

## The European Strategy for the Baltic Sea Region

The aim of the Strategy is to coordinate the efforts of various actors in the region, so that by working together they would promote a more balanced development of the region. The Strategy focuses on actions and will include a plan for evaluating the progress. Besides including a strategy for common governance of the region, the Strategy has four main objectives to:

1. improve the environmental state of the Baltic Sea region, especially the Baltic Sea;
2. make the Baltic Sea region a more prosperous place by supporting balanced economic development across the region;
3. make the Baltic Sea a more accessible and attractive place for its inhabitants, a competent labour force and tourists; and
4. make the Baltic Sea region a safer and more secure place.

"The overall idea is that policies should be integrated, as they all have an impact on each other, and they should be based on a cooperative dialogue, as they all have an impact on neighbouring countries," says Oliver Baudelet from Directorate General Regional Policy, who is putting together the basic document. "It was decided that a good environmental status is our goal number one." DG Regional Policy is presently consulting stakeholders on their inputs, and the final document is to be presented to the European Council in June 2009.

### Inputs to the Strategy

Because of the broad integrated approach of the Strategy, about 20 Directorates General are giving input to the strategy, for example on Energy and Transport, Agriculture and Rural Development, Environment, Maritime Affairs and Fisheries. However, equally important are comments and input from authorities and stakeholders in the region. To this end, a series of meetings is being organized. The first stakeholder conference was held in Stockholm, Sweden, on 30 September 2008, and will be followed by a final stakeholder

conference in Rostock, Germany, 5-6 February 2009. In between, round-table discussions are to be held on the four themes for the Strategy:

- Accessibility and attractiveness issues have already been discussed in Kaunas, Lithuania, on 18-19 September 2008.
- Environmental issues were addressed in Gdansk on 13 November.
- Economic development issues were discussed during the Baltic Development Forum Summit in Copenhagen on 1-2 December.
- Safety and security issues, including maritime safety, will be addressed in Helsinki, Finland, on 9 December.

More information on these events can be found on the web page of the Directorate General Regional Policy, who welcomes active participation in the conferences. "Broad stakeholder involvement is the foundation of successful implementation of the Strategy," says Oliver Baudelet.

### Adoption of the Strategy

It was the European Council who on 14 December 2007 asked the Commission to develop a Strategy for the Baltic Sea region. The Council stated that: "This strategy should inter alia help to address the urgent environmental challenges related to the Baltic Sea. The Northern Dimension framework provides the basis for the external aspects of cooperation in the Baltic Sea region." Sweden, who will hold the presidency during autumn 2009, plans to have the Strategy discussed during its term.



*Sif Johansson*

*Oliver Baudelet, Directorate General Regional Policy*

### The Baltic Sea Region

The eight member states around the Baltic Sea are naturally included in the Strategy, but depending on the issue the Russian Federation, Norway and Belarus are also involved. For example, the Strategy will involve all the countries in the region in economic issues, countries and parts of countries in the catchment area in water quality issues, and central governments in security issues.

### The Environmental Section

The base for this section is, of course, the implementation of relevant EU Directives and the HELCOM Baltic Sea Action Plan. Which actions will finally be prioritized will be discussed further after the round-table discussion in Gdansk. The need for



*Rodeo.fi, Barbro Wickström*

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science in policy development and sound measures will be supported by the Strategy.

**Sif Johansson, Ph D**  
DG Environment

Further information about Strategy events can be found at:  
[http://ec.europa.eu/regional\\_policy/cooperation/baltic/events\\_en.htm](http://ec.europa.eu/regional_policy/cooperation/baltic/events_en.htm)

# Editorial: A Changing Era

This newsletter is the ninth and last to be published within the BONUS ERANET project. However, this does not mean the end of a BONUS Newsletter – it will just change its form and name to the BONUS EEIG Newsletter.

Five years, the lifetime of the BONUS ERANET project, have passed quickly. When BONUS started, the landscape of Baltic Sea research looked quite different from today's situation. Five out of the nine Baltic Sea countries were not EU Members – now there is only one country surrounding the Baltic Sea which is outside the European Union. Baltic Sea scientists applied for funding from dozens of different addresses – now BONUS EEIG launches joint calls with one address for applications and projects funded jointly by eleven different

fundors. The personnel dealing with Baltic Sea research funding hardly knew each other – now communication between officials is almost daily. The research funding agencies communicated very little with actors in the Baltic Sea environment sector – now BONUS has created a communication surface between HELCOM and the RTD agencies.

From the very beginning, launching a Joint Baltic Sea Research Programme was a very appealing idea. Why not put national funds together into a joint programme instead of managing several separate, partly overlapping programmes and research areas, which are poorly studied despite the need for research? If collaboration in environmental management is working so nicely, why couldn't it work equally nicely in research funding?

It was, however, hard to foresee the variety of administrative structures, traditions, legal regulations and ways of thinking in the research funding organizations in the Baltic Sea countries. The only way to build up a jointly funded programme within this inherent variety was to dive deep into the administrative and scientific jungle, turn every stone and explore what was beneath. Thus, the BONUS ERANET tasks included exploring the administrative structures, legal barriers, evaluation practices, national science policy priorities, gaps in collaboration, funding volumes, Baltic Sea science publications, research collaboration, infrastructures, researcher training etc. Most importantly, the national funding agencies together with the science community and the end-users of the research results could agree on the scientific agenda for the joint programme, BONUS-169 Science Plan and Implementation Strategy. Also, a new legal entity, BONUS EEIG, was founded by the Baltic Sea funding agencies. What had been achieved was finally tested during the past year through the first BONUS+ Call

for proposals, which resulted in the co-funding of 16 projects with the participation of over 100 universities and research institutes.

This development would not have been possible without an ERANET. Establishing the ERANET funding scheme by the EU was a splendid idea – all steps have been necessary, otherwise the good idea and sincere hopes for better and well coordinated science support for the protection of the Baltic Sea would have collided with overwhelming legal, administrative and political difficulties.

The best result of the work well done is that the ERANET project has made itself redundant. It has created the framework for a long-term research funding collaboration within the BONUS EEIG and Joint Baltic Sea Research Programme, BONUS-169. Now the real work, the actual research, is about to start. We have reached the end of an important period of time and must now look towards the future.

**Kaisa Kononen**



Rodeo.fi, Barbro Wickström

## BONUS IN A NUTSHELL

In this newsletter the word BONUS is used several times. This term was first used only in the context of the ongoing BONUS ERA-NET project. During the course of the projects, new activities have been developed, which have got their own BONUS inspired abbreviations. Today, BONUS is used as a general term referring to all of these activities.

**BONUS ERA-NET** is a project with a full name *BONUS for the Baltic Sea Science – Network of Funding Agencies*. It is funded by the EU Sixth Framework Programme during 2003-2008. It has the form of a consortium with 14 partners from all nine Baltic

Sea countries. Twelve of the partners are funding agencies, one is a research institute and one is an international organisation. The project's aim is to build up a network of funding agencies and create conditions for a Joint Baltic Sea Research Programme.

**BONUS EEIG** is a newly established legal entity with a full name of *BONUS Baltic Organisations' Network for Funding Science EEIG*. It is an independent organisation under the legal entity of a European Economic Interest Grouping, which was established so that it can be a contractor with the European Commission and other possible parties. Its members are either funding agencies directly, or organisations managing national funding allocations for the joint calls under the Joint Baltic Sea Research Programme. As regards the BONUS+ call, it will be the contractor concerning the EC funds, manage the call and the evaluation process and distribute the EC funds to the national funding

agencies after the selection of the projects to be funded.

**BONUS+** is the call launched on September 17<sup>th</sup>, 2007 and closed on December 28<sup>th</sup>, 2007. It includes both national and EC funds of ca 22 M€. The latter are coming from so-called ERA-NET Plus funding scheme of the FP 7 on a basis of a specific contract with the EC, and therefore the call abbreviation is BONUS+. Altogether 16 projects with the participants of over 100 universities and research institutes receive funding for 2009-2011.

**BONUS-169** is the abbreviation given to the Joint Baltic Sea Research Programme. The aim is to implement this programme under Article 169 of the EC Treaty and that is why the abbreviation is BONUS-169. The start of the Article 169 stage is postponed until 2009. The programme has, however, started already in 2007 with BONUS+ call as a bridging measure.

### BONUS ERA-NET Partners

Academy of Finland

Project Management Organisation Juelich, Germany

Danish Agency for Science, Technology and Innovation (The Danish Natural Science Research Council)

Estonian Science Foundation

International Council for the Exploration of the Sea

Ministry of Education and Science of the Republic of Lithuania

Latvian Council of Science

Ministry of Science and Higher Education, Poland

Institute of Oceanology, Polish Academy of Sciences

Russian Foundation for Basic Research

Foundation for Strategic Environmental Research, Sweden

Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning

Swedish Environmental Protection Agency

Baltic Organisations Network for Funding Science EEIG (Coordinator)

# Dialogue between BONUS and the Black Sea

A dialogue meeting dedicated to the Black Sea region took place on the 24<sup>th</sup> of September, 2008 in Bulgaria and was organized by the Institute of Oceanology of the Polish Academy of Sciences, the task leader, with the kind assistance of the host organization, the Institute of Oceanology of the Bulgarian Academy of Sciences. The meeting hosted representatives of the research community and funding agencies from Bulgaria, Romania, Ukraine and Turkey, a representative of the European Commission and two representatives of BONUS coordination. The Black Sea Commission and the SESAME project were also represented.

The main aim of the meeting was to present BONUS as a possible model for research funding cooperation within the Black Sea region. Another aim was to exchange experiences and information on existing cooperation in the Black Sea region. In addition, the meeting was an opportunity for the European Commission to present the forthcoming call on the overarching of marine ERA-NET, which is to be launched in November.

The basic questions discussed during the meeting included which research areas are the most important for better understanding and management of the Black Sea marine environment, whether the Black Sea countries are ready for international regional cooperation, whether the separate Black Sea ERA-NET is a feasible scheme and whether there is any interest in participating in the overarching ERA-NET.

Some similarities were recognized between the Baltic Sea situation in 2003, when BONUS started, and the current situation in the Black Sea region. In 2003, only four out of nine Baltic countries were member states of the EU. In 2005, a further four countries became members (Estonia, Latvia, Lithuania and Poland). In January 2007, two Black Sea states, Bulgaria and Romania, joined the EU. Membership negotiations with Turkey are underway.

ERA-NET projects with regional aspects, such as BONUS, create a platform for integration in a holistic, interdisciplinary manner regarding regional requirements to meet all nations' needs, while ERA-NETs with thematic aspects are able to coordinate work related to similar problems already being carried out by various research projects and scientific organizations. The Work Programme 2009 of the FP7, under Theme 6 - Environment (including Climate Change) of the European

Commission, includes a plan for a call for proposal "Towards integrated European marine research strategy and programmes". This action will support one, single marine ERA-NET, taking into account the ongoing integrating initiatives.

The Black Sea is a semi-enclosed brackish sea, surrounded by land of 6 countries: Bulgaria, Romania, Ukraine, Russia, Georgia and Turkey. The region of the Black Sea is rich in natural resources and is strategically located at the border between Europe and central Asia and the Middle East. The region, with its large population, offers various opportunities but also poses many challenges. The region is now in a period of expansion, and infrastructure development, increased shipping traffic and tourism are increasing the pressure on the Black Sea environment.

During the meeting, the representatives of each country presented their activities and national views. In particular, participants of the meeting had the opportunity to learn more about the Integrated Project SESAME presented by Project Manager Eleni Kaberi. This project, supported by the EU FP6 "Southern European Seas: Assessing and Modeling Ecosystem changes", integrates the work of the Black Sea and Mediterranean research institutions. The project has already received recognition within the EU and among the partners as being very well coordinated and useful, and there is no doubt that the continuation of such good work shall be considered in one form or another.

The Commission on the Protection of the Black Sea Against Pollution (the Black Sea Commission or BSC) is an intergovernmental body established in the implementation of the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), its Protocols and the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea. Violeta Velikova from the Permanent Secretariat at Istanbul presented the basic principles of the versatile activities in protecting the environment and enhancing cooperation by the Black Sea Commission. Presently, the Black Sea is showing signs of recovery to a certain extent due to joint regional effort and international cooperation. The general problem, however, is that some states do not respect their commitments to monitoring the marine environment.

There is great potential for cooperation in the Black Sea region. Research cooperation among scientists from all Black Sea countries exists, but so far



Meeting participants in the Black Sea dialogue meeting

M. Gorika TOPAS

cooperation between funding agencies has been missing. It is believed that BONUS experiences, as presented in the series of BONUS Publications, could function as guidelines for others on how to proceed in research funding cooperation.

Our meeting was to show that not only our success stories but also the challenges we have faced can be used for benchmarking analysis in the

Black Sea region to develop a plan for new ideas and tools. We hope that our initiative regarding dialogue meetings in regions such as the Black Sea is of benefit to both sides and can be a good start for overarching cooperation in European marine research funding.

**Regina Terlecka**

## DIALOGUE IN ATHENS

The second dialogue meeting of work package 6 was held with the Mediterranean countries. The meeting was organized in Athens, Greece, on 23 October 2008, and it was attended by both BONUS partners and representatives of the Mediterranean countries.

The meeting started with a presentation of BONUS by Programme Manager Andris Andrusaitis. He presented the history of BONUS starting from the beginning of BONUS ERA-NET and ending with current activities, including the Strategic Research Agenda for BONUS-169, which is being prepared. Mr. Andrusaitis' presentation was followed by the presentation of the BONUS-169 Science Plan and Implementation Strategy by Mr. Jan Thulin from ICES.

Mr. Thulin presented the different phases of compiling the Science Plan, including several consultations with scientists and other stakeholders, and the eight themes that were formed based on these consultations. He concluded that after many years of "no action" there is now public awareness of the bad condition of the Baltic Sea and the political will to do something about it. There are now also many strategies and plans to support policy-making.

Mr. Evangelos Papanthassiou presented the SESAME project. SESAME is an international research project, supported by the European Commission, which explores and studies the ecosystem changes of the Mediterranean and Black Sea and their surrounding environments. Mr. Papanthassiou told the meeting that a communication network between scientists in the Mediterranean region has been created and some spin-off projects have been formed through SESAME.

Mr. Kostas Nittis from the Hellenic Centre for Marine Research presented preliminary plans for the new marine ERA-NET. It was discussed that if the joint calls in the new marine ERA-NET have very many participants and broad themes, it may be difficult to get national funding agencies committed to the funding. However, all in all the new marine ERA-NET was considered to be a positive development, and meeting participants expressed an interest to be involved in future discussions.

Finally, Ms. Esin Esen presented the Scientific and Technological Research Council of Turkey (Tübitak), and the meeting ended with an open discussion on the new marine ERA-NET.

**Reetta Koivisto**



Lene Friis Møller

## Results of the BONUS+ Call – the first call of the Joint Baltic Sea Research Programme

On 18 June 2008, the six-month long effort of selection was accomplished and BONUS EEIG announced sixteen research proposals to be funded in 2008–2011.

As already reported, none of the thematic areas identified in the BONUS-169 Science Plan and Implementation Strategy were brought to the forefront in the first call. Instead, the call was to test how attractive participation in the Joint Programme might seem to the researchers and what would the distribution of power be like, so all seven BONUS research themes were opened for submission of proposals. The response exceeded even the most optimistic expectations. By the deadline, 149 letters of intent by international teams of researchers were uploaded onto the BONUS Electronic Proposal Submission System (EPSS). The first round of selection resulted in 55 proposers invited to submit a full proposal. The tough competition proposals had to face leaves no doubt about the winners' scientific quality and potential to produce extremely valuable outputs. Nevertheless, it is worth recognizing that many good

and promising proposals had to be left outside of the funding capacity of the BONUS+ Call.

### Linking science and policy

Built on the thematic framework provided by the BONUS-169 Science Plan and Implementation Strategy, each of the research proposals have a cross-cutting aspect logically combining two or in many cases several fields of investigation to better address the marine research needs in the Baltic Sea region. Most importantly, each of the projects involves an effort to contribute to evidence-based policy-making, so any of them may be recognized as a part of the BONUS theme "Linking science and policy".

### Understanding climate change and geophysical forcing

This theme is represented by two projects. INFLOW will address one

of the fundamental properties of the Baltic Sea physical system: inflows of saline water from the North Sea. By using sediment proxy data gathered from along a Baltic Sea transect, the relationships between long-term instrumental data and signatures of modern sediments will be quantified. These studies will be extended to longer time scales (the past 6,000 years) and linked to climatic data from the wider North Atlantic to identify the forcing mechanisms of ecosystem changes. Scenarios of the future development of the Baltic Sea will be produced by modelling.

Practical aspects of physical oceanography will be tackled in Baltic Way. This project aims to develop an innovative low-cost technology for the environmental management of shipping, extendable to offshore areas, and coastal engineering activities, allowing to place dangerous activities in areas where an accident would pose a minimum threat to vulnerable zones. The project approach makes use of existing semi-persistent current patterns that affect the propagation of pollution.

### Combatting eutrophication

For years eutrophication has been considered to be the main threat to Baltic Sea health. Therefore, it may not come as a surprise that the largest group of BONUS+ projects sets the aim of better understanding eutrophication-related biogeochemical processes in the sea and its drainage basin and developing efficient and cost-effective ways to curb this adverse phenomenon. The goal of project AMBER is the implementation and application of the Ecosystem Approach to Management (EAM) in the Baltic Sea, with a focus on the coastal ecosystem. Retrospective analyses on long-term data sets, intensive modelling with different types of models combining land-use models and climate models, and selected measurements of biogeochemical transformation processes in the near coastal area and groundwater will be applied and integrated into a sound scientific basis for the development of EAM tools such as ecological quality objectives.

Project Baltic-C will develop and apply a new integrated ecosystem model framework based on the cycling of organic carbon and carbon dioxide in the Baltic Sea water, drainage basin, atmosphere, and sediments. The model development will consider data from existing databases, data from dedicated research vessel cruises, existing meteorological field stations, and data gathered by new automatic measurement systems on the Voluntary Observation Ship (VOS).

Project HYPER will synthesise knowledge about processes leading to hypoxia over long time scales and on an ecosystem scale covering wide ranges of salinity, temperature and red-ox conditions, and investigate the feedback mechanisms of the benthic fauna on biogeochemical nutrient cycling. The project will contribute to the development of the Baltic NEST Decision Support Tool.

Another project looking into the phenomenon of hypoxia is BALTIC GAS. This study aims to understand how climate change and long-term eutrophication affect the accumulation of shallow gas and the emission of methane and hydrogen sulphide from the seabed to the water column and atmosphere.

Finally, project RECOCA will ensure further development of the NEST decision support tool, providing a more realistic drainage basin scale, incorporating cost analysis, and adding hypoxia as an additional indicator of ecosystem response to eutrophication.

### Preventing pollution

Two BONUS+ projects address the issue of assessing the biological effects of chemical pollution. BALCOFISH will integrate pollutant gene respons-

es and fish ecology in Baltic coastal fisheries and management. This project aims at developing coastal pollution assessment techniques based on biological effects on the eel-pout population, including genetic effects, while the pan-Baltic project BEAST promises to develop a set of integrated indicators of chemical pollution and tools needed to detect and understand human-induced pressure on the Baltic Sea ecosystem. The scope of this project ranges from genetic responses to organism susceptibility to diseases and parasites.

### Protecting biodiversity

The concept of biological diversity is often understood merely as the diversity of species. In reality, however, the issue is at least three-dimensional, including both the genetic diversity within a species, diversity of species, and diversity of habitats. It can be noted with satisfaction that BONUS+ will work in all of these dimensions. Project BaltGene will identify and map Baltic Sea genetic biodiversity and experimentally test its importance in the functioning and resilience of the ecosystem. This project will also assess the potential threats to the unique diversity from fisheries-induced selection, climate changes, aquaculture activities and habitat loss. Results will help to set management measures that take into account the demographic and genetic structure of populations.

BAZOOCA will address the well known problem of occurrence of



Erik Selander, BAZOOCA project.

A young *Mnemiopsis leidyi* infested by two parasitic sea anemones of the species *Edwardsiella lineata*.

non-indigenous species in the Baltic Sea. By using models, experiments and field studies, BAZOOCA will quantify the ecosystem consequences of the occurrence of comb jelly *Mnemiopsis leidyi* in the pelagic food web, from microbes to gelatinous top

predators. Focal topics of the project include predation on cod eggs and larvae, changes in water clarity as a possible cause leading to regime shifts from fish to jellyfish, and couplings between zooplankton and microbes.

Project PREHAB will develop methods for powerful, precise and cost-efficient spatial prediction of the biological properties of coastal habitats, and combine them with scenarios of human pressures to assess the effects on coastal ecology, ecosystem goods and services, and social benefits associated with alternative management options.

### Integrating ecosystem and society

A well represented group of studies will be devoted specifically to one of the most challenging and at the same time vitally important fields: integrating the ecosystem and society. PROBALT works on improving the societal conditions for Baltic Sea protection. The project will analyze the societal conditions and provide tools for the effective protection of the Baltic Sea, with a special emphasis on combating eutrophication. Project IBAM will produce an integrative environmental decision model for the Gulf of Finland. This model will incorporate major scientific information in probabilistic terms and combine risk management on five levels: fisheries, eutrophication, oil spills, dioxin risks

and climate change. Environmental risks will also be in the scope of RISKGOV. This project will improve understanding of the structures and processes that shape the governance of environmental risks and suggest a normative framework for improving environmental risk governance in the Baltic Sea.

Finally, perhaps the most ambitious research proposal of the BONUS+ Programme is ECOSUPPORT, which promises to provide a multi-model system tool to support decision-makers. The tool will be based upon scenarios from an existing state-of-the-art coupled atmosphere-ice-ocean-land surface model for the Baltic Sea catchment area, physical-biogeochemical models of differing complexity, a food web model, statistical fish population models, economic calculations, and new data detailing climate effects on marine biota.

In the autumn of 2008, while the national research funding organizations together with BONUS EEIG are establishing the funding procedures to support these studies, sixteen international teams are preparing to commence intensive research work in early 2009. On 13–15 January 2009, BONUS EEIG will gather representatives of all projects for the Programme's "kick-off" conference at Dipoli convention centre in Espoo near Helsinki.

Andris Andrusaitis



Finnish Institute of Marine Research

# Baltic Sea science – production, cooperation and the price of it all

In the course of the BONUS ERA-NET project, its Task 1.6 was extended with a bibliometric study of ISI-ranked papers on Baltic Sea science. This study is now published as BONUS Publication No. 9. It analyses the current research subjects, cooperation within and between countries, and the publication volume, quality and costs of Baltic Sea research as a whole and for each Baltic Sea country separately.

## An instrument for future evaluations

The purpose of the funding provided by the BONUS+ and BONUS-169 calls is to significantly stimulate research on BONUS Theme 6 (Integrating Ecosystem and Society) and Theme 7 (Linking Science and Policy). Simultaneously, research volume, quality and scientific cooperation are expected to increase by the surplus funding. The new report is a baseline study for the years 2002–2006, so that the renewal, volume and quality of the science produced in the BONUS Joint Baltic Sea Research Programme 2008–2016 can be evaluated in the future. The report recommends evaluating also the practical relevance of the new scientific results by analysing how official EU, ICES, HELCOM and national EPA documents will refer to ISI-ranked papers produced within the Research Programme.

## Research volume

Altogether, 1975 ISI-ranked papers published during 2002–2006 were found in 15 databases with the search criteria 'Baltic Sea', 'Oresund', 'Danish Belt' and 'Kattegat'. Forty-nine countries were involved in these publications: the nine Baltic Sea countries, 21 other European countries and 19 non-European countries. Scientists from the Baltic Sea countries generated more original data while scientists from other countries used these data more in review papers. Sweden published 110 papers per year, Germany 93, Finland 86, Poland 57, Denmark 49, Estonia 24, Russia 16, Lithuania 9, Latvia 6, other European countries 85 and non-European countries 44. At least one of the Baltic Sea countries was involved in the publication of 93% of the papers.

The 1975 papers were published in 384 different journals, but only 20% of the journals published more than one paper per year. The 'hard core' group of scientists publishing on Baltic Sea science is small; while the number of authors during 2002–2006

was 3626, only 36 scientists published on average more than two papers per year.

## Research quality

The journal impact factor (IF), a measure of scientific quality, should be used with care because it largely depends on discipline, e.g. the IFs for geology and physics journals are much lower than those for toxicology, genetics and microbiology. This is one of the reasons for the differences in the median IF between the countries. It was lowest for Russia (0.7), and highest for Sweden, Germany and Denmark (1.7–1.8). The countries in transition published relatively more in the fields of traditional geology and physics (seabed mapping, lithosphere studies, water transport) while the old market economy countries concentrated more on interdisciplinary research in modelling, air-sea interactions, fisheries and management.

## Costs and cost-efficiency

The bibliometric data were correlated to the R&D funding in 2004, when 882 research projects on Baltic Sea science were active in the nine Baltic Sea countries at a total cost of 51.6 M€ (BONUS Publication 3). A paper costs the most in Denmark (~160,000 €) and the least in Estonia (~20,000 €). The differences mainly illustrate the levels of scientists' wages, which were highest in the old market economy countries and lowest in the countries in transition. The average EU contribution to the R&D funding was around 30% for the eight Baltic EU countries. It was highest in Denmark (58%) and lowest in Finland (12%).

Low cost-efficiency was identified in specific research subjects in some countries compared to others, e.g. genetics and microbiology (Sweden), meteorology (Finland, Germany), modelling, method development and technology (Poland, Sweden), physical oceanography (Denmark), socio-economy (Poland), biodiversity (Sweden), climate change (Denmark, Germany) and eutrophication (Finland).

## Research focus

Basic research and studies on contaminants produced about three times more papers relative to the percentage of R&D funding invested (Figure 1). The opposite, a high investment of R&D funding and, relative

to that, a low production of papers, was found in studies directly related to environmental or societal issues, e.g. biodiversity, climate change, eutrophication, fisheries and coastal problems. One explanation is that expensive infrastructure is necessary for environmental research. Another explanation is that 'applied' research applications often result in 'basic' research publications, which illustrates a discrepancy between money raising and academic career merits.

## International cooperation increases the impact factor

Thirty-nine percent of the papers were produced by a single institute, 29% by national cooperation and 32% by international cooperation between two or more countries. International co-publication raised the IF for seven out of the nine Baltic Sea countries (Figure 2). Denmark, Finland, Germany and Sweden co-published most with each other. The five countries in transition co-published most with the four old market economy countries. There was also a tendency to co-publish with the closest neighbour with whom regional parts of the Baltic Sea are shared, e.g. Sweden

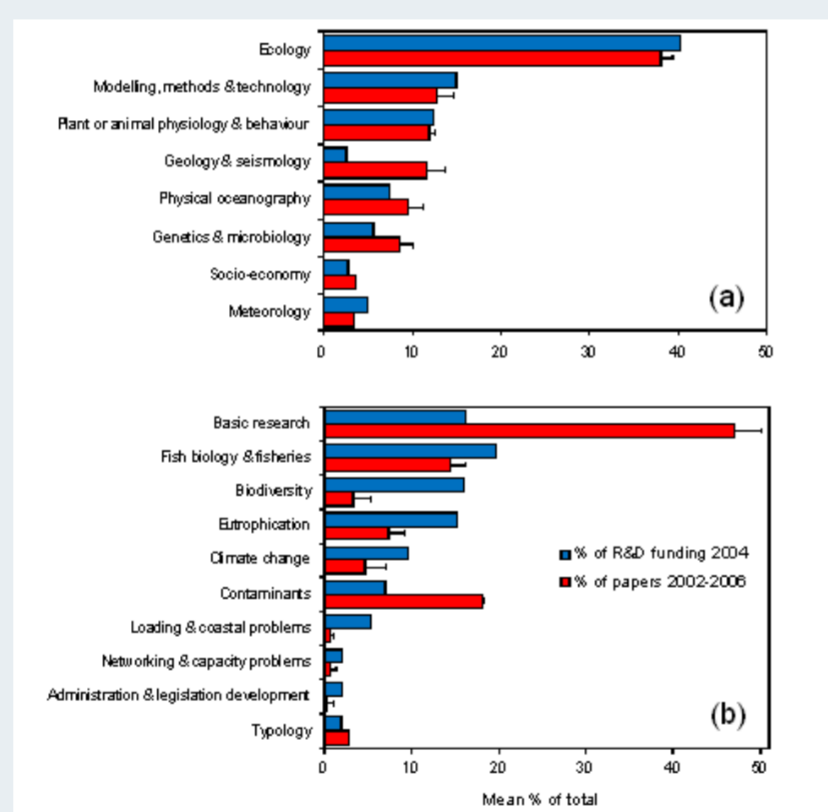
and Finland (Gulf of Bothnia), Russia and Estonia (Gulf of Finland), Poland and Germany (S Baltic Sea), Denmark and Germany (SE Baltic Sea).

## Research coordination is necessary

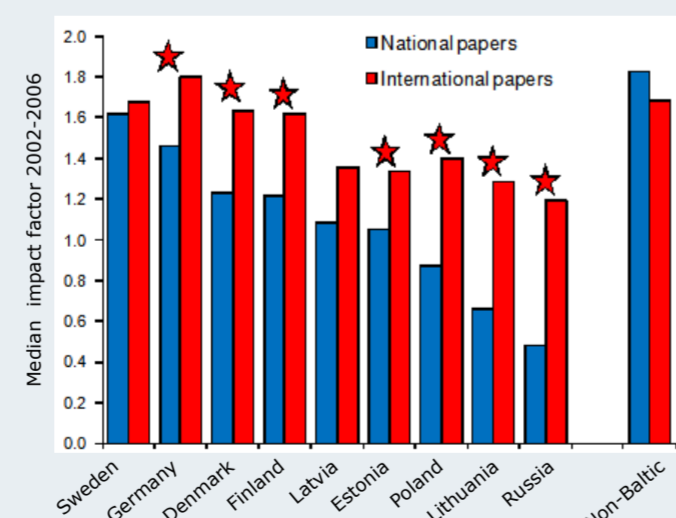
One of the major conclusions of the report is that better coordination of research towards specific goals is necessary to create a scientific basis for managing the human activities affecting the Baltic Sea ecosystem so that its goods and services can be utilized by society also in the future. In particular, this includes improved interdisciplinarity between natural and social sciences and increased international cooperation, two of the main goals of BONUS.

**Pauline Snoeijs**,  
Chair of the BONUS ERA-NET  
Advisory Board  
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International Publication of Baltic  
Sea Science 2002–2006 (BONUS  
Publications No. 9) will be available  
on [www.bonusportal.org](http://www.bonusportal.org)



**Figure 1.** The % of R&D funding invested correlated well with the % of ISI-ranked papers produced in most scientific classes (a), but not in the thematic research focus groups (b).



**Figure 2.** International co-publication raised the IF for seven out of the nine Baltic Sea countries. Stars indicate significant differences obtained in Mann-Whitney U-tests.

# BALTEX – A multidisciplinary research network for the Baltic Sea basin

BALTEX (the Baltic Sea Experiment) was launched in 1992 as a Continental-Scale Experiment (CSE) of the Global Energy and Water Cycle Experiment (GEWEX) within the World Climate Research Programme (WCRP). Following GEWEX, the motivation for establishing BALTEX was to observe, understand and model the hydrological cycle and energy fluxes in the atmosphere, on land, including rivers and lakes, and in the Baltic Sea. The active involvement of relevant research organisations and national Hydrometeorological Services has been a successful strategy in establishing and maintaining the BALTEX programme. Having reached several of its primary goals, Phase I of the programme was concluded in 2002, and, building upon the success of Phase I, extended objectives have been formulated for the period until 2012.

## Phase I (1992–2002)

The key objective of BALTEX Phase I was to explore and model the various mechanisms determining the space and time variability of energy and water budgets of the BALTEX region and its interactions with surrounding regions. From its very beginning, BALTEX aimed at developing transportable methodologies in order to contribute to the basic needs of climate, climate impact, and environmental research. BALTEX Phase I generated active research covering the whole field of advanced modelling and data studies in meteorology, hydrology and oceanography. Major research elements of BALTEX include the collection of *in situ* and remote sensing data, re-analysis of existing data sets, data assimilation, numerical experiments and coupled modelling, and process studies including field experiments. Prominent achievements are the first coupled regional models for the entire Baltic Sea basin (including the atmosphere, land surface, and the sea, including sea-ice) and improved water budget estimates through newly assimilated data sets. Special observing periods, such as the Pilot Study for Intensive Data Collection and Analysis of Precipitation (PIDCAP) in 1995, and BRIDGE, the major enhanced observational period within BALTEX with dedicated additional observations running from 1999 to 2002, were conducted in the frame of BALTEX. For a review of BALTEX Phase I achievements see e.g. BALTEX (2005) and Omstedt et al. (2004).

<sup>1</sup> RCAO, developed at the Swedish Meteorological and Hydrological Institute (SMHI) in Norrköping, Sweden; and BALTIMOS, developed by a German consortium under leadership of the Max Planck Institute for Meteorology in Hamburg, Germany.

## Phase II (2003–2012)

Basic research in the field of water and energy cycles remains on the agenda of the programme. Additionally, the achievements of BALTEX Phase I have called for an application of the models and an extension of research goals. Therefore, Phase II (2003–2012) extends the scope of BALTEX to the following areas (BALTEX, 2006):

- Climate variability and change since 1800 and the provision of regional climate projections for the Baltic Sea basin in the 21<sup>st</sup> century
- Improved tools for water management, with an emphasis on more accurate forecasts of extreme events and long-term changes
- Biogeochemical cycles and transport processes within the regional Earth system under anthropogenic influence
- Strengthened interaction with decision-makers, with an emphasis on global change impact assessments
- Education and outreach at the international level

An important aspect of BALTEX Phase II is its holistic approach to observing, understanding and modelling major environmental aspects relevant for the entire Baltic Sea basin. BALTEX Phase II research thus contributes to building up a high resolution integrated modelling capability for Northern Europe, embedded in an Earth System Model. Coupling biogeochemical and ecological models with regional climate models is a major challenge for the coming years and constitutes a core activity in BALTEX Phase II.

A recent major achievement of BALTEX Phase II has been the publication of the "BALTEX Assessment of Climate Change for the Baltic Sea basin (BACC)". The BACC Author Team consists of more than 80 scientists from 13 countries, covering relevant disciplines of climate and climate change impact research. The book (BACC Author Team 2008) offers an up-to-date overview of the present evidence of climate change in the recent past, climate projections up until 2100 using the most sophisticated regional climate models available, and an assessment of climate change impacts on terrestrial, freshwater and marine ecosystems in the Baltic Sea basin.

## BALTEX and BONUS

BALTEX has created an ideal platform for the establishment and further development of advanced tools in the context of regional Earth system modelling and the ecosystem approach to

management of the Baltic Sea basin. BALTEX objectives overlap with several research themes of BONUS, particularly themes 2, 3 and 6. A closer cooperation between BALTEX and BONUS seems therefore an obvious future option with mutual benefit. Concrete research examples are two BALTEX project proposals which have recently been retained for funding within the BONUS+ Call, covering the predictions of the Baltic Sea carbon and oxygen system (BALTEX-C) and scenarios of the Baltic Sea ecosystem to support decision making (ECOSUPPORT). Also, BALTEX is represented in the BONUS EEIG Advisory Board. BALTEX is an open network, and active contributions to BALTEX initiatives are always very welcome ([www-baltex-research.eu](http://www-baltex-research.eu)).

## Activities and infrastructure

Results of BALTEX are documented in about 400 peer-reviewed journal articles and numerous reports. BALTEX has generated seven special journal issues, and a further one, dedicated to the 5<sup>th</sup> International Study Conference on BALTEX held in 2007, will be published in early 2009. A BALTEX Newsletter is issued twice a year.

International Study Conferences on BALTEX have been held regularly with typically 120 to 150 participants covering the entire spectrum of the interdisciplinary research of BALTEX. The timing and location of conferences follow the BALTEX tradition, which is to hold a conference on a Baltic Sea island every 3 years. Following Gotland (1995), Rügen (1998), Åland (2001), Bornholm (2004), and Saaremaa (2007), the forthcoming conference is planned to be held on the Polish island of Wolin in 2010.

BALTEX is led by the BALTEX Science Steering Group (BSSG), whose members represent the major BALTEX research fields from countries all over the basin. Joakim Langner, Head of the research department at the Swedish Meteorological and Hydrological Institute (SMHI), is the current chairperson of the BSSG. The BSSG is supported by the

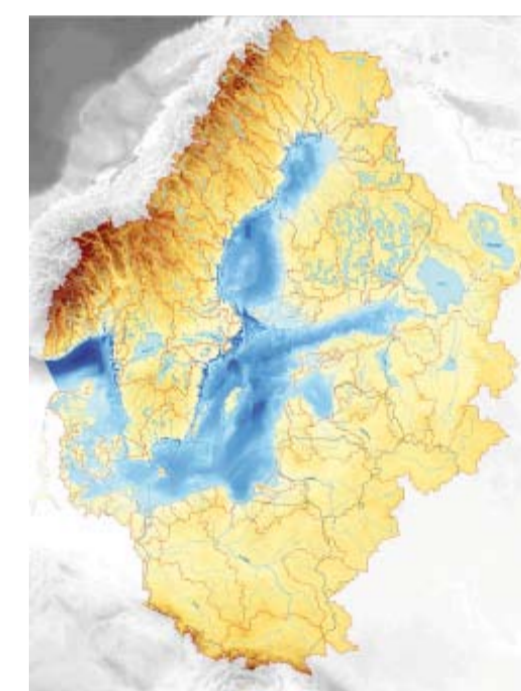
International BALTEX Secretariat, based at the GKSS Research Centre in Geesthacht, Germany. Several working groups have been established to both assist the BSSG in shaping the programme but also to execute part of the actual research in BALTEX. BALTEX has established a dedicated data support infrastructure, which is currently being updated in order to reflect the recent changes in the programme's objectives.

For more information on BALTEX, see [www.baltex-research.eu](http://www.baltex-research.eu).

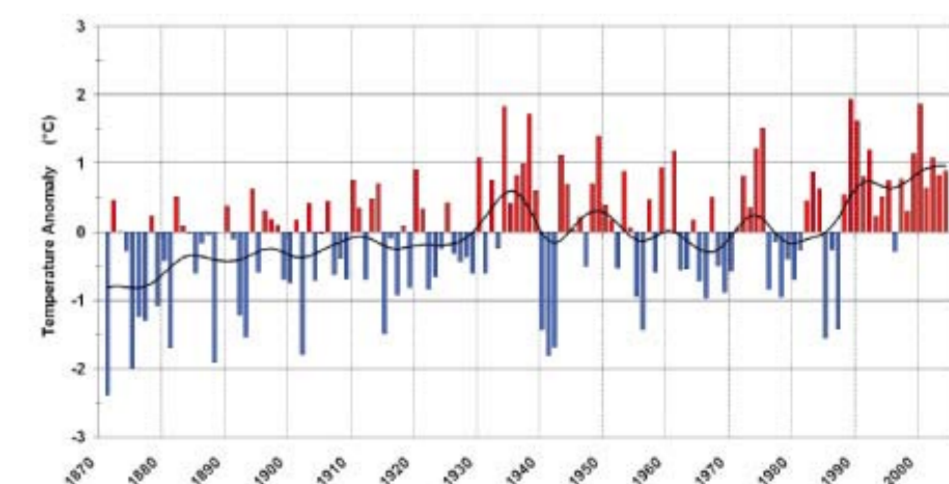
**Hans-Jörg Isemer** and  
**Marcus Reckermann**  
International BALTEX Secretariat

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**Figure 1.** The Baltic Sea basin (by courtesy of SMHI)



**Figure 2.** Air temperature changes in the Baltic Sea basin from 1871–2004, shown as deviation from the 1961–1990 mean value. Bars represent annual values, and the black curve shows the smoothed data (data from BACC Author Team 2008).



## Valery Forbes, the new chair of BONUS EEIG

### What is your professional background?

I have a PhD in Coastal Oceanography from the State University of New York at Stony Brook. My current research interests are in aquatic ecotoxicology, ecological risk assessment and population ecology. I act as Professor and Head of Department of the Department of Environmental, Social and Spatial Change at Roskilde University, Denmark.

### What are your main professional interests as the chair of BONUS EEIG?

I think that promoting the integration of natural sciences and social sciences with the aim of solving complex environmental problems offers great promise, but is also extremely challenging. BONUS's focus on integrating ecosystems and society and the aim of linking science and policy are particularly exciting elements of the programme and ones that I would like to promote.

### In your opinion, what has been the most significant event in the lifetime of BONUS ERA-NET so far?

Certainly being able to pull off a very successful first call in BONUS+, which has not only demonstrated the willingness of the participating countries to join forces in solving the Baltic Sea's problems but also highlighted the high quality of (natural and social) scientific expertise that exists in the Baltic Sea countries.

### What are your expectations concerning the future of BONUS and Baltic Sea region collaboration?

I believe that BONUS and subsequently BONUS+ have made very impressive strides towards truly integrating Baltic Sea research within a very short timeframe. I hope and expect that the future will see BONUS's successful implementation as an Article 169 initiative. I also expect that in coming years we will see real benefits of the research outputs for the long term sustainability of the Baltic Sea and the societies that depend upon it.

## BONUS Newsletter

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 Publisher BONUS EEIG  
 Hämeentie 33  
 FI-00500 HELSINKI  
 Webpage www.bonusportal.org  
 Newsletters are available in pdf format on the webpage  
 Layout Sole Lätti  
 Printing Kirjapaino Uusimaa

BONUS has received funding from the European Community's Sixth Framework Programme.



## Finnish BONUS+ launch

The Academy of Finland was the first to launch the BONUS+ activities by organizing a dedicated Baltic Sea seminar 'Research gives boost to the management of Baltic Sea change' on 4-5 November 2008 in Helsinki. The seminar aimed at giving an overall picture of the status of Baltic Sea research in Finland and finding flexible mechanisms for transferring key research knowledge to support decision-making.

The seminar started with a speech given by the Minister of Education, Ms Sari Sarkomaa, who emphasized the importance of science in supporting better policy-making. Then, excellent key note presentations were given on the challenges of science communication, the value of the Baltic Sea, and the anatomy of the problems in protecting the Baltic

Sea. Furthermore, presentations were given on research needs relating to the sustainable development of the Baltic Sea, and on how scientific knowledge and practical knowledge needs meet each other. Finally, the four Finnish BONUS+ coordinators presented their projects and how they would support decision-making. The first day ended with an overview of the evolving Baltic Sea Strategy.

On the second day, the approximately 80 participants from academia, ministries and NGOs convened in a brainstorming learning café in order to create ideas for new mechanisms of knowledge transfer and communication.

The suggestions will be compiled into a report, and a follow-up seminar will be arranged within a year.



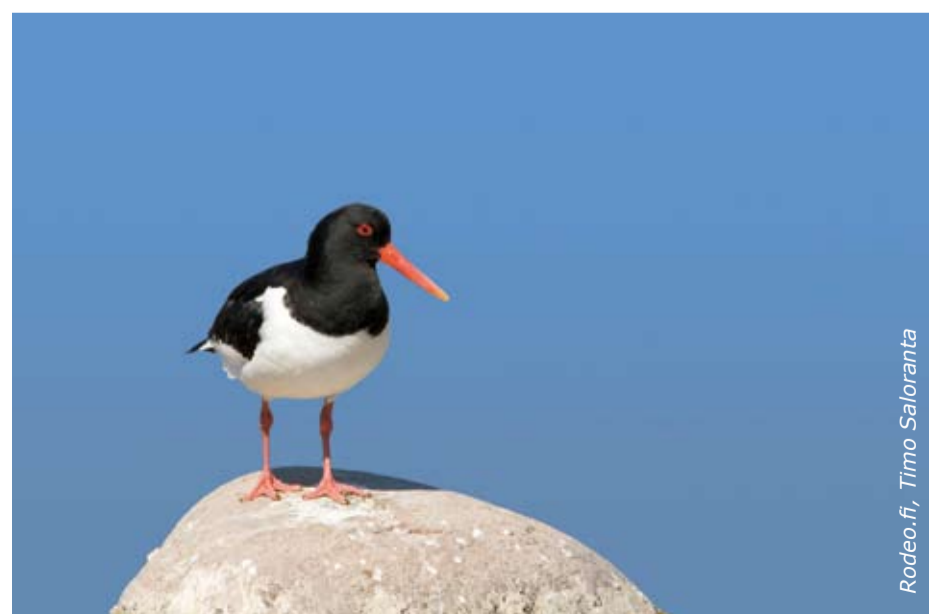
*A sub-group discussing how the decision-making can adapt to the consequences of the climate change*

## BONUS+ KICK-OFF CONFERENCE

will take place at Dipoli Conference Centre, Espoo, Finland, on 13-15 January 2009.

During the first two days, the teams of sixteen funded projects will share their research plans and discuss the ways of cooperation throughout the 3-year lifetime of BONUS+ Call. A dedicated session will be devoted to the technical aspects of programme management: introduction to the BONUS reporting system, data policy, joint training, stakeholder consultation and dissemination activities.

In the evening of 14 January, young Finnish researchers invite their contemporaries participating in the conference to the BONUS Young Researchers Club. On 15 January BONUS EEIG invites all participants to take part in the BONUS brainstorming session "What science can do for the protection of the Baltic Sea and sustainable use of its resources". The purpose of this session is to initiate a broad discussion on how to further develop the BONUS-169 Action Plan and Strategic Research Agenda to best respond to the marine and maritime research needs in the Baltic Sea region and beyond.



*Rodeo.fi, Timo Saloranta*