funding applications to EU. L.Laursen pointed out that the engagement of Danish universities in BALTEX will have to be strengthened. This is particularly important for future national Danish funding for BALTEX. At present, DMI, as the national meteorological service, follows a restrictive policy in supporting BALTEX. DMI presently takes the view to accept the BALTEX Meteorological Data Centre (BMDC) as a meta data centre only, and, hence, does not plan to exchange data physically with BMDC, but intends to deliver requested data individually to researchers or research groups.

Action: The Chairman of BSSG is asked to contact DMI in order to try to change the present restrictice policy of DMI with respect to BALTEX.

In **Sweden**, four PhD students are now being funded at SMHI, which are exclusively working on BALTEX modelling issues. SMHI at Norrköping prepared and conducted the First Study Conference on BALTEX (see section 3). A comprehensive project investigating the outcome of climate change on water resources in Sweden is being finalized at SMHI and Swedish universities.

In **Finland**, the Finnish Research Programme on Climate Change (SILMU) ends this year. As part of SILMU an International Conference on Past, Present and Future Climate was held 22-25 August 1995 in Helsinki. At present, FMI, the national Finnish weather service, is not deeply involved in BALTEX. The main reason is a lack of necessary funding. Main BALTEX-related activities comprise sea-ice modelling and related data analysis. FIMR maintains coastal observation stations and platforms in the Baltic Sea.

Action: The Chairman of BSSG is asked to contact FMI for more engagement in BALTEX.

The Research ministery (BMBF) in **Germany** approved funding of a second position for a scientific staff member in the BALTEX Secretariat (Appendix 15). A first evaluation of the German BALTEX projects funded by BMBF will be conducted this year. For this evaluation a status seminar on German water cycle projects including BALTEX will be held in September 1995. The present funding period for German BALTEX projects includes the years 1994 to 1996.

Russia (Appendix 7), **Latvia** (Appendix 8), **Lithuania** (Appendix 9), **Belarus** (Appendix 10), and **Poland** (Appendix 11) submitted written reports on the status of the implementation of BALTEX on the respective national levels. BSSG noted with satisfaction that especially Poland and Russia defined several national research projects for BALTEX. All eastern BALTEX countries, including **Estonia**, pointed out that the lack of national and international funding for BALTEX causes problems for the conduction of even simple research or data preparation activities in BALTEX. BSSG was asked to explore additional sources for funding of projects in the eastern BALTEX countries. Necessary data preparation and delivery of data will need future funding on a more or less continuous basis.

7 PIDCAP

PIDCAP, the BALTEX Pilot Study for Intensive Data Collection and Analysis of Precipitation, started in August this year. PIDCAP is mainly planned as an intensive observation period, including a special one-week field study in the Baltic Sea at the beginning of September 1995. The objectives of this pilot study are

- to collect and analyse measured and estimated precipitation from different data sources,
- to compare different precipitation data sets against each other in order to identify and establish reliable standards for model validation,
- to validate the output of BALTEX Regional Models against such precipitation data sets,
- to develop, test and establish necessary data management and analysis procedures (especially the co-operation between different research groups and the BALTEX Meteorological Data Center) for future comprehensive studies in the framework of BALTEX.

PIDCAP will focus on the study of rain. The first key data collection and modelling period of PIDCAP is August to October 1995. The area of interest for PIDCAP has been defined as the southern BALTEX region south of about 60° N, however, with possible extension to other parts of the BALTEX region, if necessary. It will include both land surfaces and the Baltic Sea area.

A PIDCAP information meeting was held in Visby during the First Study Conference on BALTEX, on 30 August 1995. This meeting shortly reviewed the present status of the individual PIDCAP contributions. A summary of the projects planned in PIDCAP was presented to BSSG by H.-J.Isemer. 16 different projects have been defined for PIDCAP (see Appendix 12). PIDCAP comprises data analysis studies of both *in situ* and remote sensing data, and modelling studies. A field campaign east of the island of Gotland was planned for 1 to 9 September 1995. Some of the projects are real-time projects which already started at the beginning of the observational period. No major problems were reported from either of the participating groups at the information meeting.

The time schedule for PIDCAP foresees that a short description of the PIDCAP data sets will be provided by the different groups and should be sent to the BALTEX Meteorological Data Centre not later than 30 November 1995. Data sets are expected to be available for exchange within the PIDCAP participants six months after the end of the PIDCAP period at latest. A

PIDCAP workshop presenting preliminary results for intensive discussion is scheduled for summer 1996.
The PIDCAP project description is given in Appendix 12.

8 Planning for further BALTEX Studies or Intensive Observational Periods

Due to the shortness of the available time a detailed discussion on this item was postponed to the next BSSG meeting.

9 Data Management and Availability

9.1 BALTEX Meteorological Data Centre (BMDC)

E.Heise of DWD Offenbach represented the BALTEX Meteorological Data Centre (BMDC).

9.1.1 Questionnaire

BMDC sent out a questionnaire to the national meteorological services in the BALTEX area in order to receive a state-of-the-art overview on existing data at the different services. Almost all of the services in the 10 BALTEX countries responded to the questionnaire so far. An overview on the availability of the most frequently used data types is given in table 1. It is evident from table 1 that those data which are not transmitted routinely via GTS (and hence are not available at international data centres in general), but are available from additional stations at the individual services, constitute a significant data potential. The additional data are urgently required for data assimilation, model validation and climate studies in the frame-work of BALTEX. All efforts should be put into making these additional data available for BALTEX research.

BMDC thanked the national meteorological and hydro-meteorological services for the support in context with the BALTEX data questionnaire.

9.1.2 BMDC Status Report

A status report of BMDC was distributed to the BSSG members before the meeting. This report (see Appendix 13) details

- the task of BMDC,
- the type of data to be stored, either physical or virtual,
- real-time and non-real-time data,
- the data exchange policy.

BMDC will act as a **real data centre**. Both real time and non-real time data are **physically** stored. In addition, BMDC will act as a **meta data centre** where information on data sets, which are stored elsewhere are collected and stored. The BMDC report defines both real time and non-real time data (see sections 1.1.1 and 1.1.2 in Appendix 13) which will be stored physically, or as meta information, at BMDC. Furtheron, the data periods, for which these data will be stored, are specified. In accordance with the BALTEX Initial Implementation Plan, these periods include:

Table 1: Data coverage of the BALTEX region

	Routine transmission via GTS	Additional stations available
TEMP etc.	23	0
SYNOP etc.	259[1)]	ca. 270
Precipitation [2)]	247[5)]	ca. 3100[4)]
Soil temperatures [3)]	71[5)]	ca. 170[4)]
Soil moisture[3)]	27[5)]	ca. 120[4)]
Radiation[2)]	8[5)]	ca. 100[4)]

1) In fact 342 stations are received at Offenbach

2) Data from Russia not yet available

3) Data from Denmark and Russia not yet available

4) Non-real time data

5) As part of the SYNOP bulletins

- 1986 and 1987,
- 1992 and 1993,
- August to October 1995 (PIDCAP),
- January 1996 onwards.

The BMDC paper outlines the data exchange policy within BALTEX. BMDC prepared a draft for an agreement which determines the rules for the data exchange between the national services and BMDC. Additionally, regulations for the delivery of data to researchers through BMDC are laid down in a draft obligation agreement. The agreement will have to be signed in future by users before they may receive data from BMDC. Both drafts are included in Appendix 13.

E.Heise pointed out that BMDC will be successful only, if the national meteorological and hydro-meteorological services in the BALTEX countries will actively support BMDC in its efforts to get access to the mentioned data needed for BALTEX.

BMDC asked BSSG to confirm the selection of data, data periods, and the proposal of the data policy, as given in the BMDC report (Appendix 13).

BMDC further asked the BSSG for support in

- requesting the services of the BALTEX countries to provide the observational data in a maximal possible extent via GTS,

- requesting the services of the BALTEX countries to provide especially the non-real-time data for the periods which are specified in the BMDC paper.

After discussion, BSSG adviced BMDC to change the following details concerning data policy:

- Neither the data exchange agreement nor the data exchange obligation should contain a paragraph forcing BMDC, or the research group to erase BALTEX data after the end of the BALTEX-related study, or after the end of BALTEX.

- Reimbursement, if any, by data users in case of contract violation is to BMDC only, not to the individual national data suppliers.

- Data users, who like to make available BALTEX data to third parties will need to receive the permission of BMDC only, not of the individual national data suppliers.

No further objections were noted by any of the BSSG members. The status report of BMDC was accepted by BSSG.

Action: The Chairman asked the BSSG members to forward the BMDC report to the respective national meteorological and hydro-meteorological services. He asked the BSSG members to use their influence to convince the data centres on the respective national levels to support the work of the BALTEX Data Centres by allowing an easy as possible data exchange in the framework of BALTEX, and to urgently request the national services in the BALTEX area to provide free access to all data necessary for BALTEX.

9.2 BALTEX Hydrological Data Centre (BHDC)

S.Bergström gave the report for B.Carlsson who could not attend. The BHDC report is given as Appendix 14. SMHI has collected monthly river runoff data for allmost all major rivers which release water into the Baltic Sea. The period covered is 1950 to 1993. There is a report available at SMHI describing details of this data set (S.Bergström and B.Carlsson, 1993 : Hydrology of the Baltic Basin. SMHI RH Report No.7, 21 pp and appendices). S.Bergström pointed out that this data set is available for research purposes in BALTEX.

BSSG recommended close co-operation between BHDC and the Global Runoff Data Centre at Koblenz, Germany.

9.3 BALTEX Oceanographic Data Centre (BODC)

The BALTEX Oceanographic Data Centre was formally installed at FIMR Helsinki. No special activities for collecting data have been initiated so far.

9.4 BALTEX Secretariat

Upon application of E.Raschke a second scientific staff position in the BALTEX Secretariat is now being financed by the German Ministery of Research and Technology (BMBF). Rüdiger Brandt was appointed as the second scientific staff member in the International BALTEX Secretariat at GKSS Research Centre in Geesthacht (Appendix 15). R.Brandt is a meteorologist, he graduated at Hannover University. Among his responsibilities will be the survey of the collection and validation of operational measurements which are presently collected in co-operation with several national hydro-meteorological services.

H.-J.Isemer reported that the BALTEX data collection and preparation initiatives at six national hydro-meteorological services in the eastern BALTEX area made good progress. These initiatives are funded by BMBF through the BALTEX Secretariat which took responsibility for the co-ordination of the data preparation activities. Data sets for sub-periods of the BALTEX key periods (see e.g. section 9.1.2) from all six national territories (Belarus, Estonia, Latvia, Lithuania, Poland, and Russia) were submitted to the Secretariat. Data types include 3-hourly meteorological surface observations, soil moisture and soil temperature, radiation measurements, 12-hourly and daily precipitation sums, daily river runoff data, and sea-level data from coastal stations. Emphasize is on these data which are routinely measured but which are not transmitted operationally via GTS to other data centres or national services (see also section 9.1.2). A major part of the data from past periods are only available on paper in yearbooks and other reports. Considerable efforts are necessary to digitize these data sets. Finalization of the data preparation for the periods 1986/87 and 1992/93 is scheduled within the year 1996. The national services involved in this initiative agreed to prepare precipitation and meteorological surface data sets also for the PIDCAP period August to October 1995.

A preliminary BALTEX data report which describes the presently submitted data sets was prepared by the Secretariat and was distributed to the BSSG members.

10 GHP Meeting

A GEWEX Hydrometeorological Experiments Panel (GHP) held its first meeting in Visby, 31 August to 3 September 1995. A short joint meeting of the BSSG and GHP members was conducted during the BSSG meeting.

E.Raschke, the present chairman of GHP, summarized the terms and goals of GHP. GHP was established as a central co-ordinating group within GEWEX with the aim to foster co-operation among the Continental Scale Experiments (CSEs) of GEWEX. The latter include GCIP, MAGS, LAMBADA, GAME and BALTEX. The central scientific issues, GHP is dealing with, are water cycle processes involved in the coupling of the atmosphere and the land surface. The GHP members proposed that "the GHP will be responsible for assisting GEWEX to demonstrate skill in predicting changes in water resources and soil moisture on time scales up to seasonal and annual as an integral part of the climate system". GHP may achieve this goal based on the premise that "the prediction of regional precipitation and run-off anomalies over periods of several months is a possibility with improved understanding of water cycle processes". The terms of reference of GHP include

- to provide the GEWEX global scientific focus for the GEWEX CSEs and to ensure their regional results contribute to improvements in global scale prediction models;

- to evaluate the individual scientific contributions of the CSEs to GEWEX and overall WCRP objectives;

- to facilitate exchange of information on progress between the CSEs;

- to maximize co-operation among the CSEs activities, for example, in data collection, processing and availability, support for the preparation and validation of data sets, regional-scale modelling, conduction of joint workshops and conferences, and scheduling of intensive observation periods;

- to ensure close working relationships between the CSEs and other groups being active in the framework of GEWEX;

- to act as a central point of contact for GEWEX in its collaboration with other related programmes and studies (eg IGBP core projects, ACSYS, CLIVAR, and other WCRP activities.

The summary of E.Raschke was followed by a discussion between GHP and BSSG members. The Chairman of BSSG shortly summarized the goals of BALTEX, as outlined in detail in the BALTEX Scientific Plan and the BALTEX Initial Implementation Plan. Members of GHP expressed their satisfaction with the progress of BALTEX. H.Graßl, the director of WCRP, pointed out his satisfaction that BALTEX has gained a lot of dynamics and speed in a relatively short time. He further stressed WCRP's view that BALTEX meets several important advantages at the same time. These include

- BALTEX is an international project with contributions from more than 10 countries;

- BALTEX overcomes the former east-west barriers,

- BALTEX has tied in the national services of the contributing countries from the very beginning, hence providing for the chance of immediate-return benefits;

- the BALTEX region includes a marginal sea and, hence, BALTEX has all three disciplines, meteorology, hydrology and oceanography included.

Both WCRP and GHP noted that the inclusion of different countries with quite different national data holding organisations and strategies causes large problems in the field of data collection, availability and access. The preparation of homogeneous catchment-wide data sets is among the major challenges of BALTEX. In addition, a general tendency to reduce the existing station network density, and severe economical constraints in some of the eastern BALTEX countries impose further problems.

H.Graßl summarized the recommendations of GHP for BALTEX. A concern of GHP is a predominance of modelling activities in BALTEX. GHP is suggesting to support only a few well-selected models. A strengthening of the observational activities and strategies is recommended. New measurement technologies should be implemented in the BALTEX observational strategy. H.Graßl suggested to use BALTEX as a means to convince European countries to close existing gaps in the weather Radar network. Other recommendations pointed at e.g. the use of new technologies to measure the net water transport through the Danish Straits, and

at the consideration of tracer technologies in order to close water budgets in the Baltic Sea catchment region or its sub-catchments.

The Chairman of BSSG thanked the GHP members for the constructive discussion and comments which were well taken by BSSG.

11 Further Items

E.Ruprecht notified that the XXI.European Geophysical Society (EGS) assembly, scheduled for 6-10 May 1996 in The Hague, The Netherlands, will include a special session on BALTEX. The objectives of this session are to foster discussion between the atmospheric, oceanic and hydrological community. Special emphasis will be addressed to the presentation of numerical models in the three fields which simulate processes relevant for the hydrological cycle and to methods how to validate their results. The latter includes studies based on *in situ* and remote sensing measurements.
Conveners of this session are E.Ruprecht and W.Krauß, both at IfMK, and J.C.Refsgaard at DHI. The deadline for receipt of abstracts is 15 December 1995.

12 Next BSSG meeting

Upon invitation of J.Dera, BSSG decided to hold the fourth meeting of BSSG at the Institute of Oceanology in Sopot, Poland, on 3 to 5 June 1996.

L.Bengtsson suggested to combine this BSSG meeting with a small workshop on a special scientific issue related to BALTEX. This workshop should include a number of scientific presentations, to be hold by invited speakers. One possibility is a meeting on first results of PIDCAP, the BALTEX Pilot Study for Intensive Data Collection and Analysis of Precipitation.

Action : The Secretariat is asked to prepare for this workshop together with the next BSSG meeting, in close co-operation with the hosting Institute of Oceanology.

Appendix 1

Participants at 3rd BALTEX SSG meeting
September 2, 1995
Visby / Sweden

Pekka Alenius	Finland
Lennart Bengtsson	Germany
Sten Bergström	Sweden
Rüdiger Brandt	Germany
Jerzy Dera	Poland
Erdmann Heise	Germany
Eero Holopainen	Finland
Hans-Jörg Isemer	Germany
Zdzislaw Kaczmarek	Poland
Peeter Karing	Estonia
Sirje Keevallik	Estonia
Petras Korkutis	Lithuania
Wolfgang Krauß	Germany
Leif Laursen	Denmark
Pentti Mälkki	Finland
Gaida Matisone	Latvia
Eberhard Müller	Germany
Ehrhard Raschke	Germany
Jens Christian Refsgaard	Denmark
Eberhard Ruprecht	Germany
Ivan M. Skouratovitch	Belarus
Ann-Sofi Smedman	Sweden
Anders Stigebrandt	Sweden
Hilding Sundqvist	Sweden
Gerd Tetzlaff	Germany
Jürgen Willebrand	Germany
Evgenij Zaharchenko	Latvia
Sergei A. Zhuravin	Russia

Appendix 2

3rd BALTEX SSG Meeting

Visby, Sweden, 2 September 1995

The meeting will follow the First Study Conference on BALTEX. The meeting will **start on Saturday, 2 September 1995 at 8 am and will close at 2.30 pm**.

Agenda

1. Opening

2. Approval of 2nd SSG meeting minutes

3. Review of the First Study Conference on BALTEX

4. Reports of BALTEX Working Group Chairmen
   - 4.1 WG Process Studies (E.Ruprecht)
   - 4.2 WG Numerical Experimentation (J.Willebrand)
   - 4.3 WG Radar (J.Svensson)

5. Report of BALTEX Network co-ordinators
   - 5.1 Outcome of EU applications
     (L.Bengtsson, J.C.Refsgaard, W.Krauß, A.S. Smedmann, G.Tetzlaff)
   - 5.2 Planning of Field Experiments
     (A.S.Smedmann, G.Tetzlaff, J.Launiainen, A.Stigebrandt)

6. Reports from BALTEX Countries

7. Report on PIDCAP

8. Planning for further BALTEX Studies or Intensive Observational Periods

9. Data Management and Availability
   - 9.1 Report of the BALTEX Meteorological Data Center (A.Lehmann)
   - 9.2 Report of the BALTEX Hydrological Data Center (B.Carlsson)

9.3 Report of the BALTEX Oceanographic Data Center (P.Alenius)
9.4 Report of the BALTEX Secretariat (H.-J.Isemer)

10. GEWEX Hydrometeorological Experiments Panel Meeting

11. Further Items

12. Next SSG Meeting

Minutes

Appendix 3

of the 3rd Meeting of the BALTEX Working Group on Process Studies

Location: Department of Meteorology
Uppsala University, Uppsala, Sweden

Time: 9 - 10 March 1995

Participants: WG Members:
Claussen, Halldin (first day and first hour second day), Hasse, Lass, Launiainen (second day), Omstedt, Refsgaard, Ruprecht, Isemer (BALTEX-Secretariat), Majewski (could not come)

Coordinators:
Smedman/Högström, Stigebrandt (first day), Tetzlaff

Begin: 14.00

1. Welcome

The Chairman welcomed all participants and thanked Mrs. Smedman for the local organization. He introduced the coordinators of the 4 field experiments and the new WG member J.C. Refsgaard, hydrologist at the DHI, Hørsholm, Denmark. J.C. Refsgaard should strengthen the hydrology component in the WG.
Two WG members are resigned: Prof. Kuusisto and Prof. Sundquist.

2. Report of the Chairman

On its last meeting at Copenhagen the WG set the Chairman two tasks:

- to ask the coordinators of the field experiments, who were proposed by the WG, to accept their tasks.

  This was successfully concluded as the appearance of the 4 coordinators showed.

- to clarify with the BSSG how the experiments can be funded.

The topic was intensively discussed during the BSSG meeting at Helsinki in January 1995. Main funding should come from the EU by the programmes "MAST III" and "Environment and Climate". A BALTEX research network of seven projects was defined: 3 modelling projects and the 4 field experiments. It was also proposed which of the 7 projects should go in which of the two programmes:

MAST III:

C. Coupled Modelling of the Baltic Sea,
F. Atmosphere-Ice-Ocean Experiment,
G. Baltic Sea Vertical Advection and Mixing Experiment.

Environment and Climate:

A. Full-scale Studies of Energy and Water Cycle,
B. High-resolution Process Studies with the Emphasis on Hydrological Modelling,
D. Cloud, Precipitation, Air-Sea Interaction Experiment,
E. Cloud, Precipitation, Air-Land Surface Interaction Experiment.

The deadlines for the proposals are unfortunately due within a short time:

MAST III:	15 March 1995
Environment and Climate:	27 April 1995

So it was only possible to try for the experiment D to get the proposal ready in time. The other three will look for the second call next year.

3. Report of the BALTEX Secretariat

H.-J. Isemer reported that the Implementation Plan is now accepted and will be printed, so that it shall be available in April/May. A copy of the Executive Summary, of chapter 8 "Special Field Experiments - Process Studies" and of chapter 9 "Organization of BALTEX Research" was distributed.

He gave some information about the MAST III and Environment and Climate Programmes of the EU.

Mr. Isemer mentioned, that the pilot study for precipitation analysis, PIDCAP, from August to October 1995 is now fully accepted by the BALTEX research community, so that it will be the first field activity in the frame work of BALTEX.

4. Presentation of the experiment plan by A. Stigebrandt

A. Stigebrandt stated that the intrusion of dense salty water from the North Sea into the Baltic and its distribution in all regions is one of the most important processes in the Baltic Sea. The process, however, how the salt is mixed up from the bottom into the upper levels is hardly known. There exist entrainment and detrainment within the dense bottom current along the slopes of the Arcona basin and a vertical mixing within the Gotland basin initiated for example by internal gravity waves. Parametrisation of these processes is still very simple and therefore must fail in certain situations. The proposed field experiments should address to these problems.

A. Stigebrandt proposed a time schedule for the development of detailed plans:

June 1995:	First planning meeting in Göteborg (invitation by A. Stigebrandt and the BALTEX Secretariat)
August 1995:	Distribution of the draft of the implementation plan for this experiment
December 1995:	Final version of the implementation plan
March 1996:	Application to EU (MAST III, 2nd call).

The WG supported A. Stigebrandt to proceed in this way and urged him to define the scientific objectives before the first meeting in Göteborg.

5. Presentation of the experiment plan by A.-S. Smedman

The possible participants of this experiment had met just before the WG meeting, Mrs. Smedman summarized their results. The scientific objectives are:

- investigation of the development of clouds and precipitation over the open sea,
- validation of methods to estimate evaporation at sea,
- intercomparison of the different methods to measure precipitation,
- air-sea interaction.

These objectives should be approached in two ways:

- continuous measurements,
- intensive measuring periods.

For the continuous measurements the following methods are planned:

NOAA AVHHR observations will be applied to the SCANDIA model (SMHI) to produce cloud cover data over the Baltic Sea; precipitation over the sea is derived from gauge measurements at coasts, islands, and at ships, from RADAR data and from satellite observations; vertical profiles within the atmospheric boundary are to be determined from measurements at a 30m tower at the islet of Östergarnsholm east of Gotland.

Intensive measuring periods are planned around Östergarnsholm for two time periods:

September 1996 (SST > T_s(land)),
15 May - 15 June 1997 (SST < T_s(land)).

During these periods observations are planned onboard of the RV Alkor (IfM Kiel: MW-radiometer, radiosondes, instruments to measure turbulent fluxes, rain gauge, disdrometer) and of the research aircraft "Hercules" (UKMO: IR and MW radiometers, microphysics instruments) and from the islet of Östergarnsholm (tethered balloons, radiosondes, pibal tracking) and from Gotland (RADAR/RASS).

The continuous measurements are intended to investigate spatial and temporal variability of cloudiness, precipitation (and evaporation), to validate model results for many synoptic situations, and to develop methods for a longtime monitoring of these parameters. During the intensive measuring periods case studies are planned which aim at detailed investigations of the processes which determine cloud development, precipitation and evaporation.

The WG discussed the proposed plan. It was in general accepted and the WG supported these basic ideas for a EU proposal. Two questions, however, could not yet fully be answered: What are the deliverables of the continuous measurements, besides just cloud, precipitation distribution? How is the interaction with the models planned? (In the EU proposal that must be stated clearly).

6. Presentation of the experiment plan by G. Tetzlaff

G. Tetzlaff presented his ideas about the land experiment. He reported that there exists a dilemma with the proposed site of this experiment: firstly, there is the meteorological station Lindenberg of the German Weather Service, which is equipped with very good instruments to describe the state of the atmospheric column, but the hydrological conditions are very much anthropogenicly influenced; secondly there is the opportunity for hydrological studies 30 - 120 km north of Lindenberg, the catchment area of the upper Ücker, which is already equipped with instruments. Mr. Tetzlaff explained that the regional models may serve as a cramp to link both areas together, so that the facilities of both can be used accordingly.

The WG discussed this problem in detail. The question was raised: why was this region selected and how is the connection to very similar experiments of NOPEX? The WG agreed that a fruitful cooperation with NOPEX should be looked for and helped both BALTEX and NOPEX. In earlier discussions it was decided that BALTEX land surface experiments should be carried out in the typical regions of the BALTEX area: SE part (E-Germany/W-Poland), central part (Mid-Sweden: NOPEX site), northern part (N-Sweden, Finland with lakes and woods), so that the now proposed is the first of more land surface experiments to come.

Tetzlaff explained that he will try to organize a group of modellers to perform a feasibility study with the aim: how to organize a field experiment within the Lindenberg/Ücker area to study the atmosphere-land surface interactions and to validate coupled atmospheric-hydrological models. The WG supported Mr. Tetzlaff in his effort and urged him to gather such an international small group and even apply for funding through the EU programme "Environment and Climate" this year.

Halldin indicated that the NOPEX community will not prepare a modelling proposal to EU in this year and that NOPEX data may be used for model development, verification and validation also in the framework of BALTEX.

7. Presentation of the experiment plan by J. Launiainen

J. Launiainen explained what type of measurements are needed to describe the processes at the ice marginal zone. Observations, mainly energy budget within the boundary layer above and beneath the ice are planned. The proposed field experiments can refer to ongoing activities of the FIMR in the Gulf of Bothnia. Besides understanding of the specific processes in this region the verification of the results of the HIRLAM model is one of the main goal of this experiment as stated by Launiainen. He reported then, that he is already in contact with groups from Sweden, Germany, Canada, and the U.S.A.

The WG discussed the plan and recommended that a small group (3 members) should be established, with the task to define the scientific objectives in more detail in particular with the view of sea ice model development and to give an outline of the experiment. The following three members were proposed: J. Launiainen, A. Omstedt, and P. Lemke (AWI Bremerhaven, Germany). The Chairman was asked to inform Mr. Lemke and ask him to participate. (Mr. Lemke is at present in the U.S.A. and will be back end of March.)

As a recommendation for this group the WG stated the following problems which should be tackled:

- differences in the energy budget between ice covered and open sea,
- processes developed at the ice marginal zone by local effects or by the development of a secondary boundary layer,
- momentum exchange between the ice and the atmosphere,
- ice drifts,
- ocean currents at the ice marginal zone.

The WG further recommended that a time schedule similar to that of the oceanic field experiment (A. Stigebrandt) should be followed, so that an EU-proposal can be ready for the next (2nd) call of MAST III.

8. General discussion

a) The Chairman thanked all four coordinators for their effort which will hopefully be successful in view of the funding.
b) The WG recommended that each EU proposal should contain a general introduction, which makes clear that this proposal aims to solve problems of BALTEX and that all the proposals are linked together.
(The Chairman talked to L. Bengtsson, Chairman of BSSG: He agreed to write such an introduction and send it to the coordinators.)
The WG also recommended that the coordinators together with L. Bengtsson should give a presentation in Brussels (L. Bengtsson visits EU in March, he will find out whether such a presentation is possible; during this visit he will also discuss the problem of the participation of E-European groups on the BALTEX experiments and about their possible funding, an open question, which was raised by the WG members.)

The WG recommended that the EU proposals of the seven BALTEX projects should be exchanged between the coordinators to avoid an overlap in the different projects.

9. Next meeting

A. Omstedt recommended that the WG should plan a joint meeting with the WG on Numerical Experimentation to discuss problems which are of interest of both groups. The WG agreed to this idea; the Chairman will discuss this matter with J. Willebrand, Chairman of the other WG. Such a meeting will be envisaged for the winter 1995/96.

It is planned to have at least a short meeting during the Visby conference, depending the programme permits time for such a meeting.

The meeting was closed at 12.15.

signed: E. Ruprecht

Appendix 4

Minutes of the 4th Meeting of the BALTEX - Working Group on Process Studies

Time: Tuesday, August 29, 1995, 19.00 h
Location: Visby, Sweden

Participants:
WG Members: *M. Claussen, L. Hasse, H.U. Lass, J. Launiainen, A. Omstedt, J.C. Refsgaard, E. Ruprecht*
BALTEX-Secretariat: *H.-J. Isemer and R. Brandt*
Coordinators: *A.-S. Smedman, A. Stigebrandt, G. Tetzlaff*

- Numerous guests -

Agenda:

1. **Welcome and report by the Chairman**
2. **Report by the BALTEX Secretariat: H.-J. Isemer**
3. **Reports of the coordinators about the status (organisation, funding etc.) of their experiments**
   - **(a) PIDCAP: *L. Hasse***
   - **(b) Cloud, Precipitation, Air-Sea Interaction Experiment: *A.-S. Smedman***
   - **(c) Cloud, Precipitation, Air-Land Surface Interaction Experiment: *G. Tetzlaff***
   - **(d) Baltic Sea Vertical Advection/Mixing Experiment: *A. Stigebrandt***
   - **(e) Atmosphere-Ice-Ocean Experiment: *J. Launiainen***
4. **Future activities of the WG, next meeting**
5. **Further items**

1. Welcome and report by the Chairman

The Chairman welcomed the WG-members and all guests, here in particular the WCRP Director Prof. Dr. H. Graßl.
The Chairman congratulated Prof. Dr. A. Omstedt for the organization of the First BALTEX Conference.
The aim of this meeting was to inform the WG about the status of the planned field experiments. Thus, the reports of the coordinators are the main topics of this meeting. Proposals for funding were submitted to the EU for the experiment over the Baltic Sea and for a pre-experiment over land. Both proposals, though rated A, were not successful.
For the Atmosphere-Ice-Ocean Experiment a small group was named at our last meeting (including J. Launiainen, A. Omstedt, and P. Lemke/Kiel, Germany). They met and worked out a proposal.
The coordinator of the Baltic Sea Vertical Advection/Mixing Experiment, A. Stigebrandt, was not so successful. The oceanography community seems not very much interested in such an experiment in the Baltic Sea.

2. Report by the BALTEX Secretariat by H.-J. Isemer

H.-J. Isemer introduced his colleague Rüdiger Brandt, who is appointed to the secretariat to support Mr. Isemer and make the secretariat even more effective.
Mr. Isemer reported that the Implementation Plan was now finalized and available to everyone.
The secretariat organized this summer in St. Petersburg, Russia, a meeting on data collection in the 6 eastern European countries. Additional data are available for BALTEX from these countries.

3. Reports of the coordinators

a) *L. Hasse:* PIDCAP

The first BALTEX field experiment, a pilot study for precipitation estimation and data management, is underway since 1st of August. During the three months period (August - October 1995), Radar observations are intensified (NORDRAD and German Weather Service), observations at Östergarnsholm are carried out by the University of Uppsala (Högström/ Smedman), and for three weeks (August/September) the research vessel "Alkor" of the Institut fuer Meereskunde cruised in the area around Östergarnsholm.

b) *A.-S. Smedman:* Cloud, Precipitation, Air-Sea Interaction Experiment

The EU proposal is unfortunately rejected, although it was rated A. The Meteorological Institute of the Uppsala University has funds to carry out measurements at least for a further year at and around Östergarnsholm. Thus, this experiment could be a nucleus for the BALTEX experiment. Two ways of funding will be concerned: a second proposal to the EU, probably with the inclusion of a model group, or the different groups must be asked for national fundings. A.-S. Smedman will discuss this matter with the participating groups, and a conclusion should be drawn at least in January/February 1996.

c) *G. Tetzlaff*: Cloud, Precipitation, Air-Land Surface Interaction Experiment

An EU proposal was submitted for a modelling pre-study, which was also rejected. Plans for the main experiment will be discussed, here the observation site at Lindenberg, where the German Weather Service carries out a long-term mission on atmospheric observations, should be the nucleus for this BALTEX experiment.
G. Tetzlaff will try to submit a new proposal to the EU in 1996 for the main experiment.

d) *A. Stigebrandt:* Baltic Sea Vertical Advection/Mixing Experiment

At its meeting at Uppsala in March 1995 the WG recommended that A. Stigebrandt invited interested groups for a scientific discussion about this experiment. But the response was very weak, so that no progress could be obtained in the planning of this experiment. The WG then decided that a small group (3 people) should come together to formulate the scientific strategy and the objectives for this oceanographic experiment.

(Later during the Visby Conference, the oceanographers met and formed a group consisting of Dres. Stigebrandt, Hakannsson, SMHI Norrköping; Lass, IO Warnemünde; Mälki, FIMR Helsinki. They plan to have a first draft of a proposal to EU MAST III ready at the end of 1995).

e) *J. Launiainen:* Atmosphere-Ice-Ocean Experiment

The small group which was formed during the last WG meeting in March 1995, met in Helsinki and developed a plan for this experiment. J. Launiainen presented the draft of this plan. The WG accepted it and urged J. Launiainen to go on with his timetable to have a final draft at the beginning of 1996 and to apply for EU funding (MAST III).

The Chairman thanked all the coordinators for the work they had performed to plan the experiments. The WG expressed its hope that financial support could be found to carry out the planned experiments.

4. Future activities of the WG, next meeting

A problem which will be discussed in the future WG meetings is, how the results of the experiments can flow into the models and lead to better parametrization. A meeting together with the WG on Numerical Experimentation will be planned for 1996. The next WG meeting during the first quarter of 1996 will be concerned with the new proposals for the experiments (time and location was not yet confirmed).

5. Further Items: None

The Chairman closed the meeting at 21.30 h.

Appendix 5

BALTEX Working Group on Numerical Experimentation

Report of the 2nd meeting in Visby,

Friday, Sept. 1, 1995

Agenda

1. Introduction
2. Status of BALTEX modelling projects
3. Model intercomparison
4. Target periods
5. Status of data assimilation
6. Modelling aspects of process studies
7. Data requirements
8. Other items

1. Introduction

The second meeting of the BALTEX WGNE took place on Friday, Sept. 1, 1995 from 13:00 - 15:00, immediately following the first Study Conference on BALTEX in Visby. The chairman welcomed the participants of the meeting, and gave a brief overview on the previous activities of the group. The agenda was adopted. Unfortunately only four of the regular group members were able to attend. The list of participants is given in the appendix.

2. Status of BALTEX modelling projects

Participants reported on new activities in atmospheric, hydrological, oceanographic and especially coupled modelling started since the first group meeting (January 94), including the outcome of EU applications and current plans. It was noted that several of the projects outlined in the implementation plan are progressing well.

- *Baltic Sea response to forcing*

A. Lehmann reported on the investigations at IfM Kiel which so far have been focused on the 1992/93 period. This period allows the study of moderate and strong exchange conditions between the North and Baltic Sea (major Baltic

inflow event in January 1993). Additionally, a regional high-resolution model of the western Baltic is integrated with wind fields from the DWD Europe Model over the complete test year to calculate the water and salt budget of the Baltic for one year.

Several model runs were performed to study the sensitivity to atmospheric forcing. So far no model runs were carried out for the BALTEX period 1986/87, due to the lack of sufficiently accurate forcing fields. There is a need of highly resolved sea surface temperatures which may serve as an upper boundary flux condition for the Baltic Sea model. Such data can be provided by infrared satellite images. The BSH (Bundesamt fuer Seeschiffahrt und Hydrographie) in Hamburg currently processes daily SST maps from North- and Baltic Sea areas. To overcome the problem of a partly cloud coverage of the sea, weekly SST maps can be calculated. Experience shows that combined weekly SST maps are sufficient to achieve temperature information for most parts of Baltic sea.

In summary, modelling results for the period 1992/93 are quite satisfactory, but there are still efforts necessary with respect to the winter period 1986/87. It was suggested that the meteorological forcing from the DWD will also be used by the modelling group at the IOW (W. Fennel).

- *Sea ice model*

A coupled ice-ocean model of the Baltic Sea had been presented at the conference by A. Lehmann. The ice model is based on a Hibler-type ice model. According to J. Haapala, Hibler's ice model still has some deficiencies, and further improvement of the sea-ice components are necessary. N. Gustafsson pointed out that due to erroneous boundary layer temperatures of the atmospheric model, freezing and melting processes can not be accurately simulated in a corresponding ice model. The ice model should therefore be included into the data assimilation procedure.

- *Thermohaline circulation and long-term variability*

Integrations of the Baltic Sea model over 10-15 years forced by re-analysed atmospheric data are aspired, but presently it is not possible to integrate the IfM Kiel model over so long periods and it will be convenient only with a coupled ice-ocean model. These expensive model runs will hopefully be feasible during the final years of BALTEX. The aim of this project is the calculation of the fluxes at the sea surface.

- *Full hydrological model (conceptual)*

S. Bergstroem reported that the present conceptual hydrological models seem to work very well. There is an optimistic view that first results of the water balance of the land phase for the whole BALTEX region will soon be available.

- *Hydrological models for selected river basins (distributed, physically based models)*

J. Refsgaard reported that a EU proposal had not been successful.

- *Coupled atmosphere/ocean/land surface model*

While different atmospheric models suitable for coupling are quite similar, the situation with oceanographic models is less clear. So the question arise which

Baltic sea model shall be used. At SMHI it is considered to use the BSH model with a horizontal resolution of 2 km and 50 levels in the vertical in a coupled version with HIRLAM, but a final decision has not yet been made. It is intended to couple the IfM Kiel model with REMO at MPI/GKSS.

3. Model intercomparison

An intercomparison of atmospheric models (REMO and HIRLAM) is performed by GKSS (B. Rockel), MPI (D. Jacob) and SMHI (N. Gustafsson). It will focus on fluxes, precipitation, clouds, and soil moisture. E. Heise pointed out that the choice of initial soil moisture distributions poses a serious problem for model intercomparison. Because soil moisture is in a certain equilibrium with the model physics and because of the long time scale of soil moisture, there will be a large impact of its initial distribution on surface fluxes, evaporation and precipitation, making the comparison of the results of different models very difficult.

Three-dimensional ocean models for the Baltic Sea are presently running at IfM Kiel, BSH, DHI, IOW (with the North Sea - W. Fennel). These models are not directly comparable because of their different resolution. At present there are no activities to compare ocean models and this intercomparison is not included into the list of the BALTEX initial implementation plan. It was however agreed that the WGNE should have a discussion on various ocean models at one of its next meetings. L. Bengtsson pointed out that in the context of CLIVAR it is intended to compare coupled models.

4. Target periods

N. Gustafsson reported on the Mesoscale Re-Analysis project at SMHI. Reanalyses is performed for the following data periods using a mesoscale version of the HIRLAM 2 forecasting system:

(1) a cold winter: 15 December 1986 - 15 February 1987 (SMHI)

(2) a mild winter: December 1992 and January 1993 (SMHI)

(3) The PIDCAP period: August - October 1995 (DMI)

The DWD will carry out delayed mode data assimilation from mid 1996 with a one week cut-off time for observational data which will be carried out on a 1/6 degree horizontal grid. It was, however, pointed out by E. Heise that more data are necessary for this project. The REMO group (MPI/GKSS) have focused their activities additionally to the period May/June '93 (D. Jacob)

5. Status of data assimilation

A specific discussion item was the data assimilation in oceanography.

During the BALTEX conference in Visby only two contributions addressed this issue (O. Andrejev, Stockholm and H.E.M. Meier, Kiel).

The technical problems of assimilating sea level data seem to be rather well in hand.

However, the assimilation of hydrographic data into three dimensional ocean models needs more attention, in particular with respect to model initialisation. The necessity to obtain more hydrographic observations on a routine monitoring basis was stressed. Those data sets should be made available to the whole BALTEX community. In contrast to the situation in meteorology where the usefulness of data assimilation for improving weather forecasts is obvious, in oceanography many scientists may need more encouragement to enter this field.

At the BSH Hamburg SST data from satellite images are available. A. Lehmann will try to make these data available for the BALTEX community because as mentioned earlier many participants of the meeting are interested in such data to improve their models.

L. Bengtsson pointed out that sea level data for more than 100 years are available. Historical hydrographical data are available e.g. at the IOW - Warnemuende (W. Matthaeus). Some 100 years of daily (not digitized) and monthly mean (digitized) surface pressure maps are available at DWD. These data could be very useful for a long-term assimilation.

The IOW will investigate the feasibility of this project.

The participants agreed that a special workshop addressing data assimilation in oceanographic, and ice models would be very useful. The workshop should be open to all activities on shelf sea modelling. The contributions to the workshop should deal with the state of the art of assimilation techniques, but should also have some educational element.

J. Willebrand and N. Gustafsson will investigate whether EU-funding for such an activity can be obtained.

6. Modelling aspects of process studies

A. Omstedt informed the participants about the planned winter experiment in February/March 1998. The experiment will be carried out to collect data sets which are not yet available for the validation of the ice models. The preparation of the data will last up to 1999 and will be done by SMHI and FIMR.

The experiment is concentrated on measurements of the ice extension and measurements near the ice edge. As the data will be used for the validation of e.g. the sea-ice component of the IfM Kiel Baltic Sea model the large scale features are of special interest. The planned field experiment fits well into a MAST-3 project co-ordinated by W. Krauss. It is further suggested to make simulations with the IfM Kiel model to find out which data are necessary for the initialisation of the ice model. The crucial data necessary to initialize and force coupled ice-ocean systems are initial three-dimensional temperature distributions and sea surface temperatures.

7. Data requirements

E. Heise and N. Gustafsson agreed to specify data type and format for assimilation projects and for atmospheric model intercomparisons.

8. Other items

There was agreement that WGNE should have its next meeting in summer 1996. Main agenda items will be the development of ocean/ice circulation models, coupled atmosphere/ocean models, and results of the atmospheric model intercomparison. Time and place of the meeting will be decided at a later stage.

The meeting was adjourned at 15:00 h.

List of participants

L. Bengtsson, MPI

S. Bergstroem, SMHI

W. Fennel, IOW

C. Fortelius, U.Helsinki

N. Gustafsson, SMHI

J. Haapala, U.Helsinki

E. Heise, DWD

D. Jacob, MPI

W. Krauss, IfM

A. Lehmann, IfM

M. Meier, IfM

K. Myrberg, FIMR

A. Omstedt, SMHI

J. C.Reefsgaard, DHI

J. Willebrand, IfM

Appendix 6

Status Report - BALTEX Working Group on Radar, August 1995

As was pointed out in the latest status report, we have within this year to

- propose the types of products to be exchanged
- propose the data formats for the radar data.

A first draft of such a proposal has been sent out to the members of Working Group on Radar (WGR). In principle this draft suggests that

- the products are surface rain intensity and reflectivity,
- the formats are based on the BUFR-code and corresponding software developed by the Liaison Group on European Weather Radar Network.

There is a need to have some meeting within the WGR to discuss and decide in this issue during the autumn. However, there is a (rather general) problem with lack of money for such activities.

The radar coverage of the BALTEX will be increased this year with one new radar at Östersund (Sweden) and one at Kuopio (Finland). Regarding the radar coverage over the Baltic states, SMHI plans to initiate some work to investigate the technical and economical requirements for a radar network over the Baltic states.

The WGR also has the task to recommend radar-related research. Nothing has been done yet. There is some initiative within NORDRAD to start projects which aims to 'extend the quality of weather radar products'. Maybe this can result in projects, which also are of interest for other institutes within BALTEX.

Appendix 7

BRIEF STATE-OF-THE-ART REPORT ON THE IMPLEMENTATION OF BALTEX PROJECT BY THE STATE HYDROLOGICAL INSTITUTE FOR THE PERIOD OF 1 JULY 1994 - 20 AUGUST 1995
(Agreement with GKSS No. V 9447 of 19 July, 1994)

The State Hydrological Institute (SHI) is a coordinator on the Baltex Project among Russian institutions. Besides the SHI, the Project is also contributed by the Main Geophysical Observatory (MGO), St.Petersburg Branch of the State Oceanographic Institute (SPBSOI) and North-West Administration of Hydrometeorological Service (NWA HMS). The works on the Project are made in the two directions:

- collection, analysis, and processing of hydrometeorological and physiographic information for the Russian territory of the region and preparation of databases;
- research on the subjects of the Project.

The following results have been achieved for the study period:

Collection of Information and Preparation of Databases

1. The following data have been collected, processed and prepared in a diskette form:
   1.1. Mean daily water discharges from 50 gauging stations for May-June 1993.
   Responsible institution: SHI (data are transmitted to GKSS).
   1.2. Water level data for the Russian territory of the Baltic Sea for 3-hour intervals from 5 stations for May-June 199
   Responsible institution: NWA HMS (data are transmitted to GKSS).
   1.3. Data on water temperature and salinity over verticals observed during field measurements from Russian vessels in the Gulf of Finland during 1986-1987, 125 measurements from vessels altogether.
   Responsible institution: SPBSOI (data are transmitted to GKSS).
   1.4. Data of multipurpose meteorological observations from 25 basic stationson the Russian territory of the Baltic Sea basin for May-June 1993 for 3-hour intervals.
   Responsible institution: NWA HMS (data are transmitted

to GKSS).

1.5. Data on radiation balance and actinometric data from 5 stations for May-June 1993.

Responsible institution: NWA HMS (data are transmitted to GKSS).

1.6. Observation data on soil moisture content from 10 stations for May-June 1993.

Responsible institution: NWA HMS (data are transmitted to GKSS).

1.7. The information database is mainly presented by deep-water observations of water temperature and salinity during standard seasonal surveys made by different institutions of the Hydrometeorological Service. After the analysis of the available observation data, 324 deep-water stations have been selected, including 624 observations of water temperature and 645 observations of water salinity. The diagram ofthese stations distribution is shown in Figs 1 and 2.

1.8. Lists of the catalogue information and schematic distributions of the hydrological and precipitation sites (stations), and meteorological stations on the territory of the Russian part of the Baltic Sea basin have been prepared and transmitted to GKSS.

Responsible institution: NWA HMS.

1.9. Physiographic characteristics of the Russian territory of the Baltic Sea basin: the whole territory has been separated into 4043 squares altogether according to the grid of 9 x 9 km using the map of 1 : 200,000 scale; coordinates of the grid nodes, mean, maximum and minimum elevation marks by the grid squares, areas covered by water and land, populated areas and forested areas have been determined for the 80% of the terrain (the Leningrad District has been determined completely,

Pskov, Novgorod and Vologda Districts and Karelia has been determined partially). The work is being done to identify soil types accepted in Russia relative to the standards accepted in the BALTEX Project.

Responsible institution: SHI.

Implementation of Research Programme

1. A regional climate model of the hydrodynamic type has been developed; this model is based on the solution of a system of equations in a finite-difference form. The model is realized on the grid of 49 x 51 x 14 km. A computer P5 has been purchased for the model parametrization and computations of energy-water exchange in the atmosphere, convective processes, turbulent exchange, and moisture and heat dynamic in soil have been made. At present, prognostic computations are made on the regional circulation of the atmosphere and these computations are compared with the observed meteorological variables.

   Responsible institution: MGO.

2. The base of hydrological and meteorological data on the Gulf of Finland (the Neva Bay including) has been supplied by additional information for the last 10-year period. On the basis of the developed unified probabilistic methods for processing and analysis of the information base assessments have been made for the present trends in the development of the processes at the background of their long-term variation In addition to the data on wind and pressure, meteorological database on the cloudiness, air humidity and precipitation has been collected. Deep-water field observation data on water temperature and salinity in the Gulf of Finland for 1992-1993 have been prepared to be transmitted to the international committee on the BALTEX Project.
   On the basis of the operating two-dimensional hydrodynamic models of water level and currents fluctuations in curvilinear and rectilinear coordinates with a variable step of the grid

the particular situations have been computed and verification and comparison of the computation results have been made for the levels in Kronshtadt and St. Petersburg for a future choice of the optimal model variant. On the basis of the use of general laws of long-period water level fluctuations in the Gulf of Finland and in the Neva Bay and of basic external factors causing these fluctuations, the trends in the development of this process have been computed from the obtained regression dependences well in advance from 1 year to 10 years.
Three-dimensional hydrodynamic model (developed at the SPBSOI) has been used to compute three particular situations, i.e. November 1990, August 1991 and November 1991. The following parameters were computed: water level, currents, water temperature and salinity. The fields of water temperature and salinity in the top water layers in the Gulf of Finland and the vertical profiles correspond to the observed data quite satisfactorily in both computations. A good agreement between observed and computed data has been also achieved for the storm setup variant observed in November 1991.

Responsible institution: SPBSOI.

3. Total water inflow to the Baltic Sea from the Russian rivers has been computed; analysis of trends in the change of the hydrological regime in the region has been made from the data of standard and specialized hydrological networks.

   Responsible institution: SHI.

Appendix 8

REPUBLIC OF LATVIA
Latvian Hydrometeorological Agency

REPORT TO THE 3rd BALTEX SSG MEETING
September 2, 1995, Visby, Sweden

In the Republic of Latvia, the main efforts to implement the BALTEX Project have been concenrated on establishing a national hydrometeorological data centre. With this in mind, intensive data digitizing started in 1993. Before 1993, all hydrometeorological data were in tabulated form only. Due to financial supporting from the Federal Republic of Germany digitazing of data required directly for the BALTEX experimentation was given a high priority. All the hydrometeorological data have been got ready for the first tested period of 1992-1993. Geographical data for the territory of Latvia have been digitized and now digitazing has started of the hydrometeorological data available for the next tested period of 1986-1987.

Other historical data required for different national programmes funded from the state budget have been digitized in stages. For instance, tide-gauge hourly sea level data digitizing were carried out since 1977. Unfortunately our national funding is limited because state budget deficit now has reached the level planned for the whole year. The same can be said about the rate of inflation. So, it is unreality to get essential financial supporting from our governmental structures in the near future. We clearly understand the importance and advantage of the BALTEX Project for our country, and corresponding attempts should be made to find any sources to support the BALTEX implementation on the national level.

The main issues that essentially restrict our research activities within different working groups under the BALTEX are complications in our budget, missing facilities to train top-level specialists, and a tendency to reduce the existing research programmes. Nontheless a number of research works pertinent to the BALTEX Project are being carried out whereby an IHBM model for the riverine runoff will be installed in Latvia. A tailor-made integral model for small watersheds has been elaborated in co-operation with the Latvian University and will be calibrated for our Integral Monitoring stations at Rucava and Taurene.

Unfortunately old equipment and instruments prevent us from active participating in the PIDCAP experiment. Nontheless we shall be making intensive observations of precipitation distribution over the entire territory of Latvia throughout the whole PIDCAP's observational period, and all data required for the experiment will be available before long. A programme to equip and modernize our coastal stations and R/V GEOFIZIKIS has started in this year, and I believe that our participation in the field experiments, especially in the Baltic Sea will be more fruitful in the future.

Taking into consideration a financial crisis in our country, all kinds of financial and technical aid will be welcome from any international sources to carry through the BALTEX Project successfully. Only in close co-operation with all the countries involved in the BALTEX Project we shall be able to provide proper contribution to the implementation of the Project.

In conclusion, I would like to express my great satisfaction in the work of the BALTEX Secretariat and their assisstance in our common work.

95-08-25

Appendix 9

BALTEX - Status Report of Lithuania

The BALTEX Project in Lithuania is being carried out mostly by LBMH. To accomplish main objectives of the Project, a special group, mostly of hydrologists, has been created. Our principal task is to collect and arrange the data along with the general requirements of the BALTEX Project. The data and accounts are regularly send to the BALTEX Secretariat. We suppose that group to continue its data arrangement duty. In our opinion, the data arrangement requirements are to be more concretised and unified.

Also the scientists of the University of Vilnius are taking part in data arrangement task. This year they are carrying out a soil evaporation study.

The further perspectives of the BALTEX Project are rather unclear. We can ensure that all the necessary observations and other data will be arranged properly. But the scientific studies realisation's perspectives in Lithuania are complicated. The scientific potential still exists, especially in hydrology. But being short of a budget financing, the Lithuanian scientists cannot plan studies which are insufficiently financed. Alas, the financing assigned for the BALTEX Project is also insufficient. Of course, the possibility of planning exists, and so we are doing together with the University scientists. But of course they aren't wide scientific studies. Finally, I want to stress, that we consider our participation in the BALTEX Project as an expedient task. Especially when we are taking into account the changeable economic situation, including Lithuania.

Thank you.

Appendix 10

The Report

of the Committee for Hydrometeorology about the work performed in Republic of Belarus within the International BALTEX Project

(at 10 August 1995).

Here was prepared and sent to BALTEX Secretariat the following data files:

1. The hydrographical characteristics for regular grigpoints on the West Dwina and the Nioman river basins.
2. Observing stations lists.
3. The hydrometeorological information during 1992-93:

-data of water discarge in 1992-93;

-data of precipitation during May-June 1993;

-data of precipitation during September-December 1992;

-data of avaible soil moister's storage during May-June 1993;

-data of evapotranspiration during May-June 1993;

-data of meteorological measurements during September 1992-September 19

-data of radiation during September 1992-September 1993.

After the meeting in St. Petersburg (26-27 June 1995) there were changed and supplemented the sent data.

In present the preparing and entering of agrometeorological data (BVD. EVP, CV, CVT) into the technical bearers continue. But in connection with the lack of common methods for this data determination here is a guestion about the continuation of this work. At the meeting in St. Petersburg it was not accepted this work and the continuation of hydrografical characteristics making. The continuation of hydrografical characteristic"s making. The volume of these works is very big, but evidently the actual hydrometeorological information during concrete periods is more iimportant for the experiment.

Hence from the great atlention given PIDCAP at the meeting in St. Petersburg note should be taken to preparing the date during Auguct-September 1995.

According to the letter of BALTEX Secretariat of 27 June 1995 (sent by fax) the number of demanded hydrometeorological elements was considerably extended for unintelligible reason. Presentation of this data will reguire substantial efforts, especially for data during 1986-87 which are set up by hand.

In this connection we propose:

-to revise and reduce a number of hydrometeorological elements;

-to present the data during September 1986-September 1987;

-to work out the common methodical recommendations for agrometeorological data determination;

-to stop an orographical characteristic's determination in connection with the obsolete cartographical material.

Appendix 11

POLISH BALTEX TASK GROUP

Baltic Sea Experiment "BALTEX"

SUMMARY OF POLAND'S DRAFT IMPLEMENTATION PLAN

AUGUST 1995

INTRODUCTION

Poland is located in the Southern part of the BALTEX region, and its territory covers 312,000 km^2, i.e. approximately 18% of the whole Baltic Sea drainage. 54% of region's population lives in Poland. Two main Poland's rivers Vistula and Odra, together with a number of small coastal rivers feed the Baltic Sea with about 56 km^3 of water during a year of average climatic conditions.

The Polish research potential related to the goals provided by the BALTEX Scientific Plan is well established. Studies on atmospheric, hydrologic and marine processes have a long tradition in Poland, and are at present implemented in a number of universities and research institutes. Several hydrologic and oceanographic models were developed and are widely used for engineering purposes. Poland runs a dense network of hydrological and meteorological observing stations, of which some have collected data for more than hundred years.

This short document presents a number of recent research initiatives, which we intend to implement in the years 1996 - 1998. Two types of projects should be distinguished:

* those motivated by national priorities which basically should be supported by national funding agencies;
* those aimed to solve regional problems of differentiated importance for various countries, which at least partly may be supported from international sources.

Most of the research topics mentioned below are of the first type. We hope, however, that the results will contribute to the overall goals of BALTEX. The second type of projects may be realistically discussed only if the well known uncertainties accompanying at present the international funding possibilities will be solved.

RESEARCH ACTIVITIES

The following research topics related to BALTEX Scientific Plan are foreseen to be implemented during the years 1996 - 1998:

Hydrology:

H-1. Sensitivity of water balance to meteorological and land surface processes:
A new version of conceptual hydrologic model CLIRUN_3.1 developed at the Institute of Geophysics will be applied to calculate evaporation, runoff and storage characteristic for grid cells of the resolution 0.5° covering the territory of Poland, assuming different climatic and land-use conditions.
Coordinator: Institute of Geophysics, Warsaw

H-2. Improvement of the modelling methods of water flow in atmosphere-soil-plant systems with regard to variable atmospheric and plant conditions:
The aim of the study is to improve the understanding of interrelations between main hydrologic processes: precipitation, interception, evaporation, infiltration and runoff; numerical models developed earlier at the Institute of Hydroengineering will be tested for new empirical data, and compared with results obtained in other countries.
Coordinator: Institute of Hydroengineering, Gdańsk

H-3. Detecting changes in stochastic processes of runoff to the Baltic Sea from the territory of Poland during the XX-th Century:
Based on long series of hydrological data for the Odra and Vistula rivers, a statistical analysis of stationarity hypothesis for mean characteristics, intraannual and interannual variability, and persistence will be done.
Coordinator: Institute of Geophysics, Warsaw

H-4. Designing efficient numerical schemes for the river-groundwater interaction:

Most of existing simulation and forecasting models of flow in river networks may incorporate lateral groundwater inflows or outflows, but the conceptualization is usually poor. It is proposed to design a new concept of interaction which allows to analyse more accurately complex river-aquifer systems.

Coordinator: Warsaw University of Technology, Institute of Environmental Engineering Systems

H-5. Quantification of catchment physiographic parameters by means of GIS technology:

The pattern of soil and vegetation cover in natural catchments usually shows a big variability; for hydrological modeling there is a need to find an effective method of data aggregation, and their conversion to useful parameters.

Coordinator: Warsaw University, Institute of Physical Geography

Meteorology:

M-1. Improvement of analysis ad forecasting of cloudiness and precipitation pattern

The problem will be analysed in three scales: (1) local and short-term forecasting; (2) mesoscale forecasting based on Limited Area Model (e.g. UK Unified Model, LACE model, ETA model; and (3) large scale forecasting model.

Coordinator: Institute of Meteorology and Water Management, Warsaw

M-2. Coupling of atmospheric and hydrologic models:

Both hydrologic and meteorological models include processes in the Atmospheric Boundary Layer (ABL); atmospheric models are usually implemented in a regular grid while hydrological models operate in the catchment scale. Based on some earlier studies (models: MESO, GWARAT, GESIMA) it is intended to unify the structure of models of ABL processes used in hydrology and meteorology.

Coordinator: Warsaw University of Technology, Institute of Environmental Engineering Systems

M-3. *Detection of wide spectrum in the European region which may affect the hydro-meteorological regime in the Baltic Sea Basin:*
Analysis of changes in circulation patterns; analysis of relations between thermal conditions and regional circulation; role of the Baltic Sea in modification of sub-local atmospheric circulation; relationshipo between circulation and weather conditions, and detecttion of changes; atmospheric pattern and deep water inflow; relation between North Atlantic Salinity Oscillation and hydro-meteorological processes in the Southern Baltic.
Coordinator: Institute of Meteorology and Water Management, Maritime Branch, Gdynia

Oceanology:

O-1. *Empirical studies and modeling of mass and energy fluxes and their role in physical, biological and chemical processes in the Baltic Sea:*
Empirical studies and modeling of seasonal variability of solar energy fluxes, their absorption and role in marine processes; application of satellite data from SeaWiFS program.
Coordinator: Institute of Oceanology, Sopot and Institute of Meteorology and Water Management, Maritime Branch, Gdynia

O-2. *Stochastic analysis of an impact of mean level of the North Sea and selected meteorological fields on hydrodynamic processes in the North Sea-Skagerrak-Kattegat-Baltic Sea system:*
Transport of water through the Danish Straits has a decisive role in the Baltic Sea water balance; stochastic modeling of dynamics of inflow into the Baltic and changes in the volume of Baltic waters is the main goal of the study.
Coordinator: Institute of Oceanology, Sopot

O-3. *Application of satellite data for monitoring and analysis of Baltic Sea level:*
Use of satellite data for monitoring changes of water level in the Baltic Sea and North Sea; studies on the possible use of satellite data for evaluating the exchange

of water through the Danish Straits; impact of tides on the accuracy of satellite measurements.
Coordinator: Institute of Oceanology, Sopot and Center of Space Research, Warsaw

O-4. *Wave processes forecasting for Baltic bays:*
Wave forecasting methods are well developed for the main part of the Baltic Sea. The aim of the study is to improve methodology of forecasting wave fields in the Gulf of Gdansk and for similar regions.
Coordinator: Institute of Hydroengineering, Gdańsk

O-5. *Interaction of Baltic Sea environment and the Vistula river:*
3-dimensional hydrodynamic model of the Gulf of Gdańsk will be developed, aimed to improve analysis of vertical and horizontal movement of seawater in stratified environment, with regard to wind fields.
Coordinator: Institute of Hydroengineering, Gdańsk

O-6. *Ice condition in the Southern Baltic and in lower part o f rivers entering Baltic along the Polish coastline:*
Re-analysis of ice conditions data and modeling of ice processes in rivers and in the Baltic.
Coordinator: Institute of Meteorology and Water Management, Maritime Branch, Gdynia

O-7. *Statistical Analysis of changes of Baltic Sea level:*
Based on long-time series of observation, statistical analysis of sea level changes and variability will be implemented. A stochastic forecasting model will be developed.
Coordinator: Institute of Meteorology and Water Management, Maritime Branch, Gdynia

DATA COLLECTION and ASSIMILATION

In addition to routine measurements of hydrological, meteorological and oceanographic data, done at the network of stations run by the Institute of Meteorology and Water Management and other research institutions, special experimental

data will be collected in connection with the above mentioned research plans.

The main data collection center in Poland is the Institute of Meteorology and Water Management (hydrological and meteorological service). Research coordinators listed above will agree on the conditions of data utilization.

The BALTEX Data Centers interested in obtaining data from Poland, or information concerning their role as meta-centers, should contact directly IMWM in order to agree conditions of cooperation.

ORGANIZATIONAL STRUCTURE

BALTEX related activities in Poland are coordinated by the BALTEX Task Force formed in a framework of the Polish Committee for International Hydrologic Programs (Polish Academy of Sciences). The address for communication is:

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prof. dr. Zdzisław Kaczmarek
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Appendix 12

BALTEX

Pilot Study
for Intensive Data Collection and Analysis
of Precipitation

PIDCAP

August to October 1995

Project Description

September 10, 1995

PIDCAP

A BALTEX Pilot Study for Intensive Data Collection and Analysis of Precipitation

August to October 1995

Project Description

compiled by
Hans-Jörg Isemer
International BALTEX Secretariat

September 10, 1995

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Summary

The Initial Implementation Plan for BALTEX, the Baltic Sea Experiment, foresees Intensive Observation Periods in order to provide basic data sets for the analysis and diagnosis of synoptic-scale systems and extreme events in the BALTEX region. The first of such an Intensive Observation Period is PIDCAP, the BALTEX *Pilot Study for Intensive Data Collection and Analysis of Precipitation*. The objectives of PIDCAP include 1) the collection, analysis and intercomparison of measured and estimated precipitation from different data sources in order to identify and establish reliable standards for model validation, and 2) the validation of the output of different regional models against such precipitation data sets. The observational period of PIDCAP is scheduled for August to October 1995, the area of interest is primarily the BALTEX region south of about 60 N, with the possibility of further extension, if necessary. Precipitation data sets to be compared will include standard data (gauge land stations) and non-standard data (research vessel, specially equipped ships of opportunity, from SSM/I and radar stations). Modelling groups at MPIfM, GKSS, DMI and SMHI will perform model runs with different regional models for the same period. At present, 15 different research projects from five countries are included in PIDCAP.

1 Introduction

A number of challenging tasks for BALTEX, as outlined in the Scientific Plan for BALTEX, can adequately be solved only in close co-operation between scientists and groups from different research directions or disciplines. Measurement and modelling of precipitation will be a key issue in order to meet the objectives of BALTEX. For validation of model results reliable ground truth data must be established. This includes estimates of their uncertainties. Ground truth data will have to be compared against each other in order to identify their specific potential with respect to model validation.

At a national BALTEX workshop in Germany the need for intense co-operation between different national groups within the German BALTEX contribution and with BALTEX groups in other countries has been recognized. As a consequence plans for co-operation and interaction between groups have been outlined during this workshop. An ad-hoc working group on problems of precipitation measurements pointed out the urgent need for an organized initiative to collect rain data from different sources for comparison and validation purposes.

The implementation of this initiative was planned in form of an Intensive Observation Period. The workshop suggested to organize a

BALTEX Pilot Study for Intensive Data Collection and Analysis of Precipitation (PIDCAP).

2 Objectives of PIDCAP

The objectives of this pilot study are

- to collect and analyse measured and estimated precipitation from different data sources,
- to compare different precipitation data sets against each other in order to identify and establish reliable standards for model validation,
- to validate the output of BALTEX Regional Models against such precipitation data sets,
- to develop, test and establish necessary data management and analysis procedures (especially the co-operation between different research groups and the BALTEX Meteorological Data Center) for future comprehensive studies in the framework of BALTEX.

As a first step only rain events will be studied. The key data collection and modelling period of PIDCAP will be **August to October 1995**.

The area of interest for PIDCAP has been defined as the **southern BALTEX region south of about 60N**. It will include both land surfaces and the Baltic Sea area.

3 Implementation of PIDCAP

The BALTEX Science Steering Group, on its second meeting in Helsinki, January 25-27, 1995, considered PIDCAP as an important contribution to BALTEX and recommended international participation. The Initial Implementation Plan for BALTEX identifies two types of field experiments in order to investigate physical processes related to the energy- and water cycle of the BALTEX region: 1) field experimental campaigns studying small- and meso-scale processes, and 2) Intensive Observational Periods, the principle objectives of which are to provide basic data sets for the analysis and diagnosis of synoptic scale systems and extreme events in the BALTEX region.

PIDCAP will be mainly an Intensive Observation Period, scheduled for August to October 1995. Additionally, a field campaign is scheduled for September 1 - 9, 1995, when the research vessel ALKOR of IfM Kiel will operate in the Baltic proper east of the island of Gotland. Part of the contributions to PIDCAP described in section 4 are closely related to this ALKOR cruise.

For estimating rainfall and in order to validate rainfall predictions from models BALTEX will rely on a combination of different techniques with different characteristics concerning e.g. estimation technique, and resolution in time and space. The major objective of PIDCAP is to compare such rainfall estimates from different sources for at least part of the BALTEX area, and to identify their particular strengths and weaknesses. In a second step measured and estimated amounts of rainfall will be compared to model outputs. Time resolution of rain estimates will be at least one day. If possible, time resolution should be increased to 12 or 6 hours.

PIDCAP is meant to be a pilot experiment for later comprehensive BALTEX research phases. In this sense PIDCAP will serve as a test for procedures to combine data sets from different measurement and modelling sources. These procedures need to be developed towards a near-operational state. Hence, participation of the BALTEX Meteorological Data Center is an important step in order to test and, if necessary, to improve or develop data exchange strategies for BALTEX.

PIDCAP will rely on methods already available at different BALTEX participants or other groups. It will be run in „addition of expertise" mode: Each group is expected to determine rain in the BALTEX area by its own techniques for a given area and a given period of time. During the experiment there will be no central experiment co-ordination and no central logistics. Necessary contacts between individual groups have to be organized primarily by the participating groups. In order to prepare feasible data exchange during or after the study another co-ordinating meeting with participation of all groups will be performed before the start of PIDCAP, preferably in June 1995. This meeting will be organized by the International BALTEX Secretariat in co-operation with the Institute of Marine Sciences in Kiel (IfM). However, in general, it is recommended that participating groups develop their own co-ordination of activities and procedures in PIDCAP. Both, IfM Kiel (L. Hasse) and the International BALTEX Secretariat will prepare and survey PIDCAP in a more loose manner, but activities have primarily to originate from the participating groups.

There will be no extra or central funding for PIDCAP. Participants will need to rely on their own sources and funding to support their participation in PIDCAP.

4 Contributions to PIDCAP

A first coordinating meeting for PIDCAP took place on October 10, 1994 at IfM Kiel. The participating groups defined their research interest for PIDCAP. An announcement for PIDCAP was formulated and distributed asking for further participation of other groups.

To date, research groups in Sweden, Finland, Denmark, Austria, Great Britain and Germany have indicated their interest to participate in PIDCAP. Two projects from SMHI dealing with HIRLAM precipitation forecasts and meso-scale precipitation analysis including radar data from the NORDRAD network, a modelling project at DMI and a precipitation analysis project at Vienna University confirmed contribution to PIDCAP.

A BALTEX workshop was held in Minsk, Belarus, at the beginning of November 1994. During that workshop representatives of six countries which already co-operate within BALTEX (Belarus, Estonia, Latvia, Lithuania, Poland and Russia) indicated their intention to participate in PIDCAP. The intention is to provide a comprehensive data set of daily rainfall amounts measured at all existing conventional rain stations in those regions of the above-mentioned countries which are part of the BALTEX area. This will include, in particular, those stations which do not transmit their data into international accessible data centers, and hence, will not be available on a routine basis.

It is anticipated that further intentions of participation should be indicated until early spring 1995 to either IfM Kiel (L. Hasse) or the BALTEX Secretariat (for addresses see section 5).

In the following the participating research groups of PIDCAP and their research interests are shortly described. At present 15 projects are included in PIDCAP:

I	Rain estimates from ship gauges - Ferry-boats
II	Rain estimates from ship gauges - Research vessel
III	Application of Microwave Radiometry to Estimate Rainfall
IV	Airborne validation of cloud and precipitation parameters
V	Case Study of Precipitation Systems over the Baltic Sea
VI	Derivation of rain rates from satellite data using a combination of visible, infrared, and microwave data
VII	Weather Radar Data for PIDCAP
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Xa	Validation of model results of precipitation - REMO at GKSS
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XII	HIRLAM precipitation forecasts for PIDCAP
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XIV	Monthly gridded precipitation data
XV	Objective analysis of surface precipitation

They are described with more detail at the following pages.

I Rain estimates from ship gauges - Ferry-boats

1. **Principal Investigators** L. Hasse

2. **Institute** Institut für Meereskunde, Kiel

3. **Participants** K. Niekamp and M. Großklaus

4. **Scientific Objective**

Determine rain at the Baltic Sea

5. **Methodology and Approach**

We have deployed recording rain gages at ferries of the route Lübeck / Helsinki. This provides rain amounts for the main body of the Baltic Sea. The data can be used to establish a rain climatology of the Baltic Sea and to calibrate other techniques of rain estimation.

6. **Measurement or Data Collection Plan**

Data are collected at ships that run continuously between Lübeck and Helsinki and are about 40 hours out of 48 hours at sea. Special ship rain gages are used that are suitable to measure rain at moving ship. Rain amounts are determined every 8 minutes and are recorded together with the position for later analysis. We intend to equip two additional ships with ship rain gages in 1995. The data are collected along the mayor shipping route in the long direction of the Baltic Sea.

7. **Analysis Technique**

The data collection at running ship can be seen as a sampling for a given location along the ship route. For the determination of rain climatology, the rain amounts are corrected according to the time fraction of ship in area to total time. This provides a rain climatology along the back bone of the Baltic Sea. The simplest analysis techniques is to compare data at sea with data from shore stations, and draw isolines according to distance from shore (traditional analysis techniques). A better extrapolation from the line to the area is via numerical weather forecast models (NWF model). Such model provide fields of rain forecast for the area. Calibration against ship rain measurement of forecasted rain would lead to an improved determination of rain for the Baltic Sea.

8. **Data Requirements, Co-operation**

Rain measurements from shore stations and rain estimates from NWF models.

9. **Time Plan**
Two ships at present take observations continuously.

10. **Additional Remarks**

We would try to help to equip additional ships with ship rain gages, preferably such that do meteorological routine observations already. We intend to co-operate with other groups who need verification data from the sea.

II Rain estimates from ship gauges - Research vessel

1. **Principal Investigators** L. Hasse

2. **Institute** Institut für Meereskunde, Kiel

3. **Participants** K. Niekamp

4. **Scientific Objective**

Shipborne rain measurements for validation of rain estimates at sea from remote sensing methods and numerical weather forecast models.

5. **Methodology and Approach**

Rain will be measured at R.V. ALKOR by a mechanical ship rain gage and an optical disdrometer. The instrumentation is designed to allow measurements at a moving ship. Measurements are to be taken at a position where radar measurements are available and conditions are favourable for microwave satellite remote sensing of rain.

6. **Measurement or Data Collection Plan**

R.V. ALKOR will operate east of Gotland the first 10 days of September 1995 and collect rain data. Standard sampling interval is 8 minutes for rain amount and drop spectra. Data can be combined to hourly averages.

7. **Analysis Technique**

Data are available as short term (8 minute) and hourly rain amounts for a given position or cruise leg. The ship rain gage collects rain at a horizontal and a vertical rain collecting surface. Total rain amount is calculated as a function of local relative wind speed from the two items of information. The ship rain gage has been calibrated with reference to disdrometer measurements.

8. **Data Requirements, Co-operation**

Fields of frontal and convective rain for the position / cruise leg of R.V. ALKOR from any kind of rain estimation.

9. **Time Plan**

R.V. ALKOR will be available at the site east of Gotland from about 1 through 9 September 1995. Measurements will be made on route from Kiel to Gotland and return starting 25 August, ending 11 September 1995.

10. **Additional Remarks**

We will also try to measure air sea momentum transfer by the so-called eddy dissipation technique.

III Application of Microwave Radiometry to Estimate Rainfall

1. **Principal Investigators** E. Ruprecht

2. **Institute** Institut für Meereskunde, Kiel

3. **Participants** C. Füg, H. Gäng, C. Simmer

4. **Scientific Objective**

Developing and application of algorithms to estimate rainfall over the BALTEX area, in particular over the sea.

5. **Methodology and Approach**

a) Application of single parameter algorithms (published in the literature) to SSM/I data.
b) Use of the numerical results of a BALTEX mesoscale model e.g. REMO as input for a microwave radiative transfer model and simulation of brightness temperatures, TB, comparison between simulated and observed TB, "correction" of the geophysical parameters including precipitation rate to obtain an agreement between simulation and observation.

6. **Measurement or Data Collection Plan**

There are no observations planned by our own group.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

a) SSM/I data
   8 tapes per month per satellite (at present 2 satellites)
b) Numerical results of REMO (or similar mesoscale BALTEX model)
c) Rain gauges data from the ferry boats (see L. Hasse)
d) Rain gauges data from land stations
e) RADAR data: DWD, NORDRAD

9. **Time Plan**

a) SSM/I data are in general available 2 - 3 months after observation period.
b) The working group of REMO at GKSS estimates 3 - 4 months for the completion of the numerical results

10. **Additional Remarks**

a) Additional financial support is needed for the purchase of the SSM/I data:
   US$ 125,00 per tape plus handling, postage.
   That is 24 tapes for 3 months and 1 satellite: US$ 3.000.00,
   for all 2 satellites: US$ 6.000,00
   That is about DM 9.600,00.

b) Additional data from other satellite (METEOSAT, NOAA) in the VIS and IR spectral range should be available from other groups of the German BALTEX community.

IV Airborne validation of cloud and precipitation parameters

1. **Principal Investigators** D. Offiler

2. **Institute** United Kingdom Meteorological Office

3. **Participants** D. Jones, S. English

4. Scientific Objective

Validation of RT models describing (precipitating) clouds for development of passive microwave precipitation and liquid water path (LWP) algorithms (e.g. for AMSU, SSM/I, SSM/T1+2, MIMR)

5. Methodology and Approach

a) To use C-130 thermodynamic and microphysical data and NORDRAD data to populate an RT model for comparison with SSM/I and airborne microwave radiometer radiances at 23.8, 50.3, 89 and 157 GHz.

b) To use C-130 *in situ* data to validate SSM/I LWP algorithms and to test performance of these algorithms in precipitating systems. These algorithms will also be validated against LWP derived from C-130 microwave radiometers.

6. Measurement or Data Collection Plan

C-130 flights will be coordinated with R/V Alkor, DMSP overpasses and NORDRAD radar network. The C-130 has a long endurance and may operate at all heights up to approximately 10 km. Comprehensive measurements of standard thermodynamic parameters, cloud microphysics and narrow- and broad-band infra-red radiation are made as well as passive microwave observations at a range of frequencies.

7. Analysis Technique

LWP retrieval algorithms have already been developed by UKMO and expertise exists in combining radar and aircraft data for radiative transfer modelling at microwave frequencies.

8. Data Requirements, Co-operation

a) All DMSP passive microwave radiances
b) Ship/ferry raingauges
c) NORDRAD rainfall fields
d) 3D reflectivity fields from Rostock radar
e) "Alkor" radiometer TBs and derived water vapor burdens/LWPs

9. Time Plan

There may a few months delay in producing "definitive" calibrated microwave TBs from the aircraft radiometers. *In situ* thermodynamic and microphysical values could be made available on a shorter time scale.

V Case Study of Precipitation Systems over the Baltic Sea

1. **Principal Investigators** E. Ruprecht and C. Simmer

2. **Institute** Institut für Meereskunde, Kiel

3. **Participants** C. Füg, H. Gäng, D. Ramm

4. **Scientific Objective**

Investigation of the microwave radiation of rain clouds for validation of microwave radiative transfer models and algorithms to estimate rainfall over the sea.

5. **Methodology and Approach**

During a 2 week period August/September 1995 an experiment on the research vessel "Alkor" is planned in the center of the Baltic Proper.
Measurements are planned on board with the following instrumentation:
- radiosondes launched from the ship to describe the thermodynamic state of the atmospheric column above
- microwave radiometer, to measure the downwelling microwave radiances
- ceilometer, to determine the height of the cloud base
- instrumentation to measure sea surface temperature and meteorological data at ship level: temperature, humidity, wind, radiation.

The data are used a input for:
- the radiation model to simulate the upwards and downwards directed microwave radiances
- the mesoscale cloud model GESIMA to simulate the (vertical) distribution of cloud water and ice content and of precipitation water.

6. **Measurement or Data Collection Plan**

a) radiosonde observations (T,RH,v) several times per day: at the times of satellite overpasses (SSM/I) and depending on certain weather situations (precipitation systems).
b) microwave data from the ship-borne radiometer: continuously
c) synoptical observations: every hour (including SST)
d) cloud base height: continuously.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

In addition to the observations carried out on board the following data are required for the period of the experiment:
a) SSM/I data of all overpasses
b) Satellite data in the VIS and IR spectral range from NOAA-satellite (AVHRR), METEOSAT
c) Precipitation data from gauge on "Alkor"
d) RADAR data (NORDRAD, DWD)
   - 3-dimensional for the experimental site
   - horizontal distribution of derived precipitation over the Baltic Sea
e) numerical results of REMO.

9. **Time Plan**

a) The experiment is planned for the time period of August 23 to September 6, 1995. The data will be processed in the following two months.
b) Satellite data
   - VIS, IR data are normally available within one month after observation
   - SSM/I data are available 2 - 3 month after observation.

VI Derivation of rain rates from satellite data using a combination of visible, infrared, and microwave data

1. **Principal Investigators** J. Fischer

2. **Institute** Freie Universität Berlin

3. **Participants** R. Bennartz, A. Thoss

4. **Scientific Objective**

Although several global retrieval algorithms for cloud and rain parameters based on microwave data over ocean exist, the application of these algorithms to the BALTEX region is rather problematic. Two major reasons for that are: First, global algorithms may not represent special climatic regions very well. Second, the Baltic Sea is mainly comprised of coastal waters. Taking into account the low resolution of spacebome passive microwave radiometers, algorithms developed for open ocean conditions will fail. In order to tackle these problems we will derive synergic algorithms using a combination of infrared and visible data, which has a high resolution, and microwave data. Employing these algorithms, datasets of cloud liquid water content, instantaneous rain rates, and other parameters will be made available.

5. **Methodology and Approach**

In the microwave region a broad range of physically realistic atmospheric conditions will be simulated using an existing matrix operator model. Additionally, statistical information derived from NOAA/AVHRR and METEOSAT data will be included in the retrieval algorithms.

6. **Measurement or Data Collection Plan**

Data from NOAA/AVHRR, METEOSAT and DMSP/SSM/I is needed. Further, radio-soundings for the BALTEX region are needed as input for radiative transfer simulations.

7. **Analysis Technique**

The simulated and statistical datasets will be inverted using gradient methods.

8. **Data Requirements, Co-operation**

NOAA/AVHRR and METEOSAT data are operationally archived at the FU Berlin. Microwave datasets (SSM/I) for the PIDCAP study period from August to October 1995 have to be purchased from Remote Sensing Systems, Santa Rosa, California. The total expenses for that will be about 800 US$/month = 2400 $ total. In order to validate the retrieval algorithms, especially for rain rates, it will be necessary to get rain radar measurements.

9. **Time Plan**

Preliminary studies will be done until May 1995. First results of the retrieval algorithms will be available at October 1995.

10. **Additional Remarks**

Additional financial support is needed, to purchase the SSM/I data for the PIDCAP study period (see. 8.).

VII Weather Radar Data for PIDCAP

1. **Principal Investigators** J. Riedl (DWD, MOHp)

2. **Institute** German Weather Service (DWD)
Meteorological Observatory Hohenpeissenberg (MOHp)

3. **Participants** I. Doelling

4. **Scientific Objective**

Provision of radar reflectivity data and area precipitation data.

5. **Methodology and Approach**

a) Filter technique investigations (Doppler, statistical) and optimization of the signal processor parameters
b) Topical Z/R-relation derived from Distrometer data
c) Calculation of area precipitation (100 km range) and adjustment by surface rain gauge data (see additional remarks)
d) Extraction of three-dimensional radar reflectivity data from the Rostock radar (see additional remarks)
d) Estimation of the precipitation coverage of the southern Baltic Sea by compositing NORDRAD, Danish and German radar data.

6. **Measurement or Data Collection Plan**

1. November 94 - July 95
   a) Preparation radar Rostock (performance, clutter effects, storage capacity)
   b) Preliminary evaluation Distrometer/Ombrometer data Rostock (and Fehmarn)
   c) Preparation of access to NORDRAD and Danish radar data and to wind data.
2. August 95 - December 95
   a) Operational radar data collection including Distrometer/Ombrometer data (DWD)
   b) Data collection NORDRAD and wind data for selected periods
   c) Calculation of adjusted area precipitation data.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

a) NORDRAD data
b) Ship rain gauge data (L. Hasse, Kiel)
c) Surface rain gauge data (DWD)
d) Wind data (DWD-network, masts and buoys in the Baltic Sea).

9. **Time Plan**

November 94 - July 95 (6.1) and August 95 - December 95 (6.2).

10. **Additional Remarks**

a) To 5c): Adjusted data of daily accumulated area precipitation will be calculated for up to 10 selected days of the period.
b) To 5d): The extraction will be performed for the predetermined satellite passages.

VIII Swedish Weather Radar Data for PIDCAP

1. **Principal Investigators** T. Andersson

2. **Institute** Swedish Meteorological & Hydrological Institute
Research & Development

3. **Participants** T. Andersson, D. Michelson

4. **Scientific Objective**

a) To improve our ability to use radar for analysing precipitation.
- To improve our knowledge of the characteristics and behaviour of precipitation.
- To improve our knowledge of the characteristics and behaviour of clutter types.
- To improve current methodology for identification and removal of artifacts in radar data caused by clutter.

b) To improve our ability to use radar for analysing winds.
- To develop a methodology for utilizing clear air echoes when analysing winds (during warm seasons).

5. **Methodology and Approach**

- Image analysis methods on 2-D PseudoCAPPI imagery.
- Improved methods for analysis and processing of 3-D polar data.
- Improved analysis of vertical reflectivity profiles.

6. **Measurement or Data Collection Plan**

a) NORDRAD composite imagery:
- archive all individual reflectivity and wind images
- generate and archive all composite images
- generate and archive corrected composite images (see point 7).

b) Precipitation from satellites
- archive ZNP volume scans from Gotland, coincident with DMSP SSM/I image acquisitions.

c) UKMO C-130 campaign: week 36 (see project IV in this report)
- archive reflectivity and wind colume scans from the Gotland, Karlskrona and Norrköping radars.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

Knowledge of DMSP SSM/I data asquisition times. (C. Simmer, Kiel, see project V)

9. **Time Plan**

Data collection: August - October 1995.
Data analysis: Autumn - Winter 1995-96.

10. **Additional Remarks**

IX Rain measurements at land stations, daily values

1. **Principal Investigators** — A. Lehmann

2. **Institute** — Deutscher Wetterdienst (DWD) Offenbach
Meteorological Data Centre for BALTEX at DWD

3. **Participants** — R. Luckner

4. **Scientific Objective**

The Meteorological Data Centre for BALTEX will be the service centre for all national and international participants in BALTEX research activities as regards meta-information on data, data collection and data exchange.

PIDCAP should be the first testing phase to develop, test and establish necessary management and analysis procedures.

5. **Methodology and Approach**

MDC obtained information about precipitation data in the BALTEX countries by an questionnaire, which was distributed to all meteorological and hydrological services, participating in BALTEX. The information about delayed data is expected to be not yet complete for some countries. The MDC will contact international participants in order to supply the information.

6. **Measurement or Data Collection Plan**

The BALTEX MDC partly works as a METADATA Centre.
The following types of data are planned to be stored physically at DWD (relating to PIDCAP):
- all data of the German meteorological network
- all data of the PIDCAP area (type SYNOP and TEMP), transmitted in real time via GTS.

The MDC will endeavor to obtain additional delayed precipitation data, measured and stored in the countries participating in PIDCAP.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

The success of taking available additional non-real-time data from abroad will depend on the co-operation of PIDCAP nations.

9. **Time Plan**

Real-time data will be available as quick-look data with only a very short delay.
Non-real-time data of German precipitation network will be available about 2 month's after the end of a measuring period.

10. **Additional Remarks**

X a Validation of model results of precipitation

1. **Principal Investigators** B. Rockel

2. **Institute** GKSS Forschungszentrum Geesthacht

3. **Participants** U. Karstens, R. Nolte-Holube

4. **Scientific Objective**

Validation of the BALTEX Version of the Regional Model (REMO), in particular the validation of the parameterization for rain fall. Computations will be carried out using the physical parameterization routines developed by the German Weather Service (DWD). The results will be compared to measured precipitation rates and the results of the study proposed by the Max-Planck-Institute for Meteorology in Hamburg (MPI), (see proposal IXb) .

5. **Methodology and Approach**

REMO is based on the "Europa-/Deutschland-Modell (EM/DM)" weather forecast models of the DWD. The user can choose between two implemented physics: the original EM/DM and the ECHAM4 physics.

6. **Measurement or Data Collection Plan**

Spatial resolution of precipitation data calculated by REMO is 18 x 18 km^2. Temporal resolution is approximately 5 min; however, a minimum of 1 h for model output is preferred. The output format is either HDF or WMO GRIB1. 30h forecasts will be performed using the hours 6 to 30 for precipitation interpretation.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

Analysis data (six hourly EM initial analysis) of the DWD are required for the selected period. These data are used to run the REMO in low resolution (55 x 55 km^2, l-REMO) that calculated the boundary values for REMO in high resolution (18 x 18 km^2, h-REMO). We are interested in all data relevant for the atmospheric energy budget and water cycle, especially rainfall data.

9. **Time Plan**

Per workday normally we can run one l-REMO/h-REMO combined 30h forecast on the Cray C916 at the German Climate Computing Centre in Hamburg. Therefore, we will need about three months to get all results for the selected period (Aug. - Oct. 1995). If we could get the analysis data by day from the German Weather Service during that period, the results can be obtained latest end of November 95.

10. **Additional Remarks**

X b Validation of model results of precipitation

1. **Principal Investigators** M. Claussen

2. **Institute** Max-Planck-Institut für Meteorologie, Hamburg

3. **Participants** D. Jacob

4. Scientific Objective

Validation of the Regional Model (REMO) with respect to parameterization of processes relevant for rain fall. The parameterization routines implicit in the Hamburg climate model ECHAM4 will be tested and compared with the performance of the routines implicit in the Europa-/Deutschland-Modell (EM/DM) weather forecast models of the German weather service (DWD) (see proposal IXa).

5. Methodology and Approach

REMO is based on the EM/DM weather forecast models of the DWD. REMO includes prognostic equations of temperature, humidity, and liquid water instead of total heat and total water content as used in EM/DM. Two packages of parameterization routines can be chosen: from EM/DM and from ECHAM4.

6. Measurement or Data Collection Plan

Spatial resolution of precipitation data calculated by REMO is 18 x 18 km^2 . Temporal resolution is approximately 2 - 3 min; however, only 1h-mean values are stored as model output. The output is GRIB 1.

7. Analysis Technique

8. Data Requirements, Co-operation

Analysis data (six hourly EM initial analysis) of the DWD are required for the selected period. These data are used as boundary values for REMO. We are interested in all meteorological data (mean sea level pressure, wind, temperature, cloudiness, and, particularly, precipitation) that can be used for comparison with REMO results. Co-operation is planned with DWD and GKSS (see proposal IXa).

9. Time Plan

Under favorable circumstances, it takes approximately one month to simulate one month. Depending on the availability of the EM initial data, the simulations can be finished by December.

10. Additional Remarks

XI Validation of model results of precipitation - HIRLAM at DMI

1. **Principal Investigators** B. Sass

2. **Institute** Danish Meteorological Institute (DMI), Copenhagen

3. **Participants** DMI staff

4. **Scientific Objective**

Validation of the atmospheric water cycle in the HIRLAM forecasting system during the PIDCAP period.

5. **Methodology and Approach**

The most recent version of the HIRLAM analysis and forecast model will be used. The model domain is chosen to agree with that used at SMHI. In addition, this applies to the horizontal and vertical model resolution. The data assimilation and forecasts with the HIRLAM forecasting system will be carried out in delayed mode at DMI in contrast to the procedure applied at SMHI. This method has the advantage that conventional meteorological data that may not be available due to real time cut-off limitations can be utilized in the analyses.

6. **Measurement or Data Collection Plan**

The atmospheric analysis frequency is 6 hours. For validation of the parameterized precipitation it is relevant to consider forecasted precipitation up to a forecast range of at least 24 hours. Such forecasts will be done daily, with precipitation data stored every 3 hours for the BALTEX region. For selected periods the frequency may be increased to one hour.

7. **Analysis Technique**

8. **Data Requirements, Co-operation**

The experience gained from the real time data assimilation and analysis with the HIRLAM system at SMHI will be utilized at DMI. The processing in delayed mode (see the time plan) also enables the utilization of various precipitation data made available to the modelling groups for validation.

9. **Time Plan**

The data assimilation system including extensive diagnostics related to the water cycle is set up during spring 1996. The results of the precipitation validation utilizing other data obtained during PIDCAP should become available one year later.

10. **Additional Remarks**

XII HIRLAM precipitation forecasts for PIDCAP

1. **Principal Investigators**	K.-G. Karlsson
2. **Institute**	Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden
3. **Participants**	K.-I. Ivarsson, K.-G. Karlsson, N. Gustafsson

4. Scientific Objective

Validation of precipitation forecasts from the mesoscale version of the HIRLAM model.

5. Methodology and Approach

HIRLAM is the basic regional weather prediction model used at all the Nordic meteorological institutes. A special version is used at SMHI which includes a prognostic scheme for cloud water (the Sundqvist scheme), an improved radiation scheme and a new physiographic data-base with a better description of roughness and surface characteristics (topography, forest and vegetation types, land and sea fractions in each gridpoint etc.). In this study, a fine-resolution version of HIRLAM will be used having a horizontal resolution of 20 km and including 24 vertical layers.

6. Measurement or Data Collection Plan

The mesoscale HIRLAM version will be run operationally in parallel with the standard version of HIRLAM at the time for the PIDCAP experiment. Precipitation forecasts will be stored and collected for the area of interest. At least two forecast runs will be performed each day (00 UTC and 12 UTC) producing accumulated precipitation in three hour intervals. A higher time resolution (one hour) may alternatively be used.

7. Analysis Technique

Not applicable.

8. Data Requirements, Co-operation

No special requirements.

9. Time Plan

The mesoscale HIRLAM is introduced operationally 15 February 1995. Preparations for the collection of HIRLAM forecasts for the area of interest will be done before August 1995. Results will be compiled in its final form by the end of 1995.

10. Additional Remarks

Special case studies could be introduced for studying particularly interesting weather situations to test parametrization and model formulations.

XIII Gridded mesoscale precipitation data for six hour periods during PIDCAP

1. Principal Investigators	L. Haggmark
2. Institute	Swedish Meteorological and Hydrological Institute (SMHI), Norrköping, Sweden
3. Participants	D. Michelson

4. Scientific Objective

Our objective is to create a database containing gridded analyzed precipitation information for every six hour period, during the BALTEX PIDCAP. The used grid resolution will be 0.1 degree.

5. Methodology and Approach

The analysis is based on optimal interpolation, where consideration is taken to the various data sources specific qualities, such as accuracy and sensor internal pixel correlation.

Analysis will be accomplished by integrating data from NORDRAD, observations from the synoptical and climate station networks, and forecasts from HIRLAM.

6. Measurement or Data Collection Plan

All NORDRAD, synoptical and HIRLAM data generated during the PIDCAP will be saved and used in the analysis.

7. Analysis Technique

Preprocessing of weather radar data before creating NORDRAD composites includes applying automated routines for removal of clutter and anomalous propagation echoes. See point 5 for analysis method.

8. Data Requirements, Co-operation

9. Time Plan

Analysis during the first half of 1996.

10. Additional Remarks

XIV Monthly gridded precipitation data

1. **Principal Investigators** B. Rudolf

2. **Institute** Global Precipitation Climatology Centre
DWD Offenbach/Main

3. **Participants** B. Rudolf

4. Scientific Objective

Monthly gridded area-mean precipitation from different sources, separately, intercompared as well as merged:

- rain-gauge measurements
- IR geosynchr. satellite observations
- DMSP-SSM/I polarorb. satellite observations
- NWP model results
- climatic long-term means.

5. Methodology and Approach

Objective analysis of rain-gauge data by spatial distance/directional interpolation (method SPHEREMAP after Willmott et al.). Satellite based estimates provided by the GPCP Satellite Centres operated by NOAA and NASA (methods: GPI for IR, emission after Wilheit et al. and scattering after Ferraro et al. for SSM/I). Model based accumulated from daily ECMWF results. Grid size 0.5 degree latitude by longitude.

6. Measurement or Data Collection Plan

GTS data (SYNOP and CLIMAT reports) will be prepared to be used in the analysis with delay of about one month after observation. Additional raingauge data from national sources will be prepared with delay of about one month after delivery. The delay of delivery is unknown. Satellite based estimates will be available with a delay of about six months after observation. Model results will be prepared with delay of about one month after forecast.

7. Analysis Technique

See under 5.

8. Data Requirements, Co-operation

Monthly precipitation data from co-operating countries have to be acquired and (partly) digitized by the help of BALTEX secretariat:

600 stations	Germany	100 stations	Latvia
200 stations	Poland	400 stations	Finland
60 stations	Estonia	600 stations	Sweden
100 stations	Lithuania	50 stations	Denmark
2000 stations	Russia	(baltic sea rivers catchment areas)	

9. Time Plan

Gridded single-source estimates will be available one month after data delivery (see 6.). Results of intercomparison studies are expected to be obtained by mid of 1996.

10. Additional Remarks

XV Objective analysis of surface precipitation

1. **Principal Investigators** M. Hantel, F. Rubel

2. **Institute** Institute for Meteorology and Geophysics, Univ. of Vienna - Institute for Medical Physics, VU-Vienna

3. **Participants** M. Hantel, F. Rubel

4. Scientific Objective

Grid point representation of the precipitation field over BALTEX based on rain gauge and radar data.

5. Methodology and Approach

The surface precipitation data routinely available in the SYNOP network will be analysed with the method of optimal averaging (Gandin, 1993). Routinely observed radar data will be used as background field (first guess). This method guarantees optimum use of the radar information (high space/time coverage) and the surface information (high local accuracy).

6. Measurement or Data Collection Plan

Three sources of routinely observed data will be combined for the present project:
(1) Regular SYNOP data;
(2) Radar data (European sources); and
(3) Additional data from the BALTEX Data Centre.

7. Analysis Technique

The technique described in 5. can be run in a coarse mode and in a fine mode. The present coarse mode over Europe has a space/time resolution of 100 km/12 hours, dictated by the SYNOP network. Preliminary runs over Austria in the fine mode (Rubel, 1994) resolve down to 12.5 km and 1 hour in time. The fine mode requires additional climate data; during PIDCAP it shall be further elaborated.

8. Data Requirements, Cooperation

The technique described will be applied for selected cases. To the extent that BALTEX data become accessible the evaluation will be applied to the inner BALTEX area. This requires cooperation with the other PIDCAP groups.

9. Time Plan

- Until end of 1995: Test runs; coarse mode completed.
- 1996: Runs of selected cases in fine mode.

10. Additional Remarks

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6 List of Abbreviations

AMSU	Advanced Microwave Sounding Unit
AVHRR	Advanced Very High Resolution Radiometer
BALTEX	Baltic Sea Experiment
DMI	Danish Meteorological Institute, Copenhagen
DMSP	Defense Meteorological Satellite Programme
DWD	Deutscher Wetterdienst, Offenbach
ECHAM	European Climate Model - Hamburg version
ECMWF	European Center for Medium Range Weather Forecast, Reading
EM / DM	Europa Model / Deutschland Model
GESIMA	Geesthachter Simulations Model der Atmosphäre
GKSS	GKSS Research Center Geesthacht
GOES	Geostationary Operational Environmental Satellite
GPCP	Global Precipitation Climatology Project
GPI	GOES Precipitation Index
GRIB	Grid in Binary Format
GTS	Global Telecommunication System
HDF	Hierarchical Data Format
HIRLAM	High Resolution Limited Area Model
IfM	Institut für Meereskunde, Kiel
IR	Infrared
LWP	Liquid Water Path
MDC	Meteorological Data Centre
METEOSAT	European meteorological satellite series of EUMETSAT
MIMR	Multi-frequency Imaging Microwave Radiometer
MOHp	Meteorological Observatory Hohenpeissenberg
MPIfM	Max Planck Institut für Meteorologie, Hamburg
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NORDRAD	Nordic Weather Radar Network
NWF	Numerical Weather Forecast
NWP	Numerical Weather Prediction
PIDCAP	Pilot Study for Intensive Data Collection and Analysis of Precipitation
RT	Radiative Transfer
REMO	Regional Model
SMHI	Swedish Meteorological and Hydrological Institute, Norrköping
SPHEREMAP	Interpolation method
SSM/I	Special Sensor Microwave/Imager
SST	Sea Surface Temperature
TB	Brightness Temperature
UKMO	United Kingdom Meteorological Office
VIS	Visible
WMO	World Meteorological Organization

Appendix 13

Deutscher Wetterdienst
BALTEX-MDC

SSG-Meeting
Visby, 1995, August

BALTEX-MDC

OBJECT AND NATURE OF TASK

A meteorological data centre has been set up at the DWD for the BALTEX international research project (which is expected to run until about the year 2002). The BALTEX-MDC acts as service centre for all national and international institutions participating in the research project.

The BALTEX-MDC coordinates the collection and exchange of project-related data and information relevant to the data (metadata) from the BALTEX area. The realization of data assimilation and the compilation of water and energy balances in the BALTEX-MDC is planned as from summer 1996.

The BALTEX-MDC uses the infrastructure and the routine services of the DWD.

The tasks and performance of the BALTEX-MDC are limited to the personnel and materials available.

Decisions of the BALTEX-SSG are necessary for the further activities of the BALTEX-MDC. The problems conserned are marked in the following.

1. DATA MANAGEMENT

The BALTEX-MDC works partly as a real and partly as virtual data centre. It collects and stores selected observation data from the BALTEX area and information on observation data that are additionally available in the participating countries and provides these to the institutions participating in the BALTEX research project upon request.

1.1 Real data storage

A real data management and an international data archive is planned for the BALTEX area in the DWD/BALTEX-MDC for selected data types from conventional routine observations, which are considered to be indispensable for a large number of research collectives and tasks. In addition, all data archives available at the DWD on a routine basis can be used for the BALTEX project.

The BALTEX area is defined in the stricter sense as the hydrological Baltic Sea catchment area (Baltic Catchment Area - BACAR). Its boundaries are depicted in fig. 1.

The BALTEX-HDC is asked to give precise details of the extent of the boundaries (desirable resolution: 1 km)

A BALTEX Model Area (BAMAR) has been defined for special tasks (modelling). The position and extent of the BAMAR can be seen in fig. 2. The definition of the BAMAR is geared to the data assimilation which is planned to be conducted using the BALTEX model (BM) of the DWD.

All BALTEX-MDC activities concerning data collection, storage and release refer to the project period, i.e. no data from previous periods (e.g. test periods 1986/87 or 1992/93) and no climatological series are held. This restriction does not apply to the routine data storage carried out at the DWD (see 1.1.1).

The real data storage for BALTEX will take place from a set date for the rest of the project period. Storage will begin at 01.01.96 for all data ecxept nrt-precipitation-data with respect to PIDCAP (set date 01.08.95). The year 2002 is taken as the end of the project period. The collected data will be available after the end of the project period (see data policy).

1.1.1 Real-Time-Data (rt-data)

rt-data are required especially for the data assimilation in using models.

All reports of the following types from the BAMAR distributed via the GTS are stored at the DWD on a routine basis:

SYNOP (FM12), SHIP (FM13), METAR (FM15), SPECI (FM16), BUOY (FM18), PILOT (FM32), PILOT SHIP (FM33), TEMP (FM35), TEMP SHIP (FM36), CODAR (FM41), AMDAR (FM42), CLIMAT (FM71), CLIMAT SHIP (FM72), SATEM (FM86), SATOB (FM88)

The data are stored synoptically. The data are also available for the BALTEX testing periods of 1986/87 and 1992/93.

BALTEX DATA STORAGE: Observation data from the aforementioned categories additionally provided by the countries. Start of data storage: 01.01.96.

The SSG is asked for its support in requesting the countries to privide their observational data in a maximal possible extent via GTS (additional stations and most possible completeness of reports).

1.1.2 Non-Real-Time Data (nrt-data)

nrt-data are required mainly for verification purposes, case studies and for climatological statements. The following data types are planned for a real storage:

a) indispensable: precipitation data (6h totals, 12h totals, diurnal totals)
b) desirable: soil temperature at various depths
soil moisture at various depths
radiation data (daily sums)

Supply of nrt-data on media or via data line.
Estimated time delay: 3-6 months.

Set date: generally 01.01.96. for precipitation 01.08.95.

The SSG is asked for its support in seeing that the countries provide the aforementioned nrt-data as from the set date.

The following concrete agreements are necessary for the supply:

i) willingness in principle of the provider countries

ii) adherence to regulations of procedure
- station identification, formats, failure identification
- dates
- quality guarantee of the provider country

iii) right of use

1.1.3 External parameters

For modelling purposes the following fields of external parameters are taken for the BAMAR (grid point values with a resolution of 1/6 degrees):
- topography
- parameters for describing the type of soil
- parameters for describing the vegetation

Topography data with a resolution of 30 x 30 sec. (approx. 1 x 1 km) are available for a large part of the BAMAR (data record of the UKMO).

1.2 Virtual data storage

Data types:

- data from measurement campaigns / BALTEX field experiments
- non-conventional observations:
  radar data
  satellite data
- observation data from climatological stations (usually 3 times/day), with the exception of precipitation, soil temperature, soil moisture, radiation.
- finely resolved precipitation and radiation data (resolution $\leq$ 1 hour)
- special measurements at observatories

As the diversity of the data possible here is very large, the information should be limited to basic data:

- data definition
- site of measurement / spatial resolution
- measuring principles/instrument
- period of measurement
- temporal resolution
- data availability/usability
- dataset owner/contact person

Further special information about data should be asked from the owner of a data set.

The SSG is asked to confirm the selection of real and virtual data to be stored as well as the periods of storage.

2. Data policy

The SSG is asked to make a decision on the following proposals for data policy:

1) The principles on the use of the data are laid down in formal obligations
   i) of the DWD to the provider country
   ii) of the user to the DWD/BALTEX-MDC (enclosures 1 and 2).

2) The data suppliers assume responsibility for the quality guarantee for their data.

3) The BALTEX-MDC provides guidelines for the data supply.

4) The foreign data are to be destroyed by the user upon completion of the research activities. The destruction is to be reported to the BALTEX-MDC.

5) The collected data will be kept at BALTEX-MDC for xx years after completion of the whole project and made available upon request. Towards the end of the project the SSG will decide on the future storage of the data.

Appendix 14

Bengt Carlsson
SMHI

1995-08-20

BALTEX Hydrological data-base

Hydrological data is stored in Paradox data base. The size is 1-2 MB.

The data base consists of:

- Monthly runoff from gauge stations, m^3/s.
- Calculated monthly runoff for coast-segments, m^3/s.

Total number of segments around the Baltic sea is 122.

Time period: 1950-93.

All calculations of coastal runoff, except the Danish, are made at SMHI.

Sweden:

No separate gauge data. 40 segments are calculated accordingly to best selection of gauge stations.

Finland:

Coastal runoff calculated from gauge data from 30 runoff stations. Data supplied by National Board of Waters and Environment.

Russia-Estonia-Latvia-Lithuania:

Coastal runoff calculated from gauge data from ten runoff stations. 1950-c1989 data supplied by State Hydrological Institute. After ca 1989 also by EMHI, LMHA and LBHM.

Poland:

Coastal runoff calculated from gauge data from nine runoff stations. Data supplied by Institute of Meteorology and Water Management.

Germany:

Coastal runoff calculated from gauge data from two runoff stations. Data supplied by Bundesanstalt für Gewässerkunde.

Denmark:

No separate gauge data. Nine coast-segments are calculated accordingly to best selection of gauge stations. The calculations are made by Fagdatacenter for Hydrometriske Data, Hedeselskabet.

Data delivered to:

Department of Systems Ecology, University of Stockholm, Sweden.

Department of Water and Environment Studies, University of Linköping, Sweden.

Umeå Marine Sciences, University of Umeå, Sweden.

National Board of Waters and Environment, Finland.

Institut für Meereskunde an der Universität Kiel, Germany.

Max Planck Institute for Meteorology, Germany.

Institut für Ostseeforschung Warnemünde, Germany.

References (from SMHI):

Carlsson, B. (1992). Fresh water runoff to the Baltic Sea from surrounding land-areas. Nordic Hydrological Conference, Alta 1992. NHP-report No 30.

Bergström, S., and Carlsson, B. (1993). Hydrology of the Baltic Basin. Inflow of fresh water from rivers and land for the period 1950-1990. SMHI Reports Hydrology. No 7.

Bergström, S., and Carlsson, B. (1993). River Runoff to the Baltic Sea: 1950-1990. Ambio, 23, pp 280-287.

Appendix 15

New Staff Member at the International BALTEX Secretariat

BALTEX is growing; its Initial Implementation Plan foresees sequences of experimental and modelling investigations. More research groups express their interest to participate.

Therefore, Rüdiger Brandt (28), the second scientific staff member in the International BALTEX Secretariat, came just at the right time to help Dr. Hans-Jörg Isemer and Wiebke Jansen (secretarial staff) in their work to keep BALTEX rolling. Rüdiger is a graduate of the University Hannover and finished his Diploma in Meteorology (equ. to Masters Degree) with research on the energy balance over different types of sea ice in the Weddell Sea.

His responsibilities will now concentrate on the management of research on land-surface processes. Particular attention is required for collecting and validating operational measurements which are essential to investigate and improve the performance of the BALTEX regional scale models. Such surface observations are much more frequently available in different national data centers, compared to the international available routine weather services reports, they need particular attention.

Rüdiger Brandt's coordinates are:

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International BALTEX Secretariat Publication Series

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

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

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

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

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

Copies are available upon request at the International BALTEX Secretariat.