BALTEX Newsletter

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WCRP GEWEX

Towards integration of research efforts of Baltic Sea marine research communities in the field of developing knowledge based downstream services

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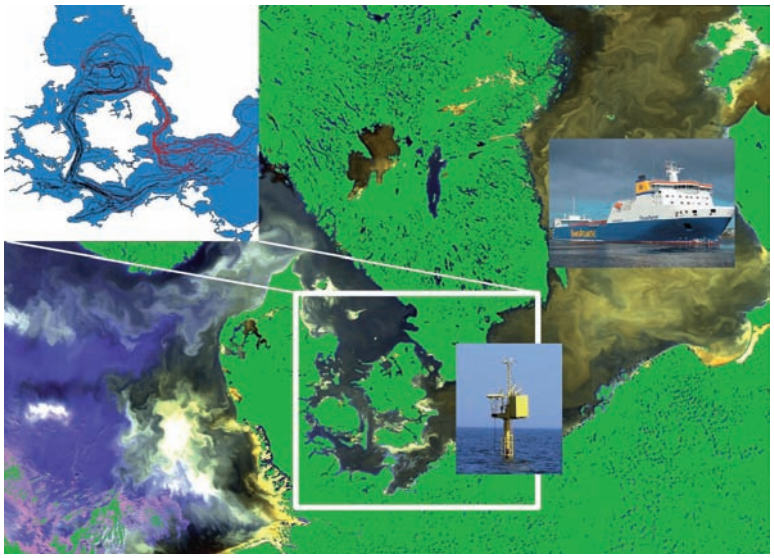
Motivation



Global Monitoring for Environment and Security (GMES) is a joint initiative of the European Commission and European Space Agency, which aims at achieving an autonomous and operational Earth observation capacity. MyOcean (www.myocean.eu.org) is a project granted by the European Commission within the GMES. Major developments in the frame of this project concern (1) marine safety, (2) marine resources, (3) coastal and marine environment and (4) weather, climate and seasonal forecasting. MyOcean provides Marine Core Services (MCS) consisting of regular and systematic reference information on the state of the oceans and European regional seas. It is foreseen that these services be fully operational by 2014.

Marine downstream services (MDS) are value adding information services and are built on top of the GMES core services. They address regional and near-coastal issues and are more detailed and specific than MCS. With few exceptions, coastal and inshore waters are not covered by the European wide activities such as MyOcean, and are left in most cases to the initiative of individual countries. The need to ensure the up-to-date science based support for MDS in the region of Baltic Sea is the main motivation for the initiative described below.

Marine observations in the coastal region have a strong potential to contribute to developing MDS (www.ecoop.eu) and are an important building block for the development of MCS. This potential is however not enough quantified and objectively assessed. In some European countries, infrastructures have been put in

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place (e.g. COSYNA, Liverpool Bay Observatory, etc.) providing automatic measurements with the help of new sensors, acquisition devices, and real-time transmission. There is potential for a successful technological and research transfer towards the Baltic Sea region where there exist established coordinated monitoring programmes such as HELCOM. There is a need to objectively assess quality and performance of observational networks in the Baltic Sea using instruments from numerical modelling and statistics with the aim to improve their functionality and cost-effectiveness. This should enable the existing networks to be further optimised, in terms of information return and cost-benefit.

Recent development

The Research Network "Assessment of coastal observing systems in the Baltic Sea: on the route to developing science based coastal services" (ACOAST-Baltic), funded by the German Federal Ministry of Education and Research (BMBF) is coordinated by the Helmholtz-Zentrum Geesthacht, Germany. The principal foreign partner is DMI, the Danish Meteorological Institute. Other partners are the Institute of Hydro-Engineering of the Polish Academy of Sciences, (IBW-PAN) and the Institute of Cybernetics at Tallinn University of Technology, Estonia. The kickoff meeting in Lauenburg, which was held on 2-3 February 2011 with a participation of 23 scientists from Baltic Sea countries was the first step towards enlarging this initial network by involving relevant experts from the Baltic Sea scientific community, with the aim of developing joint future actions.

Activities undertaken in the frame of the ACOAST-Baltic network aim at contributing to operational oceanography and are concerned with modern coastal observatories. The consolidation of relevant expertise among Baltic Sea agencies and research institutes and the import of scientific knowledge and technologies from other ocean areas (e. g. the North Sea) to the Baltic Sea are among the major objectives.

Improving the quality of science based coastal products is the principle aim of the Network. Research activities based on statistical and numerical techniques will provide a demonstration of (1) feasibility for optimisation of deployment of sensors, as well as (2) preliminary analyses of the expected outcome of using new observational platforms (High Frequency (HF) radars, FerryBoxes, and other automated systems). The new developments in ACOAST-Baltic Network along with up-to-date information management will permit developing follow-up activities aiming at reducing the uncertainty of ecosystem state predictions (including ecosystem pressures, state and impacts), and enable optimal societal responses.

One important objective of the on-going ACOAST-Baltic Network is to set up a consortium preparing the future steps toward developing a BONUS project for targeted coastal and open Baltic Sea areas, demonstrating the benefit of science-based MCS and MDS.

Rationale and future actions

a. The proposed initiative to prepare a BONUS project is based on the (1) unique experience of partners from operational agencies, research institutes and SMEs, (2) their leading role in similar activities (ECOOP, MyOcean, FIELD_AC, Balticway, Jerico), (3) available infrastructures and observing platforms in the Baltic Sea and elsewhere.

b. The main objective for the initiative is to set up a network of smart coastal observatories in targeted coastal areas based on common standards, research developments and operational principles.

c. A major consideration is that there is no Europe-wide or Baltic Sea scale activity in the field of synergy between numerical modelling and observations with a focus on coastal areas. The proposed activity will not duplicate similar activities in MyOcean or ongoing Baltic Sea activities, but will add value by emphasizing on a number of coastal observatories. It will thus look at regional scales for optimising the large scale (HELCOM) monitoring network, and sub-regional scales (important areas such as Straits and Sills or sub-basins such as Arkona, Bornholm, etc.) for the added value available from high resolution measurements, models and products.

d. Coastal marine services cannot be fully separated from the regional (basin-wide) ones, and an important potential exists in the interaction with MyOcean and other regional activities.

e. The timeliness of the proposed initiative is reflected by the identified vulnerability of the Baltic Sea to negative anthropogenic and climate change impacts (e. g. accelerated coastal erosion, negative biodiversity change and reduction of habitats).

f. Both physical and biogeochemical aspects are of vital importance for the proposed activity. The coastal transition region plays an important role for the exchange of matter and is in the focus of interest.

g. Intermediate or end-users will test the applicability and usefulness of the project outcomes for developing new services or future strategies.

h. Improved interaction with end-users, stakeholders and international bodies is one important prerequisite for the success as a BONUS project.

i. Innovation developed in the framework of the proposed project will secure and strengthen the leading role of Baltic Sea community in European and worldwide coastal and regional oceanographic activities.

Research instruments

a. Modelling/statistics
The proposed activity exploits and develops capabilities based on partners' contributions concerning the quality of observational networks. In order to extract most of the information from the coastal observing systems and to optimise investments it is necessary to evaluate the impact of each individual observing platform ensuring that the information content be as wide and multi-purpose as possible. A traditional approach to optimise the observational system is based on essentially subjective estimates of the long term characteristics of the dynamical processes in the coastal area. Observing System Experiments (OSE) are objective methods that allow an estimation of the impact of existing observational systems, while Observing System Simulation Experiments (OSSE) estimate the impact of planned observational data sets. OSE and OSSE combine the information from the observations with model dynamics and evaluate how much each observational platform contributes to the accuracy of the forecast. The network partners have developed expertise in these techniques during the recent years (www.noos.cc/ODON/products/projrep/she2006e.pdf).

b. Observations
The success of the initiative is dependent on the use of both existing and new data. The major strategies are to: (a) optimise the use of available information, (b) to use available frameworks of data management, provision and exchange, and not to build parallel ones, (c) to check the outcome of "mobility" of stations and provision of new sensors, (d) to carry out feasibility analysis of the benefit from new observations.

c. The possible benefit from using HF radars, gliders, buoys and towed platforms for scientific development and solving practical problems needs to be further justified. Furthermore, the synergy and complementarity between satellite and in situ data needs more consideration, in particular in the field of biogeochemical applications. Planned activities will be based on and linked to existing operational and science data repositories and systems. Therefore, the active involvement of the Baltic Operational Observation System (BOOS) and other relevant communities and platforms (Seadatanet, MyOcean, BALTEX etc.) is needed. The project will initiate some coastal observatories using automatic measurement stations and novel observations aiming to unify methods, test observation strategies and fill gaps. Innovative and collective use of existing infrastructures, platforms and instruments from partners is foreseen, in particular HF and X-Band radars, other local coastal observations addressing coastal erosion, related assessment and observational design issues. Focus will be put on "where to put new instruments", "new cost-effective technologies" and "adaptive sampling". Potential for setting up future EU infrastructure for the Baltic Sea will be addressed.

Acknowledgements

This article is based on a white paper prepared following the discussion during the meeting in Lauenburg, 2-3 February 2011. The authors would like to thank Johannes Schulz-Stellenfleth and Ingeborg Nöhren for developing ideas whilst preparing the network, and the partners of the network attending the Lauenburg meeting for useful comments and contributions.

A sunny 6th Study Conference on BALTEX on Wolin, the Polish Baltic Sea island

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The weather gods seem to like BALTEX conferences. As already enjoyed during the 4th Study Conference on Bornholm, Denmark, and the 5th on Saaremaa, Estonia, the sun shone from a deep blue sky during most of the 6th BALTEX Study Conference, 14 to 18 June 2010, on Wolin, the only Polish Baltic Sea island. The beautiful location on the fine sandy beach of Wolin, together with the brilliant weather including beautiful sunsets over the sea, contributed to the good spirit.

The conference was attended by 120 participants from 14 countries, mostly from states in the Baltic Sea basin: Poland, Germany, Sweden, Estonia, Russia, Finland, Latvia, Lithuania, Belarus and Denmark, but also from other countries such as Switzerland, Serbia and the USA. 69 oral presentations and 38 posters were presented, spanning the scope of BALTEX research: regional climate change, water, energy and biogeochemical cycles and transport processes in the regional Earth system, as well as water management and extreme hydrological events. Almost 2/3 of the contributions addressed cross-discipline topics, underlining the interdisciplinary nature of the conference and BALTEX in general.

A number of presentations under the session heading "Climate variability and change in the past and future" dealt with the

Participants of the 6th Study Conference on BALTEX, 14-18 June in Międzyzdroje, Wolin, Poland

question of sea level rise in the Baltic Sea. It was shown that post-glacial land uplift will probably out-compete sea level rise in the northern Baltic Sea for at least the next 50 years; however, the southern Baltic Sea coasts of Denmark, Germany and Poland experience no land uplift, but a slight depression. This makes these regions especially vulnerable for sea level rise, calling for specific adaptation measures. An important unsolved question is whether or not sea level rise will accelerate in the future.

A second emphasis of this session was an overview over recent efforts in regional climate modeling in the Baltic Sea basin, with a special view on uncertainties and detection and attribution studies. The session on "Water, energy and biogeochemical cycles in the regional Earth system" featured several presentations on nutrient and carbon cycles and budgets (including studies on seawater pH and acidification), as well as modeling efforts. It was also shown that new and efficient waste water treatment plans built in Poland in the last two decades have caused a significant decrease of nutrient inputs to the Baltic Sea through the Polish rivers Odra and Vistula. This could be a great leap forward in reducing eutrophication in the Baltic Sea. The session on "Hydrological modeling, water management and extreme hydrological events" featured presentations on the variability of extreme events like storm surges, droughts and extreme precipitation, and recent attempts to forecast those events. A new project to exploit high-resolution modeling of surface currents for environmental management of the Baltic Sea (optimization of ship routing, identification of environmental risk areas, etc.) was introduced in several presentations.

Finally, a dedicated session on "Regional adaptation to climate change" presented examples of regional adaptation projects in Northern Europe. A special highlight was a multimedia presentation designed to be presented in a multimedia theatre dome, with the aim of demonstrating scientific findings on global and regional climate change in a comprehensive way to non-experts.

The conference proceedings volume with extended abstracts of all presentations is available on the conference website:

www.baltex-research.eu/wolin2010

OCEANOLOGIA

„Changing Water, Energy and Biogeochemical Cycles in the Baltic Sea Basin": Thematic Issue of OCEANOLOGIA on the Wolin conference to be published in June 2011

Following the conference on Wolin, it was announced in good tradition that a special issue on the BALTEX conference would be published, this time in the Polish journal OCEANOLOGIA. Many speakers took the opportunity and re-worked their presentations into manuscripts. Of initially submitted 21 manuscripts, 15 papers were selected for the issue, based on the journal´s peer review procedure. Authors and titles can be found on page 18 of this Newsletter.

New regional climate change assessment reports for northern Europe

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Scientific knowledge on environmental issues in the Baltic Sea region is scattered in research institutions all over northern Europe, in a form largely unavailable to stakeholders, regional decision makers and the general public. A way to improve the situation is the establishment of comprehensive reviews. However, review articles or books mostly focus on specific topics and are authored by one or few "gurus", portraying their specific view on the subject. Also, they are mostly addressed to the scientific community.

A different, IPCC-similar approach is followed by regional climate assessment reports, for which the BACC report (BALTEX "Assessment of Climate Change for the Baltic Sea basin", 2008) is exemplary. The reports, which are written by a diverse group of experts led by few responsible lead authors, assemble the published legitimate scientific knowledge on climate change and the possible impacts on the environment in a specific region, including socio-economic implications. All chapters are subject to an independent peer review process.

The essential philosophy of this "BACC-type" assessment report is that only legitimate scientific literature should be used. That includes peer-reviewed articles in scientific journals, institutional reports and conference proceedings, but it excludes reports or articles from parties with a vested interest, be it NGOs, multinational enterprises or insurance companies. The goal should be the "objective" description of the current state of scientific knowledge. If a consensus view cannot be found in the literature, i.e. a topic is controversially debated among scientists, it should be clearly stated in the text, shortly introducing the different viewpoints of the debate. In this respect, the authors take the role of uninvolved scientists who somehow float above the scene and describe what they see, subordinating personal opinions as far as possible. While this latter claim may be not so easy to live up to as all scientists have their personal views of their research field, it warrants that unpopular (but possibly scientifically sound) opinions will not be ignored. Mainstream scientific paradigms have been challenged before and at times needed drastic revisions. Thus it is essential to keep an open but critical eye and mind towards differing opinions.

Following the BACC book, a regional climate change assessment report was published for the Hamburg region (the "Klimabericht für die Metropolregion Hamburg", Springer 2010), and two further reports of the same style are currently in preparation: The „North Sea Region Climate Change Assessment" (NOSCCA), and an update to the BACC book (BACC II). They are briefly described below.

First climate assessment report for the metropolitan region of Hamburg

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In December 2010, a climate assessment report for the metropolitan region of Hamburg, Northern Germany, was published with Springer. Following the BACC report of 2008, this is the second regional climate assessment report which summarizes the current state of research about climate change and its impacts in a specific region in Northern Europe.

The author team consisted of 14 lead authors and 23 contributing authors from relevant scientific disciplines ranging from meteorology, hydrology, hydraulic engineering, coastal and marine science to agriculture, urban planning and tourism.

The authors compiled relevant information from more than 800 scientific publications, documenting past climate changes as well as describing scenarios for the future and estimating impacts for the environment and the economy. This report, which is available only in German, provides the basis for the development of adaptation strategies to climate change in the metropolitan region of Hamburg. The assessment was initiated by a common project of the KlimaCampus Hamburg and the "Coordination Office Climate Protection" (Leitstelle Klimaschutz) of the Agency for Urban Development and Environment of Hamburg (Behörde für Stadtentwicklung und Umwelt), which was started in 2008, and is a joint product of the "Excellence Cluster" CliSAP (Integrated Climate System Analysis and Prediction) at Hamburg University, various university and research institutes, and federal agencies.

The project was led by a scientific steering committee, directed by Hans von Storch of Helmholtz-Zentrum Geesthacht, and coordinated by the "Norddeutsches Klimabüro", also located at Helmholtz-Zentrum Geesthacht. An updated version of the report is planned for 2015. A summary (in German) is available as handy

little booklet. For print and online versions of the report as well as further information, please refer to www.klimabericht-hamburg.de.

www.klimabericht-hamburg.de

NOSCCA: A Climate Change Assessment report for the North Sea Region

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A well received assessment report about climate change in the Baltic Sea drainage basin was published in 2008 (known as BACC-report; BACC Author Team, 2008). Based on the positive experience with BACC and the importance of the area for north-western Europe, a similar assessment report was started for the North Sea region. The initiative is called North Sea Region Climate Change Assessment, or in short NOSCCA.

The North Sea and its adjacent areas host unique and rich ecosystems, provide numerous services to human society and mediate important matter fluxes, which have impacts on regional water quality as well as on the regional climate. The North Sea is surrounded by densely populated, highly industrialized countries. Approximately 184 million people live within the North Sea catchment area. The North Sea is heavily exploited both by fisheries and gas and oil exploitation, and is among the busiest seas in the world. It holds the largest oil and gas reserves in Europe. The North Sea and bordering terrestrial landmasses currently experience transformations in response to anthropogenic activities and global change. Managing authorities, policy makers, industry, scientists and the public ask for reliable scenarios of those changes. NOSCCA will document the legitimate scientific knowledge on past and possible future climate change in the North Sea and adjacent areas as well as related impacts on ecosystems and socio-economic sectors. It will be a complete climate change assessment from published scientific work with a regional IPCC-like evaluation and review process. The initiative was initiated by the Institute of Coastal Research of the Helmholtz-Zentrum Geesthacht in Germany, and is led by a scientific steering committee (SSC), consisting of international independent scientists from climate related disciplines such as oceanography, atmospheric science, climatology, marine and terrestrial ecology.

A broad range of topics is considered in order to build up a comprehensive view on all aspects of and related to changing climate. Themes to be incorporated are past and current climate change, projection of future anthropogenic climate change, climate related changes in marine, terrestrial and freshwater ecosystems. Additionally, climate change impacts on the socio-economic areas of fisheries, coastal zone management, coastal defense, urban climate, recreation/tourism, and air pollution will be reviewed. The different topics will be structured into individual chapters to be compiled by an international author team chaired by one or two lead authors. An integrated summary for policy makers will be prepared by the group of lead authors.

The region of interest is the North Sea bordering the North Atlantic and the Baltic Sea (Skagerrak, Kattegat), as well as the riparian countries. The North Sea area follows the OSPAR Greater North Sea definition (OSPAR region

II), and the land areas considered are those dominated by maritime influence which to a certain extent represent catchment areas of major discharging rivers. The project is set up to assemble, integrate and assess available knowledge of past (mainly post glacial), current, and expected future (100-300 years) climate change and its impacts.

Participating scientists will be from universities, public research institutions, and international science programmes. A close co-operation with relevant international organisations such as LOICZ (NOSCCA is an affiliated project) and ICES is of great importance for the initiative. Exchange of information with OSPAR is intended. The Institute of Coastal Research of the Helmholtz-Zentrum Geesthacht is coordinating the project, supported by the LOICZ International Project Office and the "Norddeutsches Klimabüro", both also located at Helmholtz-Zentrum Geesthacht. The international scientific steering committee has approved the NOSCCA plan during its first meeting in October 2010, and all chapter lead authors have now been identified. A combined SSC/lead author meeting will take place at the beginning of October 2011 in Amsterdam, The Netherlands.

It should be stated that NOSCCA is meant to be an assessment of knowledge on climate change and not an assessment of climate change as such. The final product will be a book planned to be released by a scientific publisher in 2014.

Reference

BACC Author Team (2008) Assessment of Climate Change for the Baltic Sea. Regional Climate Studies, Springer-Verlag Berlin Heidelberg. 473 pp.

www.noscca.org

BACC II well on its way

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The update to the BACC book has now entered the writing phase. After the kick-off meeting in Helsinki in 2009, an Science Steering Committee meeting in Lund, and two lead author team meetings in Gothenburg 2010 and Hamburg 2011, the preparatory phase is now successfully completed and the actual work on the chapters is now bound to start. Issues which had to be settled were the recruitment of lead and contributing authors, and the establishment of the final book chapter structure. This new structure differs from the first BACC book: New chapters include past climate variability in the pre- and early historical time frame (10.000 yrs and 1.000 yrs back, respectively), a more extensive analysis of sea level changes in the Baltic Sea, and an in-depth reflection of socio-economic impacts, like on agriculture and forestry, fisheries and aquaculture, coastline changes and urban complexes. The question of attribution, i.e. which factors can be pinpointed to contribute to regional climate change, will be treated in a separate chapter. Here, aerosols (natural and pollutants) and land cover changes will be investigated as alternative drivers. Currently, 3 annexes are planned for the BACC II book: 1. A new survey on Baltic Sea region climate scientists on consensus and dissensus in the scientific community on important regional climate change issues; 2. An interdisciplinary overview of the Baltic Sea drainage basin (the geographical limits of BACC), and 3. A description of the concept of detection and attribution. A comprehensible summary will make the essential information available to non-scientists.

The BACC II chapter structure can be viewed at :

www.baltex-research.eu/BACC2

The overall success of this project depends on the commitment of all participating authors. In that respect, it is hoped that this endeavour will be rewarding not only for the scientific community in the Baltic Sea region at large, but also for the authors themselves.

The BACC Blog

The BACC Blog is a platform to exchange views and comments about the BACC project (BALTEX Assessment of Climate Change for the Baltic Sea Basin), and on climate change related issues in the Baltic Sea region in general.

thebaccblog.blogspot.com

A survey of political stakeholders' perceptions of climate change and adaptation in the Baltic Sea region (PolPer: Baltic 2011)

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We are attempting to discover how communication between decision makers and scientists can be improved. From the perspectives of regional decision makers, we wish to explore.

1. the perceptions of regional decision makers concerning climate change,
2. perceptions of the level of satisfaction with the interaction between science and policy in the issue of adaptation to climate change in the Baltic region,
3. the perceptions of adaptation measures to other environmental issues (e.g. sea level rise in the Baltic region), and
4. the perceptions of environmental threats to the Baltic region.

Furthermore, using the results of "SurBACC 2010: A Survey of the perceptions of climate scientists concerning climate change and climate science in the Baltic Sea basin" (Bray 2010, download at *www.baltex-research.eu/BACC*), a completed BALTEX project, it will be possible to discern levels of disparity between knowledge production and knowledge utilization. The results of the survey have the potential to provide a service to both the policy communities and the science community by

1 identifying the differences between the knowledge needs of policy makers and the knowledge provided by science,
2. suggesting new patterns of communication between science and policy, and
3. identifying knowledge gaps that hinder political decisions.

The first stage of the research is well underway. A sample of approximately 1600 political decision makers at local levels has been compiled for the German Baltic Sea region. The survey questionnaire has been developed. It is hoped that the survey will be distributed by the end of February 2011 and preliminary results compiled by the end of May 2011. The second stage of the project will enlarge the sample to include the full international community in the Baltic Sea region, as defined in the BACC Report (2008).

NEESPI, the Northern Eurasia Earth Sciences Partnership Initiative - Current status

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Background

Six years ago, NEESPI was established to address large-scale and long-term manifestations of climate and environmental change in Northern Eurasia (Groisman et al. 2009). The NEESPI web site (*neespi.org*) describes the history of NEESPI, and contains presentations at past NEESPI conferences, the NEESPI Science Plan (260 pp.) and its executive summary (18 pp.; also dubbed as a refereed publication in the NEESPI special issue of "Global and Planetary Change", Groisman and Bartalev 2007). The NEESPI Science Plan includes elements of the four Earth System Science Partnership (ESSP) programmes: WCRP, IGBP, IHDP and DIVERSITAS. Currently, NEESPI is widely recognized and endorsed by several ESSP programmes and projects: the International Geosphere and Biosphere Programme (IGBP), the World Climate Research Programme (WCRP) through the Global Energy and Water Cycle Experiment (GEWEX) and Climate and Cryosphere (CliC) projects, the Global Water System Project (GESP), the Global Carbon (GCP) and Global Land (GLP) projects, and the Integrated Land Ecosystem—Atmosphere Processes Study (ILEAPS). NEESPI has also become an entity in intergovernmental collaboration plans in the United States, Russia, and the Ukraine. The geographic domain of NEESPI is shown in Figure 1.

Figure 1. Land cover map of the NEESPI region

Current NEESPI status

Throughout its duration, NEESPI has served as an umbrella for about 140 individual research projects (always with an international participation), with an annual budget close to 15 million US Dollars (Figure 2). More than 680 scientists from more than 200 institutions in 30 countries have worked under the NEESPI umbrella. Currently, the initiative is in full swing. A new crop of NEESPI projects was launched in 2010 to compensate for the projects which have been completed, so that the total number of the ongoing NEESPI projects (76) changed slightly compared to its peak (87 in 2008). More and more, joint research, field studies, fruitful consultations, and integration efforts are paving the way to the front of the NEESP Initiative, with a new focus objective agreed upon at the NEESPI International Workshop organized by the Aspen Global Change Institute (August 2007; n*eespi.org/meetings/Aspen2007_Workshop_Report_web.pdf*/). This objective is to build up a suite of regional climatic, hydrological, environmental, and land use models, well linked to global change models that can be used for comprehensive projections of environmental and climatic changes within Northern Eurasia and estimate regional feedbacks to the global climate and the environment.

NEESPI Data distribution and outreach.

NEESPI keeps promoting data exchange among the NEESPI participants via the existing NEESPI Science and Data Support Centers in Russia, China, and the United States. The results of this data exchange materialized in a new set of publications and conference presentations, showing the current use of these data. In 2010, a new data analysis and exploring system for the hydrology of the NEESPI domain, developed by the Water Systems Analysis Group at University of New Hampshire – Durham, has become a stellar addition to the NEESPI data distribution services. An unrestricted web-based access to the system makes it a useful tool for any hydrological assessment within Northern Eurasia (neespi.sr.unh.edu/maps/).

The year 2010 was extremely productive in NEESPI outreach. Several PhD students defended their thesis while working within the NEESPI framework. In 2010, more than 150 peer-reviewed papers and/or book chapters were published or are in press (the list is still incomplete and is anticipated to increase, see *neespi.org/science/NEESPI_publications.pdf*). In particular, a suite of 34 peer-reviewed NEESPI articles were published in the third special issue on NEESPI in Environmental Research Letters (2009, No. 4, and 2010, No.1), and several books and White Papers were published by Springer (Balzter 2010; Gutman and Reissell 2011), the National Academy of Science of Ukraine (Lyalko 2010),

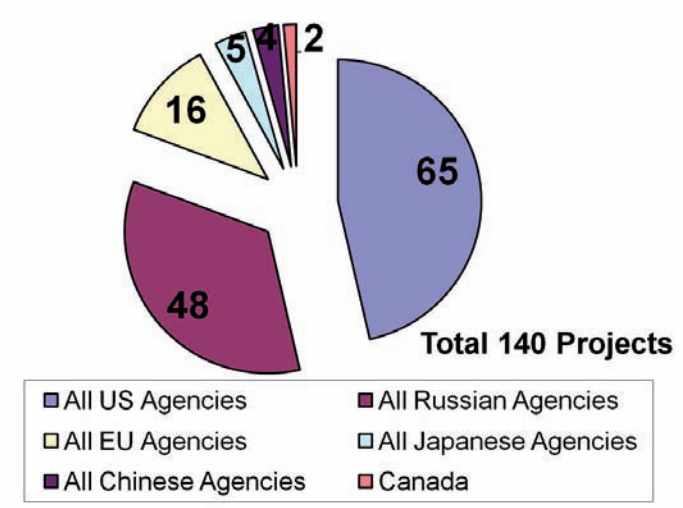

Figure 2. Project funding under the NEESPI umbrella

and FAO (Mátyás 2010). Two more books "Regional Environmental Changes in Siberia and Their Global Consequences" and "Earth Systems Change over Eastern Europe" are being prepared in English by the members of the NEESPI Team, and are scheduled to be published before the end of 2011.

Several meetings and workshops were organized in the past 12 months with the core objective to bring together a team which significantly benefits from the NEESPI membership. (neespi.org/meetings/). During these gatherings, numerous negotiations with the research community have been conducted to (a) promote NEESPI, (b) to encourage the top ranked scientists to look into the Northern Eurasian studies, (c) to ease the data exchange within the world scientific community related to Northern Eurasia, and (d) to attract researchers with projects already funded in the United States, EU, China, Japan, Russia, and International Agencies and Foundations into the NEESPI framework. In particular, NEESPI presentations were given at the NEESPI Open Science Sessions during the European Geosciences Assembly (Vienna, Austria, May 2010), the American Geophysical Union Fall Meeting (San Francisco, USA, Dec. 2010), at the 6th Study Conference on BALTEX (June 14-18, 2010, Miedzyzdroje, Wolin Island, Poland), and on international science conferences on Siberian studies (5-11 July 2010, ENVIROMIS, Tomsk, Russia), on "Monitoring Land Cover and Land Use in Boreal and Temperate Europe" (25-28 August, 2010, Tartu, Estonia and Valmiera, Latvia), and on non-boreal Eastern Europe studies (16-19 Nov., 2010, Kyiv, Ukraine). Two of these Workshops (in Valmiera and Tomsk) were accompanied by "Early Career Scientists Summer Schools". The workshops and science sessions brought together research groups from the EU, Russia, the United States, Japan, China, Ukraine, Belarus, and Kazakhstan. Their results were disseminated electronically via the NEESPI

website. Numerous research proposals to national and international funding agencies were conceived at these gatherings.

To document the suite of interesting findings reported at last year´s meetings and workshops, a special issue of Environmental Research Letters, devoted to "Environmental, Socio-Economic and Climatic Changes in Northern Eurasia and Their Feedbacks to the Global Earth System" was proposed and accepted by the ERL editorial board. The preparation and publication process of this new special issue started in January 2011 and is expected to continue until the late summer. Two editorial papers were invited for the special issue: one devoted to BALTEX Phase II, and the other to the Russian far-east studies on the Arctic shelf.

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Research Article

New dataset of high resolution atmospheric forcing fields since 1850

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Introduction

We would like to introduce and discuss a new dataset of spatio-temporal HIgh RESolution Atmospheric Forcing Fields (HIRESAFF) for Northern Europe since 1850. As an outcome of the BONUS project ECOSUPPORT, the reconstructed fields provide a new basis for ecosystem (or similar) models to run longer simulations for periods both before and after a large human impact on the Baltic Sea. The dataset also enables a better validation and estimation of model uncertainties under different climatic or nutrient load conditions.

The new dataset of HIRESAFF provides daily atmospheric fields for Northern Europe since 1850 for seven typically used near-surface variables (Table 1) with a horizontal resolution of approx. 25 km. Due to the limited availability of long historical station data, we apply a new upscaling method to reconstruct homogenous and physically consistent fields. As the method is important to understand properties of the new dataset, a short description of the method is given before discussing the strengths and merits of the reconstructed fields.

Why do we need historical forcing fields?

Due to the mostly shallow and complex basin of the Baltic Sea and its interaction with the North Sea over the Danish Straits, ecosystem or bio- (geo-) chemical models for the Baltic Sea need atmospheric forcing fields with high spatial resolution for driving ocean-climate.

Also, the high frequency variability and magnitudes of extremes are as important as the changes on long-term means. These fields are usually provided by regional climate models, downscaling existing global fields of meteorological reanalysis data since the late 1950‘s.

However, the last five decades might be too short of a period to estimate the full range of climate variability over the Baltic Sea. A longer time span would provide a better perspective of the transition from the Little Ice Age into the present state, the latter being largely anthropogenically influenced.

In order to also assess this transition, we reconstruct a

new dataset of high resolution atmospheric forcing fields of seven typically used variables (Table 1) for Northern Europe starting in 1850.

Table 1: *Description of dataset HIRESAFF.*

Domain	71° – 48°N, 5°W – 37.5°E
Horizontal resolution	0.25° x 0.25°
Temporal resolution	Daily, 1850-2007
Variables	Sea-level pressure (SLP) Wind components (U, V) Relative humidity (RH) Tot. Cloud Cover (TCC) Air temperature (T2m) Precipitation (PREC)

The Analog-Method

Caused by the noise contained in the predictor data, usual reconstruction methods based on linear regression techniques will lead to an underestimation of the long-term variability of climate reconstructions (von Storch et al. 2004). Linear regression is also not adequate when the probability distribution functions of predictor and predictand are different.

To avoid this problem, we choose the analog-method (originally introduced for downscaling by Zorita and von Storch 1999, Matulla et al. 2007) as a simple non-linear upscaling technique to reconstruct gridded atmospheric fields (predictand) compatible with the available 150-year long observations of sea-level pressure and temperature (predictor).

The large-scale atmospheric circulation fields (analogs/predictand) are taken from a pool of atmospheric fields generated by the Swedish Rossby Centre regional coupled climate ocean model (RCAO) in a simulation of the last 50 years, driven by meteorological reanalysis (Meier et al. 2011). Given a particular day in the past 150 years, the analog method searches an ‚anologous' (in terms of sea-level-pressure and temperature) day within the last 50 years. The large-scale gridded fields ascribed to the past date are assumed to be equal to the fields in the analogous day. Different settings of the analog method are possible, depending on the definition of similarity and on the restrictions placed on the set of admissible analogues. Here, the measure of similarity was defined as the Euclidean distance between station observations. The analogs were restricted to the three calender months straddling the month of the target day.

The station data for daily SLP since 1850 is mostly taken from the EMULATE project (Ansell et al. 2006) and ECA&D (Klein Tank et al. 2002). For the T2m reconstruction, monthly T2m station data since 1850 stem from Jones and Moberg (2003). Limited by the availability of the analog fields from the RCAO, the method was first crosswise calibrated and validated for 25 years in the period 1957-2007 and applied for 1850-2009. To increase the sample size of analogs to that used in the reconstruction, a leaf-one-out method was applied to derive reconstruction skills of HIRESAFF relative to the reference fields of RCAO.

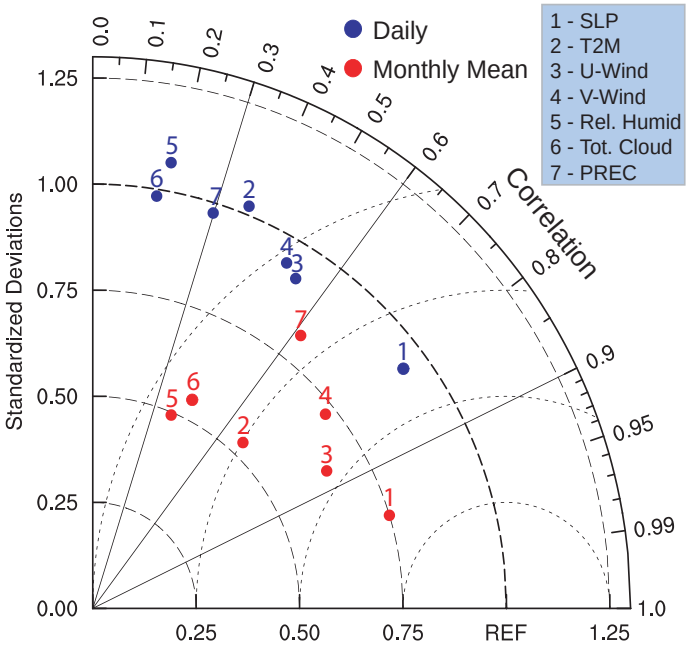

Figure 1. Taylor diagram for January showing reconstruction skills of mean field correlation and ration of variance var(REC/var(RCAO) for the period 1958-2007 on daily and monthly scale

Reconstruction Skills for 1958-2007

It is an inherent feature of the analog-method that the reconstruction shows a very similar distribution and variance compared to those of the analogs in the reference period. This is shown for the daily reconstruction in Figure 1 for January (blue dots) with a Taylor radius close to one. The Taylor radius is simply defined as the ratio of the variance of the reconstructed fields (HIRESAFF) divided by the variance of the reference fields (RCAO). As a consequence, reconstructed variables are showing a realistic variability on daily scale, but lower variability on monthly scale (red dots in Figure 1) relative to the reference fields.

The correlation between the reconstructed fields and the reference fields (Figure 1) on a daily scale (blue dots) highly depend on the variable and partly on the season (not shown). The most important variables on the daily scale, SLP and wind, show very high skills in winter (January) and lower skills in summer due to generally lower wind speeds. This can be explained by the very strong physical link of these fields to SLP as predictor and the low spatial

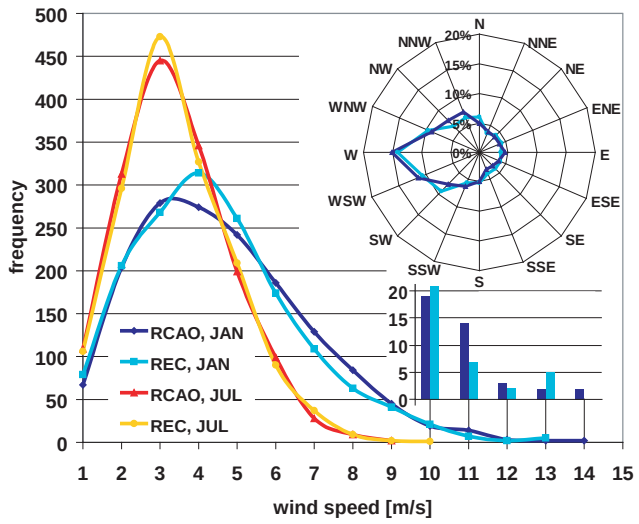

Figure 2. Comparison of the daily frequency distribution of wind speed (JAN, JUL) and wind direction (JAN) of the reference data RCAO and the reconstruction for the period 1958-2007 for grid point close to Stockholm

degrees of freedom of these variables. Other variables such as relative humidity (RH) and total cloud-cover (TCC) have lower skills due to a weaker link to SLP as predictor. This is also the case for PREC and T2m with seasonally stronger links to SLP in winter and weaker in summer. However, for the latter variables, the skills on monthly (Figure 1, red dots) to seasonal scales as well as long-term variations are more important for the ecosystem than their daily accuracy so that the correlations are fairly good for monthly means with a realistic variability on a daily scale.

Besides the variability and temporal correlation on daily

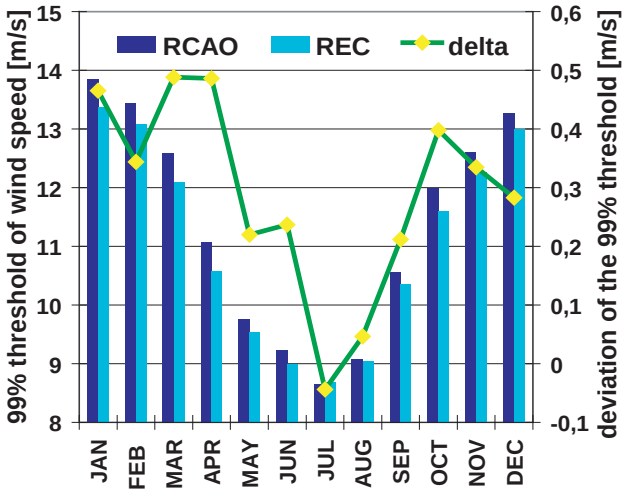

Figure 3. Comparison of the 99th percentile threshold values of daily wind speed (m/s) of RCAO and reconstructed fields of January for the period 1958-2007 close to Stockholm.

and monthly scales, a realistic reconstruction of the magnitudes and frequency of extreme events for SLP and storms is of great importance. Figure 2 shows the comparison of the wind speed distribution and wind direction, Figure 3 the 99th percentile threshold values of wind speed for January at the grid point close to Stockholm. The absolute differences for the 99th percentile wind speed thresholds are small but significant (Figure 3, green line) whereas the frequency distribution of wind speeds for January and July shows no significant difference at the 99% confidence level. Figure 4 shows the difference plot of the 99th percentile threshold values of wind speed for reconstructed fields minus reference fields (RCAO) for January. The results indicate a tendency to a mean underestimation of extreme wind speeds of 0.47 m/s relative to the reference data of RCAO although also regional overestimations up to 1.18 m/s occur in Figure 4.

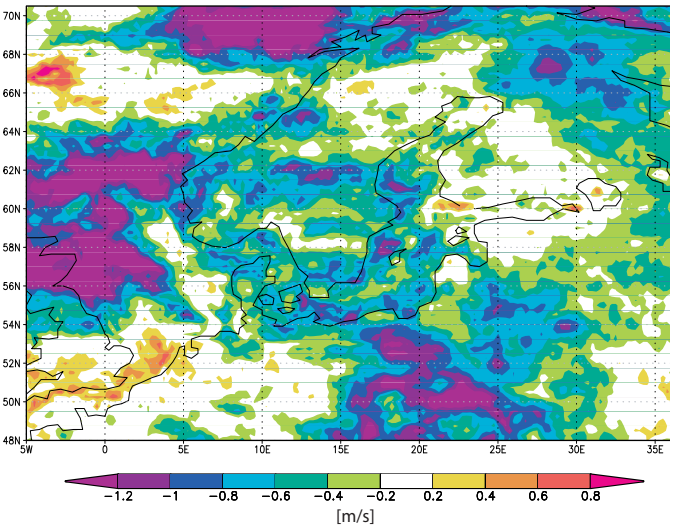

Figure 4. Difference plot of the 99th percentile threshold values for wind speed (m/s) of the reconstructed fields minus reference fields (RCAO) of January for the period 1958-2007. Negative values indicate an under-, positive an overestimation of reconstructed extreme wind speeds.

Conclusion

Using long historical station data of daily SLP and monthly T2m as predictors since 1850, the analog-method as a simple non-linear upscaling technique is a useful tool for the reconstruction of atmospheric forcing fields. Thus, the probability distributions of all variables are reconstructed with realistic daily variability. Very high reconstruction skills on the daily scale are achieved for magnitudes, distribution and number of extreme events of SLP, wind components and wind speed. This is of great importance e.g. for the Baltic Sea where single extreme events can have a much larger impact than variations on longer time scales because of strong stratification and limited exchange with the North Sea. Other variables

are showing high skills for winter and satisfying skills for summer on the monthly scale. As the latter variables are more important on the monthly to seasonal scale, we expect that the reconstructed atmospheric forcing fields reflect the weather and climate over Northern Europe reasonably well.

Further evaluation of the method and reconstruction is currently in preparation. News and possible updates of the dataset will be made available on our website:

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Research Article

The response of the general circulation of the Baltic Sea to climate variability

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The warming trend for the entire globe is 0.04°C per decade for the period 1850-2005. Furthermore, from around 1980 to present, a specific warming period started, with a temperature increase of about 0.17°C per decade, especially on the northern hemisphere. For the Baltic Sea catchment, which is located between maritime temperate and continental sub-Arctic climate zones, an even stronger warming of about 0.4°C per decade was observed since 1980. Changes in the atmospheric conditions cause corresponding changes in the Baltic Sea, not only for temperature and salinity, but also for currents and circulation patterns. The analysis of the winter (DJFM) circulation patterns for the period 1970-2008 reveals changes in the general circulation of the Baltic Sea. While it is difficult to clearly link individual winter circulation patterns to one of the four dominant atmospheric climate regimes for the North Atlantic domain, the comparison of mean winter circulation patterns for 20-year periods (1970-1988 and 1989-2008) highlights that for the later 20-year period an intensified cyclonic circulation exists in the central Baltic Sea. This intensified circulation results from stronger westerly and north-westerly winds and is most likely connected to changes in the large-scale atmospheric circulation.

Introduction

A detailed assessment of climate variability of the Baltic Sea area for the period 1958-2009 (Lehmann et al. 2011) revealed that the recent changes in the warming trend since the mid-1980s are associated with changes in the large-scale atmospheric circulation over the North Atlantic. The analysis of winter sea level pressure (SLP) data highlighted considerable changes in the number and pathways of deep cyclones (<980 hPa) in parallel with the eastward shift of the North Atlantic Oscillation (NAO) centres of action. Additionally, a seasonal shift of strong wind events from autumn to winter and early spring exists for the Baltic area. Lehmann et al. (2002) showed that different atmospheric climate regimes force different circulation regimes in the Baltic Sea. Furthermore, as climate, to a large extent, controls patterns of water circulation and biophysical aspects relevant for biological production, such as the vertical distribution of temperature and salinity, alterations in climate may severely impact the trophic structure and functioning of marine food

webs (Hinrichsen et al. 2007). To understand the processes linking changes in the marine environment and climate variability, it is essential to investigate all components of the climate system. Here we focus on the link between changes/shifts in the atmospheric conditions and their impact on the general circulation of the Baltic Sea, which is derived from 3-dimensional numerical model simulations using the Kiel Baltic Sea Ice Ocean Model (BSIOM) (Lehmann 1995, Lehmann et al. 2002).

Changes in the relative contribution of dominant atmospheric regimes

Following the work of Hurrel and Deser (2009) a cluster analysis of winter (DJFM) daily mean SLP anomalies, using NCEP/NCAR reanalysis data for the period 1949-2008 (Kalnay et al. 1996), was applied over the North Atlantic domain (80°W-30°E, 20°N-80°N) identifying four winter climate regimes in SLP (Figure 1).

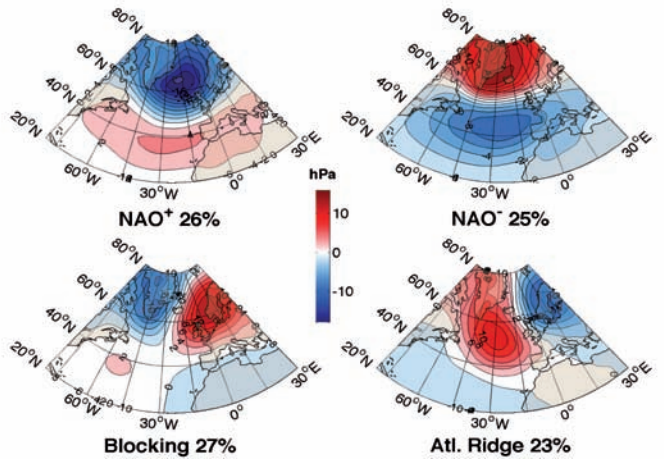

Figure 1. Winter (DJFM) climate regimes over the North Atlantic domain (80°W-30°E, 20°N-80°N) using daily sea level pressure anomalies from NCEP/NCAR reanalysis data over the period 1949-2008. The percentage of each panel expresses the frequency of occurrence of a cluster out of all winter days since 1949. Contour interval is 2 hPa.

Hurrel and Deser (2009) pointed out that two of the climate regimes correspond to the positive and negative phases of the NAO, while the third and fourth regimes display strong anticyclonic ridges over Scandinavia (the ‚Blocking' regime) and off western Europe (the ‚Atlantic Ridge' regime). For the period 1949-2008 all four regimes occur with about the same frequency between 23% and 26%. The total contribution of the ‚Blocking' and ‚Atlantic Ridge' pattern is between 48-50% and the total contribution of the NAO pattern is between 50-52%. However, the relative contributions of the two NAO patterns are different for consecutive 20-year periods, each overlapping by 10 years (Figure 2).

For the periods 1949-1968, 1959-1978 and 1969-1988, the NAO- pattern is prevailing, whereas the most recent periods

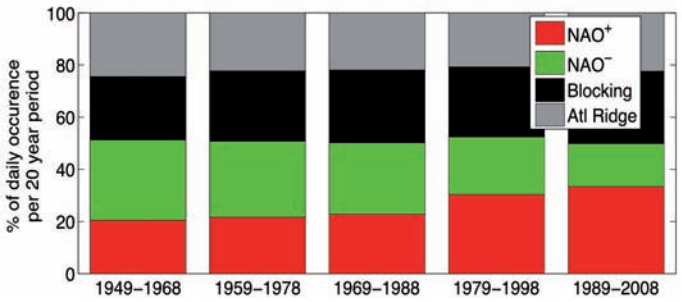

Figure 2. Contribution [%] of occurrence of the dominant climate winter regimes NAO+, NAO-, Blocking and Atlantic Ridge, in different 20-year periods (P1: 1949-1968, P2: 1959-1978, P3: 1969-1988, P4: 1979-1998, P5: 1989-2008) identified by cluster analysis using daily winter (DJFM) sea level pressure anomalies from NCEP/NCAR reanalysis data (1949-2008).

1979-1998 and 1989-2008 show an increased contribution of the NAO+ pattern. In accordance with the increased NAO+ contribution and together with the shift in strong wind events and the change in prevailing wind directions (Lehmann et al. 2011), a shift in de-trended monthly mean sea level anomalies, taken from tide gauge records from the Permanent Service of Mean Sea Level data (PSMSL; http://www.psmsl.org/data), can be observed for the periods 1970-1988 and 1989-2008 (Figure 3).

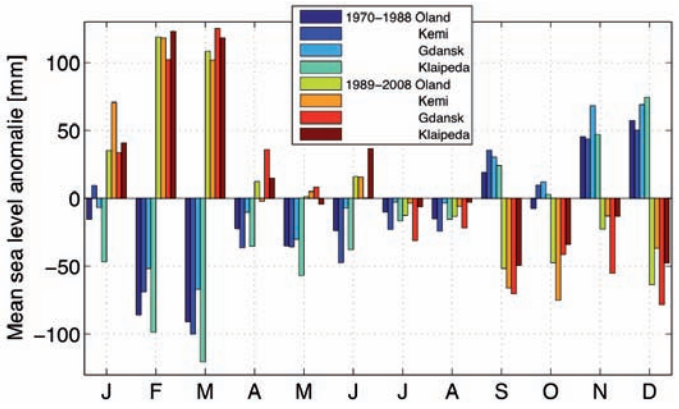

Figure 3. Detrended sea level anomalies taken from tide gauge records from the Permanent Service of Mean Sea Level data (PSMSL) for all months calculated for the periods 1970-1988 (blue-green) and 1989-2008 (yellow-red) at representative stations around the Baltic Sea.

To link the changes in the atmospheric conditions with the general circulation of the Baltic Sea, we use numerical model simulations from the Kiel Baltic Sea Ice Ocean Model (BSIOM). It is a coupled sea-ice-ocean model with a horizontal resolution of about 5 km and 60 vertical levels which resolves the upper 100 m in levels of 3 m thickness. The coupled sea-ice-ocean model is forced every 3 hours by realistic atmospheric conditions taken from the Swedish Meteorological and Hydrological Institute's (SMHI) meteorological database for the period 1970 to

2008 (L. Meuller, pers. comm.). Additionally, river runoff is prescribed from monthly mean runoff data set (Bergström and Carlsson 1994). At the western boundary, a simplified North Sea basin is connected to the Skagerrak to take up sea level elevations and to provide the characteristic North Sea water masses necessary for the water mass exchange. For a more detailed description of the BSIOM model please refer to Lehmann (1995) and Lehmann et al. (2002).

The previously described shift in de-trended monthly mean sea level anomalies between both periods is also represented in the numerical model simulations of the same period. It is important to note that the shift in monthly mean sea level anomalies occurs unidirectional over the whole Baltic Sea. This suggests a change in prevailing westerly wind situations controlling mean sea level variations.

These results confirm findings of recent studies, such as Lehmann and Hinrichsen (2001) or Johansson et al. (2004), that used historical sea level time series to demonstrate the key role played by winter climate, especially that of wind forcing. Lehmann et al. (2002) showed that a change of the local atmospheric index (Baltic Sea Index) to positive phases results in a decrease of outflow accompanied by an increase in mean sea level due to the freshwater surplus. Consequently, a change to more frequent and more pronounced winter NAO+ patterns would change the structure of the general circulation in the Baltic Sea.

Variability within dominant regimes

Hurrel and Deser (2009) concluded from cluster analysis that a large amount of within-season variance exists in the atmospheric circulation of the North Atlantic and that most winters are not dominated by any particular regime alone. Comparing the time history of occurrence of the four dominant atmospheric regimes with seasonal and monthly resolution confirms these findings (Figure 4), where the two NAO regimes show larger variability than the ‚Blocking' and ‚Atlantic Ridge' regime.

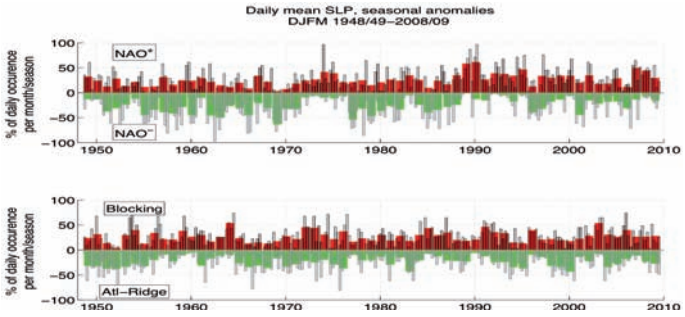

Figure 4. Time history of occurrence of the NAO, Atlantic Ridge and Blocking regimes over the period 1949-2008. Vertical bars give the number of daily occurrence per season (filled bars) / per month (contoured bars) during winter (DJFM) for the given regime.

This within-season variability seems to be important for the detection of characteristic circulation pattern in the Baltic Sea connected to a given dominant atmospheric regime. The temporally higher resolved time history plot gives the possibility to identify winter months with a distinct NAO+ contribution. Here we select 3 individual winter months with more than 85% of daily occurrence per month. From the numerical model simulations (BSIOM) of the period 1970-2008 it is now possible to derive the stream function and streamlines for these individual NAO+ dominated months (Figure 5). The examples highlight different circulation patterns than generally found in broad cyclonic circulation.

The connection of the circulation patterns to the prevailing wind situation becomes clear. The first example (January 1974) shows strong south-westerly winds, resulting in a weak (about 0.2 Sv) and small cyclonic circulation pattern in the eastern central Baltic Sea, whereas along the Swedish coast and into the Gulf of Finland a broad and relative strong anticyclonic circulation pattern exist. The situation in the second example (March 1989) is slightly different, with somewhat weaker but more westerly orientated prevailing wind direction. The response of the circulation shows an intensified cyclonic gyre (about 0.4 Sv) in the central Baltic Sea, while the anticyclonic circulation is somewhat more narrowed along the southern part of the Swedish coast but extends further into the basin of the Bothnian Sea. The third example (February 1990) highlights very strong winds from the west and north-west, resulting in a strong cyclonic gyre in the central Baltic Sea (more than 0.5 Sv) and a weak and narrow anticyclonic circulation along the southern Swedish coast and into the Gulf of Finland.

Concluding, it is to say that there is no unique general circulation pattern that can be attributed to a NAO+ regime. The circulation patterns heavily depend on the direction and strength of the prevailing winds. Strong westerly and north-westerly winds force a strong Ekman drift at the surface to the east or north-east, generate a strong cyclonic gyre in the central Baltic Sea, while south-westerly winds generate a broad and relatively strong counter circulation along the Swedish coast and a regime. regime. The circulation patterns heavily depend on the direction and strength of the prevailing winds. Strong westerly and north-westerly winds force a strong Ekman drift at the surface to the east or north-east, generate a strong cyclonic gyre in the central Baltic Sea, while south-westerly winds generate a broad and relatively strong counter circulation along the Swedish coast and a weak cyclonic gyre in the centre. These situations lead to changes in up- and downwelling along the coasts and in the deep basins.

The comparison of the mean winter (DJFM) circulation pattern for the periods 1970-1988 and 1989-2008 highlights that for the later period, an intensified cyclonic circulation exists in the central Baltic Sea, which is comparable to the

example of February 1990, while for the first period the resulting circulation pattern is most similar to March 1989 (Figure 5). The intensified circulation seen during the later 20-year period results from stronger westerly and north-westerly winds and is most likely connected to changes in the large-scale atmospheric circulation as reported by Lehmann et al (2011). Nevertheless, further analysis is needed to clearly separate the effects of different atmospheric regimes on the circulation pattern in the Baltic Sea. Especially the influence of the ‚Blocking' and ‚Atlantic Ridge' regimes could be of importance.

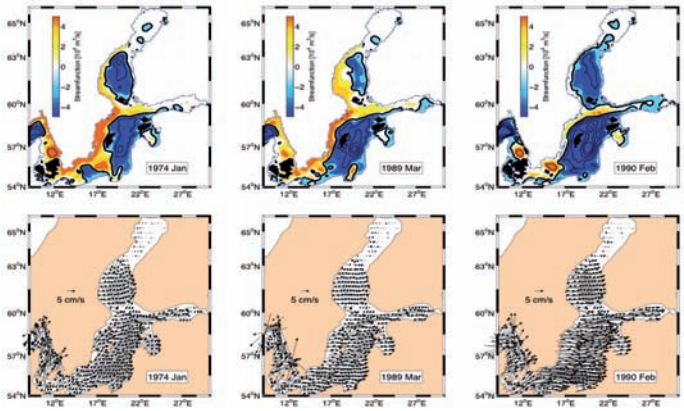

Figure 5. Stream function (top panel) and streamlines (bottom panel) representation of the average barotropic circulation for January 1974 (left), March 1989 (middle) and February 1990 (right) derived from numerical model output (BSIOM) for dominant NAO+ pattern Contour interval for the stream function is 0.1 Sv.

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BALTEX data access procedure facilitated

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Data relevant to BALTEX cover a wide range of disciplines, data types, periods, geographical extent, frequency and spatial resolution. Various institutions and agencies in numerous countries hold different types of data which are required for research purposes in BALTEX. For example, some observational data are collected operationally by national hydro-meteorological services and agencies of at least 10 different countries in the Baltic Sea drainage basin; some environmental data as well as modelling data (re-analyses and climate projections) are stored on servers of research institutes.

Four BALTEX data centres for meteorology, hydrology, oceanography and for radar data were installed during BALTEX Phase I by the Science Steering Group with the main objective to concentrate specific types of data or information (metadata) at these centres, and thus to facilitate the data exchange between the different data suppliers on the one side and individual scientists or research groups within BALTEX on the other side. Currently, the data delivery to the BALTEX Data Centres has ceased, but historical data are available anytime.

Easier access to BALTEX data

At the 26th BALTEX Science Steering Group meeting on 25 November 2010 in Gothenburg, a facilitated access procedure to BALTEX data from the BALTEX Data Centres was approved. For easier access, the procedure was decentralised. Data access will now be given directly by the data archives which host BALTEX relevant data. The access is free for academic use and thus also for BALTEX related research.

With this new procedure, it is no longer necessary to fill in a form and contact a BALTEX Science Steering Group member for approval. Now researchers interested in the BALTEX data available at the above specified data centres should directly approach the managers of these data centres, who will grant permissions according to the conditions and access restrictions of these centres. In order to get access to the data, the request is directed to the respective data centre by e-mail (with copy to *baltex@hzg.de*), specifying the affiliation of the data user and a short description of the research project for which the requested data will be used for. Based on this information, the data centres decide on the release of the data. This is necessary to warrant that the

data are only used for research purposes. BALTEX data users shall properly acknowledge and make reference to the origin of BALTEX data, whenever the latter are used for publication of scientific results. A minimum requirement is to reference the BALTEX programme and the respective BALTEX data centre. For details see the BALTEX Data Management web site (see below), and the conditions of the respective data centres.

Distributed BALTEX-relevant data centres

Other BALTEX relevant data are distributed at institutions all over the BALTEX region and beyond. Access to these data is subject to the individual data policies of the respective institutions, but access is generally free and usually involves little administrative effort. A list of distributed BALTEX relevant data bases is available on the BALTEX Data Management web site (see below). In case that relevant data sources are missing in the BALTEX data archive catalogue, please feel free to send a message to the International BALTEX Secretariat (*baltex@hzg.de*), referencing the URL and a short description of the archive in order to complete the BALTEX data archive catalogue at *www.baltex-research.eu/data*.

www.baltex-research.eu/data

GKSS Research Centre re-named to Helmholtz-Zentrum Geesthacht (HZG)

Helmholtz-Zentrum Geesthacht
Zentrum für Material- und Küstenforschung

On 1 November 2010, GKSS Research Centre, for decades known as an international research centre for materials research and coastal research with a high reputation, was re-named to Helmholtz-Zentrum Geesthacht - Zentrum für Material und Küstenforschung GmbH (Centre for Materials and Coastal Research) – or short HZG, if an acronym is to be used. This name change intends to demonstrate the current research fields in its new name, and to show the affiliation with the Helmholtz Association of German Research Centres, as well as the connection with the city of Geesthacht. The conceptual pillars of materials and coastal research are idealized in the new logo. GKSS, now HZG, has been home and sponsor of the International BALTEX Secretariat from the very beginning.

www.hzg.de

'Meer & Küste' – A german magazine on coastal changes in the Baltic Sea for laymen and experts

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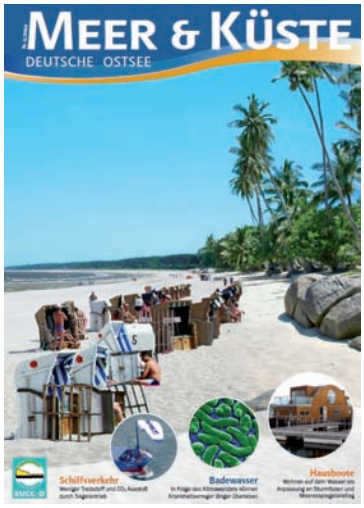

The information magazine „Meer & Küste" (in german), published by EUCC – The Coastal Union Germany, provides tourists, coastal dwellers, experts, and other interested readers (including children) with interesting news about the german Baltic Sea coast, comprehensively and easy to read. The current issue discusses relevant future changes caused by climate change impacts, pointing out problems but also discussing possible solutions.

The magazine is authored by different experts and is supported by projects such as the ongoing INTERREG IVB project 'BaltCICA – Climate change: Impacts, costs and adaptation in the Baltic Sea Region'. The magazine is distributed among tourist information centers, environmental education centers, scientific institutions and authorities in the german coastal states.

'Meer & Küste' is a sister product to the dutch magazine 'Kust & Zee', which is published by the dutch department of EUCC – The Coastal abd Marine Union. The magazines have been established to promote Integrated Coastal Zone Management (ICZM) and are intended to close a gap of information on sustainable development of coastal areas. Best practice examples and conflicts between different groups of interest are described in a visual way, addressing a diverse target group. The concept of the magazine may be suited for a transfer to other coastal regions.

The PDF can be downloaded from the EUCC-d website: www.eucc-d.de/meer-und-kueste.html. Contact: *eucc@eucc-d.de*

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New BALTEX Publications

Wesslander, K., P. Hall, S. Hjalmarsson, D. Lefevre, A. Omstedt, A. Rutgersson, E. Sahlée, A. Tengberg, 2011. **Observed carbon dioxide and oxygen dynamics in a Baltic Sea coastal region.** Journal of Marine Systems, 86, pp 1-9, May 2011

Hansson, D., Eriksson, C., Omstedt, A., Chen, D., 2011. **Reconstruction of river runoff to the Baltic Sea, AD 1500-1995.** International Journal of Climatology, 31: 696–703, April 2011)

Lehmann, A., K. Getzlaff, J. Harlaß, 2011. **Detailed assessment of climate variability in the Baltic Sea area for the period 1958 to 2009.** Climate Research, Vol 46, pp. 185-196, March 2011

Keevallik, S., 2010. **Shifts in meteorological regime of the late winter and early spring in Estonia during recent years.** Theor Appl Climatol, Online First™, DOI: 10.1007/s00704-010-0356-x December 2010

Hünicke, B., 2010. **Contribution of regional climate drivers to future winter sea-level changes in the Baltic Sea estimated by statistical methods and simulations of climate models.** International Journal of Earth Sciences, Vol 99, No 8, pp. 1721-1730, December 2010

Omstedt, A., M. Edman, L. G. Anderson, H. Laudon, 2010. **Factors influencing the acid-base (pH) balance in the Baltic Sea: a sensitivity analysis.** Tellus B,, Vol 62, Issue 4, pp. 280-295, September 2010

Wesslander, K., A. Omstedt, B. Schneider, 2010. **Inter-annual and seasonal variations in the air–sea CO_2 balance in the central Baltic Sea and the Kattegat.** Continental Shelf Research, Vol 30, pp. 1511-1521, August 2010

Hordoir, R., H. E. M. Meier, 2010. **Freshwater fluxes in the Baltic Sea - a model study.** Journal of Geophysical Research, Vol 115, August 2010

Savchuk, O., 2010. **Large-Scale Dynamics of Hypoxia in the Baltic Sea.** In E.V. Yakushev (ed.), Chemical Structure of Pelagic Redox Interfaces: Observation and Modeling, Hdb Env Chem, DOI 10.1007/698_2010_53, Springer Verlag Berlin Heidelberg, 2010

Backer, H., Leppänen, J.-M., Brusendorff, A.-C., Forsius, K., Stankiewicz, M., Mehtonen, J., Pyhälä, M., Laamanen, M., Paulomäki, H., Vlasov, N., Haaranen, T., 2010. **HELCOM Baltic Sea Action Plan – A regional programme of measures for the marine environment based on the Ecosystem Approach.** Marine Pollution Bulletin, Vol 60, Issue 5, pp. 642-649, May 2010

Keevallik, S., A. Männik, J. Hinnov 2010. **Comparison of HIRLAM wind data with measurements at Estonian coastal meteorological stations.** Estonian Journal of Earth Sciences, Vol 59, Issue 1, pp. 90-99, March 2010

Myrberg, K., Andrejev, O., Lehmann, A., 2010. **Dynamic features of successive upwelling events in the Baltic Sea - a numerical case study.** Oceanologia 2010, 52 (1), pp. 77-99, January 2010

New BALTEX Publications

An up-to date literature compilation on
Sea level change in the Baltic Sea
is now available at
www.baltex-research.eu/publications/

New Books

Omstedt, A. **Guide to Process Based Modeling of Lakes and Coastal Seas.** Springer Geophysical Sciences, 2011. 310 p.

Ekman, M. **The changing level of the Baltic Sea during 300 years: A clue to understanding the Earth.** Summer Institute for Historical Geophysics, Åland Islands, 2009. 155 p.

Håkanson, L. **Modeling nutrient fluxes to, within and from the Kattegat to find an optimal, cost-efficient swedish remedial strategy.** Uppsala Univ., Geotryckeriet, 2009. 122 p.

Leppäranta M. and Myrberg K. **Physical Oceanography of the Baltic Sea.** Series: Geophysical Sciences. Springer 2009. 410 p.

Coming up in OCEANOLOGIA 53, 2011: Thematic Issue „Changing Water, Energy and Biogeochemical Cycles in the Baltic Sea Basin". The 6th Study Conference on BALTEX, Międzyzdroje, Poland, 14–18 June 2010

Andrejev, O., T. Soomere, A. Sokolov, K. Myrberg. **The role of spatial resolution of a three-dimensional hydrodynamic model for marine transport risk assessment**

Dailidienė, I., H. Baudler, B. Chubarenko, S. Navrotskaya **Long term water level and surface temperature changes in the lagoons of the South and East Baltic**

Dzierzbicka-Głowacka, L., J. Jakacki, M. Janecki, A. Nowicki **Long-term variations of the distribution of phytoplankton biomass in the Baltic Sea simulated by a three-dimensional model**

Hongisto, M. **Variability of the marine boundary layer parameters over the Baltic Sea sub-basins and their impact on the nitrogen deposition**

Kostecki, R., B. Janczak–Kostecka. **Holocene evolution of the environment of Pomeranian Bay, southern Baltic Sea**

Meier, H.E.M., A. Höglund, R. Döscher, H. Andersson, U. Löptien, E. Kjellström. **Quality assessment of atmospheric surface fields over the Baltic Sea from an ensemble of regional climate model simulations with respect to ocean dynamics**

Päädam, K., P. Post. **Temporal variability of extreme precipitation in Estonia 1961-2008**

Rimkus, E., J. Katys, A. Bukantis, A. Krotovas. **Extreme precipitation in Lithuania**

Schneider, B. **PO4 release at the sediment surface at anoxic conditions: Contribution to eutrophication?**

New BALTEX Publications

Služenikina, J., A. Männik. **A comparison of ASCAT wind measurements and numerical weather prediction models over the Baltic Sea.**

Soomere, T., A. Räämet. **Spatial patterns of the wave climate in the Baltic Proper and the Gulf of Finland**

Speranskaya, N. **Changes in some elements of the water cycle in the easternmost part of the Baltic Sea Basin**

Väli, G., V. Zhurbas, J. Laanemets, J. Elken. **Simulation of nutrient transport from different depths during an upwelling event in the Gulf of Finland**

Wiśniewski, B., T. Wolski. **Physical characteristics of extreme storm surges and sea level falls at the Polish coast**

Zhang, W., J. Harff, R. Schneider, C. Wu. **The role of wind data analysis in modelling the morphological evolution of the southern Baltic coast – a case study of the Darss-Zingst peninsula**

Announcements

Lagoon Ecosystem Modelling (ECOPATH/ECOSIM): From Hydrodynamics to Fisheries. AMBER Workshop, 21-23 June 2011, University of Klaipeda. **www.io-warnemuende.de/lagoonecosystemmodelling.html**

8th Baltic Sea Science Congress, St. Petersburg, Russia. 22-26 August 2011. **www.bssc2011.org/.**

LOICZ Open Science Conference: Coastal sytems, global change and sustainability. Laishan District, Yantai, China, 12-15 September 2011. **www.loicz-osc2011.org/**

10th European Conference on Applications of Meteorology - 11th European Meteorological Society Annual Meeting 2011: Forecasting the weather - ensemble techniques in probabilistic weather prediction. 12-16 September 2011, Berlin, Germany. **meetings.copernicus.org/ems2011/home.html**.

ICES Annual Science Conference
Gdansk, Poland, 19-23 September 2011
www.ices.dk/iceswork/asc/2011/index.asp

5th International Conference on Flood Management (ICFM5) Tsukuba, Japan, 27-29 September 2011.
www.ifi-home.info/icfm-icharm/icfm5.html

WCRP Open Science Conference: Climate Research in Service to Society. Denver, Colorado, USA, 24-28 October 2011. Announcement **www.wcrp-climate.org/conference2011/index.html**

Announcements

A BSSSC / BALTEX Conference
Adapting to Climate Change
Case Studies from the Baltic Sea Region
Hamburg, Germany, 31 May 2011

Actions towards establishing sustainable adaptation measures to climate change are currently taking place at various levels. One is the research community at large, where in an increasing manner dedicated projects are being launched to both identify regional and local impacts of climate change and, accordingly, identify suitable adaptation options. Several of these projects are being undertaken in close co-operation with relevant decision makers from various sectors, including policy and economy. Additionally, an increasing number of examples emerge where adaptation to regional climate change has reached the level of practical decision making and innovation.

The key objective of this international conference is to give practitioners and decision makers at the regional political level in the Baltic Sea Region a platform to present and discuss concrete examples of regional or local adaptation to climate change. Latest scientific findings will be presented, and climate services will be described. However, the focus will be on case studies presented by regional authorities. There will be a panel discussion including high level scientific and political representatives from Denmark, Poland and Germany.

The conference is organized under the auspecies of BALTEX and the Baltic Sea States Subregional Co-operation (BSSSC). BSSSC is a political network for decentralised authorities (subregions) in the Baltic Sea Region. Its participants are regional authorities of the 10 Baltic Sea littoral states.

The conference is free of charge, but the number of participants is limited. Registration is possible via www.baltex-research.eu/BSSSC/.

Conference organizers:

Hamburg
www.hamburg.de

Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research

www.baltex-research.eu/BSSSC/

BALTEX is the European continental-scale experiment within the Global Energy and Water Cycle Experiment (GEWEX). It constitutes a research programme focussing on water and energy cycles in the climate system of the entire Baltic Sea basin with contributions of more than 10 countries. GEWEX has been launched by the World Meteorological Organisation (WMO), the International Council for Science (ICSU) and UNESCO's Intergovernmental Oceanographic Commission (IOC), as part of the World Climate Research Programme (WCRP). The scientific planning of BALTEX is under the guidance of the BALTEX Science Steering Group. The BALTEX *Newsletter* is edited and printed at the International BALTEX Secretariat with financial support through the Helmholtz-Zentrum Geesthacht, Germany. It is the hope that the BALTEX *Newsletter* is accepted as a means of reporting on plans, meetings and work in progress, which are relevant to the goals of BALTEX, as outlined in the Science and Implementation Plans for BALTEX.

The editor invites the scientific community to submit BALTEX-related contibutions to be published in this *Newsletter.* Submitted contributions will not be peer-reviewed and do not necessarily reflect the majority's view of the BALTEX research community. Scientific material published in this *Newsletter* should not be used without permission of the authors.

Please, send contributions to the BALTEX *Newsletter,* requests for BALTEX - related documents, suggestions or questions to the International BALTEX Secretariat via

www.baltex-research.eu

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