



# PostBALTEX letter to institutes in BSR October 2011

- **Fields of research** to be included and specific issues to be targeted. The current focus is outlined in the BALTEX Phase II Science Plan (available at [www.baltex-research.eu/BP2](http://www.baltex-research.eu/BP2)). POSTBALTEX should fill a gap not covered by other similar regional activities.
- **International framework.** Currently, BALTEX is linked to the World Climate Research Programme as a Regional Hydroclimate Project under CEOP, the Coordinated Energy and Water Cycle Observations Project and GEWEX, the Global Energy and Water cycle Experiment.
- **Geographical scope.** The Baltic Sea region defined as the Baltic Sea hydrological drainage basin has been the main area of interest for BALTEX.
- **Mode of operation i.e. activities** promoted by POSTBALTEX.
- **Important stakeholders.**
- Your own active **contribution** to and **expectation** for POSTBALTEX.



# 30+ recipients and BSSG

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- Prof. Agneta Andersson, **Umeå University**, Sweden
- Dr. Vida Augulienė, **Lithuanian Hydrometeorological Service**, Vilnius, Lithuania
- Prof. Dr. Bodo von Bodungen, **Leibniz-Institute for Baltic Sea Research**, Warnemünde, Germany
- Ms. Anne Christine Brusendorff, **Helsinki Commission**, Helsinki, Finland
- Dr. Erik Buch, **Danish Meteorological Institute**, Copenhagen, Denmark
- Dr. Dennis Ehm, **Akademie für Raumforschung und Landesplanung**, Hannover, Germany
- Prof. Dr. Carl Folke, **Stockholm Resilience Centre**, Stockholm, Sweden
- Dr. Bent Hansen Sass, **Danish Meteorological Institute**, Copenhagen, Denmark
- Prof. Christoph Humborg, **Baltic Nest Institute**, Stockholm University, Sweden
- Dr. Hans Hvidtfeldt Larsen, **DTU Systems Analysis (SYS)**, Roskilde, Denmark
- Prof. Dr. Lea Kauppi, **Finnish Environment Institute (SYKE)**, Helsinki, Finland
- Dr. Maris Klavins, **University of Latvia**, Riga, Latvia
- Dr. Johannes Klein, **Geological Survey of Finland**, Espoo, Finland
- Prof. Dr. Johan Kleman, Bert Bolin Centre for Climate Research, **Stockholm University**, Sweden
- Prof. Leif Klemetsson, Tellus - The Centre of Earth Systems Science at the **University of Gothenburg**, Sweden
- Dr. Kaisa Kononen, **BONUS EEIG** Secretariat, Helsinki, Finland
- Dr. Włodzimierz Krzyminski, **Institute of Meteorology and Water Management**, Gdynia, Poland
- Dr. Andris Leitass, **Latvian Hydrometeorological Agency**, Riga, Latvia
- Dr. Pontus Matstoms, **Swedish Meteorological and Hydrological Institute – SMHI**, Norrköping, Sweden
- Dr. Mirosław Mietus, **Institute of Meteorology and Water Management**, Gdynia, Poland
- Prof. Dr. Sergej Olenin, **Klaipeda University**, Lithuania
- Prof. Dr. Vladimir Yu. Osadchiy, Atlantic Branch of the P.P. **Shirshov Institute of Oceanology**, St. Petersburg, Russia
- Dr. Mieczysław S. Ostojki, **Institute of Meteorology and Water Management**, Warsaw, Poland
- Prof. Dr. Vadim Timoteevich Paka, Atlantic Branch P.P. **Shirshov Institute of Oceanology**, Kaliningrad, Russia
- Prof. Dr. Henrik Smith, **Lund University**, Sweden
- Prof. Göran Ståhl, **Swedish University of Agricultural Sciences**, Umeå, Sweden
- Dr. Yrjö Viisanen, **Finnish Meteorological Institute**, Helsinki, Finland
- Dr. Roman M. Vilfand, **Hydrometeorological Research Centre Moscow**, Russia
- Prof. Dr. Martin Visbeck, **Leibniz-Institut für Meereswissenschaften**, Kiel, Germany



## Response (so far..)

- HELCOM
- Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (R. Chekan)
- Leibniz-Institut für Ostseeforschung Warnemuende (IOW)
- Risø National Laboratory for Sustainable Energy (S-E Gryning)
- Leibniz Institute of Marine Sciences at the University of Kiel IFM-GEOMAR (A Lehmann)
- The Hydrometeorological Research Centre Of Russian Federation, Moscow
- Finnish Environment Institute (SYKE) (H. Kaartokallio)



## HELCOM

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

The HELCOM Secretariat considers it important that during the next 10 years, "POSTBALTEX" will focus its research on the impacts of climate change on the Baltic Sea ecosystem. Particular emphasis should be put on the foreseen impacts of climate change on biological components of the ecosystem. It would be good if these activities also included research on acidification of the Baltic Sea and its effects on biological components. From HELCOM's point of view these themes are important because future policy decisions related to the protection of the marine environment require this type of information as their basis and policy decisions need to adjust according to the needs arising from climate change impacts, as well as adaption and mitigation.

The HELCOM Secretariat considers the current international framework as well as the geographical scope of BALTEX suitable.

HELCOM continues to serve as a suitable policy framework through which the scientific findings of the BALTEX community can be channelled into marine environment related decision making. The HELCOM Secretariat looks forward to continuing good cooperation and active dialogue with the BALTEX community.



# Belarus

- **urban climate.** The city development in the Baltic Sea basin follows three main directions, which are influenced by the demographical development. Conversion of industrial, military and non used train track areas to housing and service centers, the economical concentration and more densely built up inner cities are named as new urbanity. Climatologically speaking this development leads to an increase of heat island, air pollution and a reduced ventilation of the cities. This development has positive and negative factors. Urban climate studies can be used to support ideas of architects and planners without destroying thermal and air quality comfort. Especially the importance of open spaces and the thermal conditions there are taken as example to create a climatologically approved urban design.
- **urban hydrology.** The city development changes the hydrology of the Baltic Sea drainage basin. Roads and artificial surfaces cut down infiltration and storage while storm sewers speed up the flow of water into rivers. It is suggested that urbanization increases the risk of flooding as rivers respond much more violently to a storm event. Problems of water supply and manufacturing waters are also very important and need to develop universal system of water resources management within Baltic Sea basin.
- **people health under climate change.** Enforcing climate change effected to large cities, industrial area and other polluted areas more strongly. Large cities are usually concentrated a huge population. The solar radiation, air temperature, humidity, air pressure, wind and their simultaneous impact on health have to be estimated in climatic research. Weather change effects the depth and frequency of breathing, blood circulation, oxygen supply of cells and tissues, carbohydrate, saline and lipidic water balance and ect. It is known that certain type of weather corresponded to special level of biochemical process, which occurred in cells and supply production of energy and its input into environment. Physiological process including nerves, muscles, circulation of the blood and respiratory system work comfortable in narrow temperature diapason only. Meteorological sensitiveness is a differential sign of large cities citizens because they are in permanent isolation from nature and could not feel in advance and be ready to it. As a result the system get a “weather stress”.



# The Hydrometeorological Research Centre Of Russian Federation, Moscow

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



## Risø (Gryning)

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





# DMI Centre for Ocean and Ice (COI) (Jun She)

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





# IOW (V. Mohrholz T. Neumann)

## Fields of research

- Development and provision of modeling systems for the hydrological system including nitrogen cycles.
- Establish (logistics, validation, providing forcing and boundary data etc) modeling systems for the Baltic Sea ecosystem “ready to use”. They should comprise regional climate models, hydrological models, models for atmospheric deposition, circulation and biogeochemical models for the Baltic Sea. The idea behind is to have a tool/system available which allows quickly to respond to requests concerning the response of the Baltic Sea to changed forcing.
- Including higher trophic levels in Baltic Sea models. This should provide “end to end” models for the Baltic Sea which allow investigating the response of higher trophic levels e.g. fish to external pressure.
- Reconstruction and understanding of the Baltic Sea ecosystem 2000-4000 years back in time including changes due to sea level change and change of the bathymetry (e.g. uplift).
- Water exchange between the Baltic and the North Sea, with changing forcing due to climate change
- Mixing of water masses and related fluxes of matter due to natural forcing and artificial structures.

## International framework

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

## Important stakeholders

- HELCOM, EU commission, national authorities, the public

## Own contributions, activities

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



# IFM-GEOMAR (A. Lehmann)

- **Fields of research**

**We need a careful revision of BALTEX Phase II objectives, a wrap up. Have we fulfilled the scientific requests, what is missing, have we been successful at all?**

**Objective 1:** Improved understanding of energy and water cycles under changing conditions.  
I guess this objective has become a bit unfashionable. For my knowledge there is not much progress.

**Objective 2:** Analysis of climate variability and change, and provision of regional climate projections over the Baltic Sea basin for the 21st century.

Still in progress, quite well on the way. Most of the potential activities have been fulfilled or are in progress.

**Objective 3:** Provision of improved tools for water management, with emphasis on extreme hydrological events and long-term changes.

I am not hydrologist, I really can not assess how much of the Potential Activities have been processed.

**Objective 4:** Biogeochemical Cycles in the Baltic Sea basin and transport processes within the regional Earth system under anthropogenic influence.

Thank to BONUS+ this objective is well in progress. More or less all potential activities are touched.

**Objectives 5 and 6** also progressed quite well.

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



# IFM-GEOMAR contn'd

- **International framework**

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

## **Geographical scope**

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

## **Mode of operations**

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



# SYKE

Fields of research and specific issues to be targeted.

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

International framework.

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

Geographical scope

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

Mode of operation.

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

Stakeholders.

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



## SYKE contn'd

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



## Brief summary

- Fields – keep strong link to underpinning physics, chemistry and biology, holistic view (Earth system), but of course including process studies
- Frameworks – Link to GEWEX/GREW suggested.
- Geographical area – Baltic Sea catchment, links to Arctic, and other European regional seas
- Stakeholders – Broad, including HELCOM.
- Mode – Similar to current mode, i.e. networking and assessments (BACC)