



Newsletter

November 2009

BONUS Baltic Organisations Network
for Funding Science EEIG



Rodeo.fi - Barbro Wickström

HIGH LEVEL SUMMIT WILL FOSTER COMMITMENTS TO RESTORE THE BALTIC SEA

State leaders, business CEOs, NGOs and individual citizens willing to contribute to the restoration of the Baltic Sea will convene in Helsinki on 10 February 2010 in the Baltic Sea Action Summit. The event is convened by the Finnish President Tarja Halonen, Prime Minister Matti Vanhanen and Chairman of the Baltic Sea Action Group, Ilkka Herlin.

The Summit has a novel and ambitious goal. Instead of aiming at carefully worded resolutions or optimistic promises, it aims at concrete commitments to action. The idea is that the participants commit to actions that best marry their interests with their abilities for the benefit of the Baltic Sea. Commitments can be financial or non-financial as long as they contribute to the recovery of the Baltic Sea.

Scientia pro Mari Baltico – Science for the Baltic Sea

In order to promote better use of research to support Baltic Sea management decisions, the Academy of Finland is organizing an event called BONUS Day – Scientia Pro Mari Baltico on the day before the Summit, 9 February 2010. It is a joint effort of the Academy of Finland,

BONUS EEIG and Baltic Sea Action Group in cooperation with the main Baltic Sea research institutes.

The participants of the BONUS Day will be from the Baltic Sea Region representing the research community, administrative and political decision making bodies. The theme of the event refers to the EU Strategy for the Baltic Sea Region and is one of its passages: "Use research as a base for policy decisions". At the same time it realizes the principles of the EU's Maritime Policy, which calls for excellence in marine scientific research in support of maritime policy. A special emphasis will be put on maritime safety, eutrophication and biodiversity and how economic, political and communicative actions in these fields are supported by scientific research.

The main platform for the cross discipline and sectoral discussions will be a Learning Café to indicate and discuss the current practices and emerging trends of science-policy links in the Baltic Sea Region. The Learning Café is preceded by a kick-off session, i.e. provocative presentations that will make the participants see both sides of the coin. The Prime Minister's Office

has provided the House of the Estates as a venue for the event. We are looking forward to having fruitful discussions. The event offers excellent networking opportunities. The summary and message of the BONUS Day will be brought to the heads of states in the Baltic Sea Region in their Summit on the following day, 10 February 2010.

In recent years, the Academy of Finland has allocated a considerable amount of funding to multidisciplinary research studies on marine and maritime issues. As a logical next step, the Academy of Finland will strengthen the societal impact of these studies and thereby the foundations of the BONUS-169 research programme. BONUS Day is a strategic event that initiates interaction between the research community and other actors of civil society.

Laura Raaska and Kyösti Lempa
Academy of Finland

PROGRAMME OUTLINE FOR BONUS-169 ADOPTED

The goal of elevating the BONUS Programme to the status of Article 169 activity is soon becoming reality. The European Commission submitted the legislative proposal to the Parliament and the Council in October this year. A new programme outline providing a roadmap for creating a Strategic Research Agenda and implementing research based on a more complete thematic scope and stronger participation of stakeholders has now been adopted.

An important progressive step towards designing a joint Programme was preparation and agreement of the BONUS-169 Science Plan and Implementation Strategy in 2006 – a process involving over 800 scientists and stakeholders in all nine Baltic Sea countries. The Science Plan served as a framework for the

CONTENTS

High level summit will foster commitments to restore the Baltic Sea	1
Programme outline for BONUS-169 adopted	1
BONUS in a nutshell.....	2
Editorial: Integration dimensions	3
BONUS Annual Conference 2010 in Vilnius, 19-21 January	3
ECOSUPPORT: An advanced modeling tool for scenarios of the Baltic Sea ECOSystem to SUPPORT decision making.....	4
BEAST: Biological effects of anthropogenic chemical stress: Tools for the assessment of ecosystem health.....	5
BONUS Young Scientist workshop in Tallinn	6
Jüri Elken, the new Chair of BONUS EEIG.....	7
R/V SALME – a renovated research vessel available for marine scientists	7
Getting to the bottom of the hypoxia problem in the Baltic Sea – successful completion of the HYPER cruise	8

BONUS+ Call, which was launched in 2007. However, it became clear in the course of further preparations that an outline of enduring research cooperation should foresee more progressive development and be thematically broader to encompass the whole Baltic Sea System.

As a preparatory step related to the Commission's proposal on BONUS-169, a new programme outline was prepared by the EEIG's drafting team and experts appointed by the Commission. The BONUS EEIG Steering Committee approved the document in July. The outline describes the mechanism for developing BONUS-169 Strategic Research Agenda, which is based on the former work of the BONUS ERA-NET, but will develop it into a broader programme that has stronger and clearer integration of stakeholders as well as socio-economic and natural sciences.

Continues on page 2

THE NEW OUTLINE BROADENS THE SCOPE OF THE PROGRAMME

The Strategic Research Agenda for BONUS-169 will be based on four principles, combining experience from the BONUS+ Call with clearer definition of the Baltic Sea System geographical area and the stakeholder's constituency.

One major lesson learned while implementing the BONUS+ Call was that the Science Plan of an extensive and enduring Joint Research Programme must be a 'living' document, evolving along with the developing scientific thinking and receptive to emerging research needs. From this conclusion arose the *most important principle* of the Strategic Research Agenda: A dynamic approach to be followed.

The *second principle* involves the inclusion of both marine and coastal aspects in order to fully encompass the ecosystem of the Baltic Sea and its coasts – the Baltic Sea System.

The *third principle* recognizes the importance of knowledge on the influences and inputs to the Baltic Sea System from the catchment.

Finally, the *fourth principle* concerns strengthening of stakeholder participation.

The programme will be structured in two phases: the Strategic Phase (2010-2011) and the Implementation Phase (2012-2016).

STRATEGIC PHASE FOCUSES ON INTEGRATION AND DEVELOPMENT OF A RESEARCH AGENDA

The scope of some national research funding institutions currently integrated into the BONUS EEIG does not embrace the entire thematic width of the Baltic Sea System research (e.g. coasts, drainage basin and fisheries, socio-economy). Moreover, a significant part of the relevant applied research is funded through the sources affiliated to specific sectors of economy or governance, e.g. agriculture, fisheries, marine transportation, energy, environmental protection, spatial development and planning. Thus, in order to build a full-bodied Programme, the task of the Strategic Phase will be to find ways to involve additional funding agencies both as permanent members of BONUS EEIG, or as co-financiers interested in supporting specific thematic calls for research proposals.

The national ministries involved in the governance of the Baltic Sea issues and other involved stakeholders will be approached to establish a Forum of Sector Research to discuss the Programme's potential and the emerging research needs from the decision-making perspective.

The Forum will also be an instrument for advancing the pan-Baltic integration of research currently performed with non-competitive funding and integration of marine research infrastructures.

Another focus of the Strategic Phase is the development of the Strategic Research Agenda. Here the main instrument will be Strategic Orientation Workshops involving natural and social scientists and stakeholders. The discussion of research themes for the coming calls will take into account broader, new and emerging topics.

IMPLEMENTATION PHASE WILL BE STRUCTURED UNDER FOUR PRIORITIES

The first priority aims at setting up and implementing a Baltic Sea System Programme by opening a competitive call for proposals and funding projects of high excellence and relevance. The first call is planned to be opened in 2012.

The second priority focuses on facilitating the cooperation of Baltic Sea System researchers and integration of research programmes. BONUS-169 will be a centre of gravity for a variety of specific support actions: organising conferences and workshops, facilitating communication and information exchange as well as fostering common use of research infrastructures.

The third priority focuses on the young generation and aims at carrying out strategies to strengthen human capacity building in interdisciplinary science and science-based management.

Based on the achievements during the Strategic Phase, the fourth priority aims at establishing smooth links between scientists, policy-makers and knowledge users. We believe that BONUS-169 will make the Baltic Sea System research more applicable for real-life solutions, and policy-making more based on scientific knowledge.

The entire programme outline document is available at www.bonusportal.org.

Kaisa Kononen and Andris Andrusaitis



Riku Lumiaro - Finnish Institute of Marine Research

BONUS IN A NUTSHELL

The word BONUS is used several times in this Newsletter. The term was first used only in the context of the BONUS ERA-NET project, which finished in the end of 2008. During the course of the project, new activities were developed, which have got their own BONUS inspired abbreviations. Today, BONUS is used as a general term referring to all of these activities.

BONUS EEIG is a 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 in order to 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. BONUS EEIG is funded by the member fees and the Finnish Ministry of Education. As regards the BONUS+ Call, BONUS EEIG is the contractor concerning the EC funds, it managed the call and the evaluation process and distributed the EC funds to the national funding agencies after the selection of the projects to be funded. The aim is that in the future all members contributing to a call would transfer their funds to a common pot which would be fully managed by the EEIG.

BONUS+ is a call that was launched in 2007. It includes both national and EC funds. The latter are from the so-called ERA-NET Plus funding scheme of the EU Seventh Framework Programme on the basis of a specific contract with the EC, and therefore the call

abbreviation is BONUS+. BONUS+ is also a term used for the 16 research projects funded through the call. The implementation of the BONUS+ funded projects is to take place during 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 thus its abbreviation is BONUS-169. Article 169 stage will start with a strategic phase in 2010-2011 and continue with an implementation phase during 2012-2016.



Rodeo.fi - Eric Tisselee

BONUS EEIG Members

Danish Agency for Science, Technology and Innovation

Estonian Science Foundation

FIRD Coop, Finland

Forschungszentrum Jülich Beteiligungsgesellschaft mbH, Germany

Latvian Academy of Sciences

Agency for International Science and Technology Development Programmes, Lithuania

Foundation for the Development of Gdansk University, Poland

Swedish Environmental Protection Agency SEPA

Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning FORMAS

EDITORIAL: INTEGRATION DIMENSIONS

The EU's Maritime Policy, published as a Commission's communication two years ago, calls for new ways of designing and implementing sea-related policies at the EU, national and local levels. The key message is that oceans and seas can no longer be considered on a purely sectoral basis but in an integrated, intersectoral and multidisciplinary way. The underlying principle emphasizes the role of science by stating that "[maritime] policy should be supported by excellence in marine scientific research, technology and innovation."

A year ago the Commission defined its proposal for the means for creating better integration between marine and maritime research. According to the communication on European Strategy for Marine and Maritime Research the basis

for the definition of research needs and priorities should be a more effective integration and pooling of knowledge and resources.

Integration in relation to Baltic Sea research is multifaceted and multidimensional. It is anticipated to proceed progressively across scientific disciplines, over national borders, between groups of actors (scientists, policy makers, managers, businesses, NGOs), through the continuum of land-coast-sea, cutting across socio-economic sectors as well as scaling down and up between European, regional and local institutions and structures. How far are we now?

BONUS collaboration started as an ERANET, network of funding agencies. The first step was to learn to know and learn from each other

and each other's best practices. The second step was to plan and implement joint strategic activities and the third step to implement joint activities, namely a joint call, BONUS+, for proposals. 16 multinational projects with over 100 institutes and universities are now implementing joint studies aiming at a better future of the Baltic Sea. This development was hardly foreseen when starting the cooperation six years ago. It can be said that the integration of Baltic Sea research funding was achieved during the BONUS ERANET and BONUS+ phases.

We are now stepping up to a new level of the integration process. The start of the BONUS-169 programme and its strategic phase during 2010-2011 is a timely and logical progressive stage of the multifaceted and

-dimensional integration process. The aim is to broaden the funding basis of the programme, deepen the involvement of end-users and stakeholders and bind the sectoral research institutes into the collaboration framework. In parallel, a research agenda specifically addressing research needs from the policy perspective, will be developed.

A whole set of new perspectives of integration will be opened through the launch of the strategic phase of the BONUS-169 programme. Cooperation, which started modestly by the willingness of the funding agencies to learn from each other, is likely to increase the societal impact of Baltic Sea scientific research remarkably.

Kaisa Kononen

BONUS ANNUAL CONFERENCE 2010 IN VILNIUS, 19-21 JANUARY



The previous issue of the BONUS Newsletter informed about the BONUS+ kick-off conference that launched the Programme. Now, after almost a year has passed since 16 research projects commenced their work in more than 100 participating institutions, it is time to gather again to share the first results and discuss further plans.

In times of booming communication opportunities and calendars crowded with a multitude of events and scientific meetings, it is a challenge to design a Conference programme that would be of utmost interest and usefulness to its potential participants.

We hope that the well established BONUS tradition of communication with scientists and stakeholders will help us to attain this aim. Earlier this year BONUS asked a scientist of each consortium to formulate a few most "burning" issues that would

represent the quintessence of scientific quest in their projects. Now, having the outcome of this survey analyzed, we are more confident of being able to offer an attractive Conference programme and plan thematic cross-project cooperation events for the coming years. We can also see more clearly which are the most "attacked" areas on the map of the needed scientific knowledge, and which areas will need more attention in the future – implementing the BONUS-169.

Thus, the Conference programme, as it seems now, will be built on the four main thematic sessions:

1) Building the knowledge-based governance and management of the Baltic.

With sub-themes: Generic issues of communicating knowledge to the policy level, Management of environmental risks, Developing tools for policy-making and management.

2) Understanding processes and assessing the status of the Baltic.

With sub-themes: Abiotic setting, Functioning of biotic communities, Measuring ecosystem health.

3) The Baltic Sea System: continuum of catchment, coast and the sea.

4) Future of the Baltic Sea: can we predict and shape it?

After discussing with scientists and stakeholders, and approval by the BONUS EEIG Steering Committee, the Secretariat opened the call for Abstracts until 20 November 2009.

In order to have an insight into the cutting-edge developments in other European regional seas and elsewhere in the world, the Conference will feature a couple of plenary lectures by global authorities of marine research. We also

hope to meet marine scientists and representatives of agencies funding marine research in other European regional seas – the Black Sea, the Mediterranean, the North Sea, and the NE Atlantic.

The BONUS Forum of Programme Coordinators will convene on the last day of the Conference to discuss the practical aspects of cooperating across the projects: sharing information, joint use of research infrastructures, conducting collaborative research, and arranging joint stakeholder activities. The BONUS Young Scientist Club will also gather during the days of Conference – this time hosted by young researchers of Lithuania.

To be informed about the events of the BONUS Programme, readers are advised to follow www.bonusportal.org and subscribe to the Bonus Bulletin at bonus@bonusseeig.fi.

Andris Andrusaitis

ECOSUPPORT AN ADVANCED MODELING TOOL FOR SCENARIOS OF THE BALTIC SEA ECOSYSTEM TO SUPPORT DECISION MAKING

With an increasing population and intensified agriculture in the Baltic drainage basin the nutrient loads into the sea have increased. Today experts believe that eutrophication is the most severe threat to the Baltic Sea ecosystem. During recent decades, eutrophication-associated problems like oxygen deficiency in the deep water, spreading of dead bottom zones, increased frequency and intensity of blue-green algae blooms, etc. have been observed.

Consequently, measures against eutrophication in the Baltic Sea have been discussed. In November 2007, the ministers of all Baltic Sea countries signed the ambitious Baltic Sea Action Plan (www.helcom.fi). As the response of the Baltic Sea is slow and an improved state is not expected to occur before several decades after the implementation of the measures, the changing climate has to be taken into account. The calculated nutrient load reductions might not have the same effect in the future climate than in the present climate.

Changing climate may impact the marine ecosystem

The recently carried out Baltic Sea Experiment (BALTEX) Assessment of Climate Change for the Baltic Sea Basin (www.baltex-research.eu/BACC) concluded that global warming may cause hydrographic changes that may have significant impacts on the marine ecosystem and its biodiversity. Results from regional climate modeling suggest that, for instance, the annual mean sea surface temperature averaged for the Baltic Sea area may increase between 2 and 4°C depending on the greenhouse gas emission scenario and the global climate model used. The mean maximum ice extent might be reduced by about - 60 to - 70 % with mean ice free conditions in the Bothnian Sea and large parts of the Gulf of Finland and the Gulf of Riga. As salinity changes in the Baltic Sea are caused by both wind and river flow changes, projections of salinity are rather uncertain. However, any systematic changes are likely to have large impacts on the marine ecosystem.

Multi-model system tool for decision makers

The combined effects of climate change and nutrient load scenarios will be investigated within the interdisciplinary ECOSUPPORT project

(www.baltex-research.eu/ecosupport). Eleven partner institutes from seven Baltic Sea countries are involved. The main aim is to provide a multi-model system tool to support decision makers. The tool is based upon scenarios from an existing state-of-the-art coupled atmosphere-ice-ocean-land surface model for the Baltic Sea catchment area, marine physical-biochemical models of differing complexity, a food web model, statistical fish population models, economic calculations, and new data detailing climate effects on marine biota.

The concept to achieve the above aim is built on the confidence in the models' capacity to simulate climate change and includes several steps:

(i) assessing the predictive skills of the models by comparing observed and simulated past climate variability and analyzing causes of observed variations;

(ii) performing multi-model ensemble simulations of the marine ecosystem for 1850-2100 forced by reconstructions of past climate and by various future greenhouse gas emission and air- and riverborne nutrient load scenarios (ranging from a pessimistic business-as-usual to the most optimistic case);

(iii) analyzing projections of the future Baltic Sea ecosystem using a probabilistic approach accounting for uncertainties caused by biases of regional and global climate models, lack of process description in state-of-the-art ecosystem models, unknown greenhouse gas emissions and nutrient loadings, and natural variability;

(iv) assessing impacts of climate change on the marine biota (e.g. effects of ocean acidification), biodiversity and fish populations (with focus on cod, sprat and herring);

(v) calculating the costs of climate change;

(vi) generating a free-access data base of scenario model results and tools to access the database; and

(vii) disseminating the project results to stakeholders, decision makers and the public.

The objectives are to

1. calculate the combined effects of climate change and changing human activity (i.e. changing nutrient loads from the land and

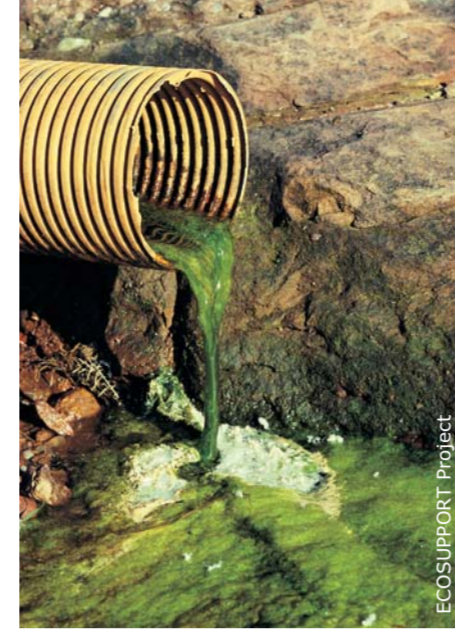
2. assess the resulting socioeconomic impacts;
3. perform time-dependent scenario simulations from the present climate until 2100, and quantify the uncertainties around these future projections;
4. support decision makers and stakeholders with a tool providing them with relevant and readily accessible information that will help to raise wider public awareness; and
5. conduct focused assessments of local-scale impacts of climate change on coastal areas (with focus on the Gulf of Finland, Vistula Lagoon, and the Polish coastal waters).

The expected outcome is an advanced modeling tool for scenario simulations of the whole marine ecosystem that can underpin and inform management strategies to ensure water quality standards, biodiversity and fish stocks.

Focus on the system model approach

Within ECOSUPPORT we will apply a hierarchy of existing state-of-the-art sub-models for the Earth system.

A high-resolution coupled atmosphere-ice-ocean-land surface model (RCOA) with lateral boundary data from Global Climate Models (GCMs) will be applied to investigate the future climate of the Baltic Sea region. A hydrological model HYPER is used to calculate future river flow and riverborne nutrient loadings. Changing airborne

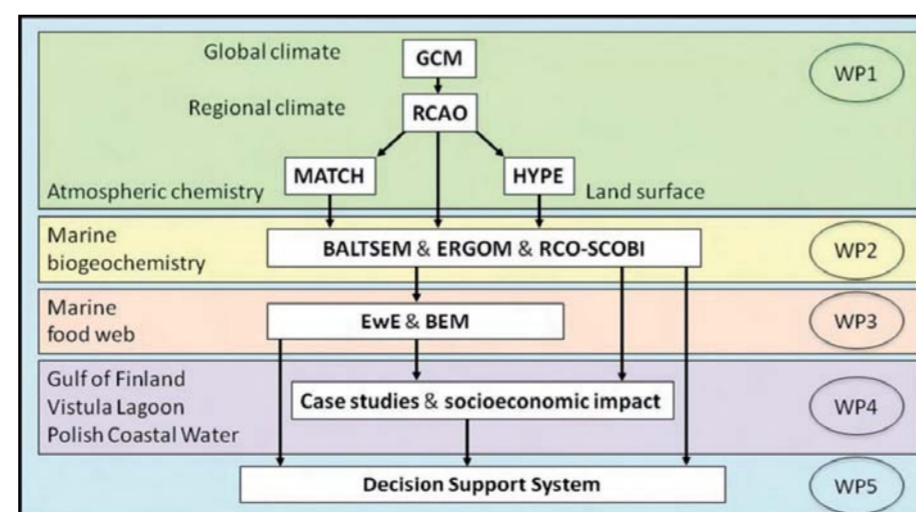


nutrient deposition over the Baltic Sea is simulated with the advanced photochemical transport model MATCH. Three state-of-the-art coupled physical-biochemical models will be used to calculate changing concentrations of nitrate, ammonium, phosphate, diatoms, flagellates, cyanobacteria, zooplankton, detritus, and oxygen in water and sediments (BALTSEM, ERGOM, and RCO-SCOBI).

The food web of the Baltic Sea will be simulated by applying the ecological software EwE, which is an excellent tool, to: a) address ecological questions; b) evaluate ecosystem effects of fishing; c) explore management policy options; d) evaluate impact and placement of marine protected areas; and e) evaluate effects of environmental changes. Statistical models for Baltic Sea fish species link climatic forcing and lower trophic level processes to fish dynamics. We will also generate Bioclimatic Envelope Models (BEMs) for key species in the Baltic Sea system to assess the susceptibility of these taxa to range-extension and possible local extinction arising from climate change.

For the focus study sites, Gulf of Finland, Vistula Lagoon and the Polish coastal waters, we will conduct assessments of the impact of climate change on the regional and local development. Biological valuation maps that compile and summarize all available biological and ecological information will be used as baseline maps for future spatial planning at sea.

H.E. Markus Meier
Swedish Meteorological and Hydrological Institute, Norrköping



Working structure and model hierarchy in ECOSUPPORT

BEAST BIOLOGICAL EFFECTS OF ANTHROPOGENIC CHEMICAL STRESS: TOOLS FOR THE ASSESSMENT OF ECOSYSTEM HEALTH

With an acronym like BEAST you cannot fail. It would be just monstrous.

When scrutinizing the quite ambitious R&D aims of our 16-institute Baltic-wide consortium it is tempting to bet that this BEAST, created to tackle the "true beast" of marine chemical pollution, would in its sheer enthusiasm go wild and stumble over itself. We are relieved to report that after nine months of intensive roaming "The Thing" has survived without any serious bumps in the road... and the enthusiasm is still growing.

The BEAST uses biomarkers

The Baltic Sea Action Plan (BSAP) defines the main future management tasks and challenges as the achievement of "good ecological status" and "healthy wildlife". Hazardous substances have been identified as one major threat for the Baltic Sea ecosystem and its biota, and, accordingly, the need to develop biological effects monitoring to facilitate a reliable ecosystem health assessment has been indicated in the BSAP.

So far, embarrassingly little has been done in the Baltic Sea region to include biological effects in monitoring programmes, traditionally based on measurements of concentrations of chemicals in seawater, sediments and biota. With the enormous and increasing number of potentially toxic substances present in the environment this approach alone can no longer be considered valid. Most importantly, it does not provide us with the information needed to assess the effects that contaminants may cause in the different levels of biological organisation.

Stress caused by anthropogenic chemicals can be revealed by so-called biomarkers, which include indicators of e.g. immunological responses, intensified metabolism of toxicants, neurotoxicity, genotoxicity and endocrine disruption. Biomarkers can tell us if an organism has been exposed to contaminants present in their environment, and many have strong diagnostic power. Examining biological effects of contaminants under natural conditions is probably the only realistic way to improve our understanding concerning environmentally harm-



ful levels of contaminants in the presence of modifying factors such as other chemical compounds and abiotic factors.

The BEAST brings tools

With the BEAST project we aim to give a major thrust to developing the biological effects approach in the Baltic Sea region. The project generates data and practical guidelines to fulfil the request of HELCOM concerning the implementation of biological effects methods into the Baltic Sea monitoring programme. A number of similar initiatives and developments are currently going on in Europe, including activities concerning the OSPAR and MEDPOL areas and the Marine Strategy Framework Directive.

The BEAST will present us (1) an integrated multi-level toolbox consisting of established and novel biomarkers as sensitive diagnostic tools to identify how hazardous substances affect the Baltic Sea ecosystem (also in the context of stress due to varying environmental conditions and climate change), and (2) scientifically-based recommendations for the set-up of an integrated chemical-biological effects monitoring of hazardous substances in the whole Baltic Sea area based on sub-regional assessments for future integrated assessments of ecosystem health.

The BEAST focuses on ecosystem health

The BEAST stretches out to develop methodologies for the assessment of ecosystem health in the Baltic Sea, a considerably challenging task. Hazardous substances and their effects are an integral part of such assessments; however, ecosystem health contains a lot more, including its specific definition in each case and area.

The application of integrated indices and similar approaches (e.g. expert systems, environmental prognostics) allows comparisons of the "health status" of populations from different regions. Furthermore, indices consisting of chemical, biomarker, disease and population/community data can provide an overall assessment of the ecosystem health of an area. Integrated assessment can provide a tool for environmental managers

and decision makers and help to improve risk assessment regarding the ecological impact and socioeconomic consequences of chemical pollution.

Some of the data generated by the BEAST project are expected to be of immediate use for trials developing strategies for integrated ecosystem health assessments in the Baltic Sea. An ongoing activity of BEAST WP3 is to collect and prepare data sets for a data treatment workshop to be held in early 2010.

BEAST tracks in 2009

Initiating a large project is often tricky. Helpfully, the backbone of the BEAST was formed by partners who had already worked together in the extensive EU project BEEP (Biological Effects of Environmental Pollution on Marine Coastal Ecosystems, 2001-2004). So, in 2009 the BEAST soon started to wag its tail around the Baltic with several activities. Concerning what many researchers call "real" work, namely Field & Lab, the basic research part (WP1) of the BEAST is targeted at the validation of methods through experiments as well as testing of new and established methods, and this is done in the Gulf of Bothnia, G. of Finland, G. of Riga, G. of Gdansk and the Belt Sea.

A large research effort was made in the G. of Finland in August-September 2009 as a two-week joint cruise of the Finnish oceanographic r/v Aranda and the German fisheries r/v Walther Herwig III in Finnish and Estonian coastal and offshore zones (20 stations and 9 fishing areas). Pelagic and benthic samples were collected for a variety of measurements, including biomarkers (in bivalves, zooplankton and fish), sediment bioassays, fish diseases, chemical contaminants, algal toxins, and phyto-, zooplankton and benthos community structure. This unique data set will be used to test different approaches for the assessment of ecosystem health in the G. of Finland. Other field activities carried out during the first months include samplings in the Gulf of Riga and the Belt Sea. Most field campaigns are scheduled for 2010 – a true Year of the BEAST.

Since – as usual – project money is too tight to mention, the BEAST actively fosters a "satellite project" approach, offering the project

ECOSUPPORT PARTICIPANTS

- Swedish Meteorological and Hydrological Institute
- Baltic Nest Institute, Resilience Centre, Stockholm University, Sweden
- Tjärnö Marine Biological Laboratory, Sweden
- Technical University of Denmark
- Leibniz-Institute for Baltic Sea Research, Germany
- Institute of Oceanology Polish Academy of Sciences
- Marine Systems Institute, Tallinn University of Technology, Estonia
- Finnish Meteorological Institute
- GKSS-Research Centre Geesthacht, Germany
- Atlantic Branch of P.P. Shirov Institute of Oceanology, Russian Academy of Sciences
- Linköping University, Sweden

BEAST PARTICIPANTS

- Institute of Fishery Ecology, Johann Heinrich von Thünen-Institute - Federal Research Institute for Rural Areas, Forestry and Fishery, Germany
- Leibniz Institute for Baltic Sea Research, Germany
- National Environmental Research Institute, Denmark
- Department of Applied Environmental Science, Stockholm University, Sweden
- Sea Fisheries Institute, Poland
- Atlantic Research Institute of Marine Fisheries and Oceanography, Russia
- Estonian University of Life Sciences
- Finnish Game and Fisheries Research Institute
- Institute for Applied Ecology Ltd., Germany
- Institute of Biology, University of Latvia
- Institute of Ecology, Vilnius University, Lithuania
- Latvian Institute of Aquatic Ecology
- Scientific Research Center for Ecological Safety, Russian Academy of Sciences
- Zoological Institute, Russian Academy of Sciences

infrastructures (e.g. ship time), a network also for non-BEAST partners and other types of scientific collaboration. This strategy is considered a “win-win” for all. Close collaboration with the BONUS+ BALCOFISH project examining effects of hazardous substances in the eelpout (*Zoarces viviparus*) is actively being established for the obvious benefits for both projects. Intercalibration and training workshops start in autumn 2009 with selected biomarkers methods and continue in 2010/11.

In addition to collecting new information the BEAST intends seriously to make use of it. The WP2 aims at testing and validation of monitoring and assessment approaches, and to provide guidelines and recommendations for integrated monitoring in the Baltic Sea. The selection of

suitable methods and construction of assessment criteria needs data on biomarkers in different sub-regions. Close collaboration with relevant working groups of HELCOM and other intergovernmental organizations such as OSPAR and ICES is essential in this work, and many of the BEAST partners are active members of these groups. Already in 2009 several partners have contributed to the use of existing biomarker data in the HELCOM thematic assessment on hazardous substances (HAZAS).

The BEAST wants to dance...

So far, so good. The BEAST stands firmly on its big, hairy feet and is ready to roll. We do not want to stick exclusively to our allotted territory but look forward to mingling

actively with others, searching for stimulating interfaces concerning science and management of the Baltic Sea environment. So, approach the BEAST with no fear!



Kari K. Lehtonen
Finnish Environment Institute
www.bonusportal.org/research_projects/beast/

BONUS YOUNG SCIENTIST WORKSHOP IN TALLINN

One of the BONUS priorities is to support the development of young researchers. Discussions during the January meeting of BONUS Young Scientist Club revealed an interest in learning more about the general principles of good scientific practice and the issues and institutional set-up of the Baltic Sea environmental protection. Although instruction in good scientific practice is included in curricula of many universities, many young researchers, especially from the new EU member states, lack this generic knowledge, being left to their own intuition or learning by making mistakes. Understanding the mechanisms of Baltic Sea environmental protection, in turn, is desirable to underpin any really applicable marine environmental study.

The Baltic Sea Science Congress, held this year in Tallinn on 17-21 August, gathered many researchers in the beginning of their careers, providing a good opportunity to organize a young researcher workshop combining both these themes.

The session on Good Scientific Practice was opened by the lecture “Ethics in Research and Research funding” by Dr. **Paavo Löppönen**, Director, Academy of Finland, Member of the Finnish National Advisory Board on Research Ethics. Dr. Löppönen presented the fundamental principles of Good Scientific Practice (GSP): integrity and accuracy in research, ethically sound data collection, crediting other researchers, intellectual property rights, and good research administration practices. It was further

demonstrated why GSP is so important not only for scientists and research institutions, but also for agencies funding science. The most typical examples of GSP violation were discussed, and finally, the lecturer gave an insight into the work of the institutional system developed to maintain high standards of good scientific practice in Finland.

Professor **Valery Forbes** of Roskilde University continued on the topic by looking into one of the most sensitive issues in science – authorship. How to deal with a conflict of the order of authors? How to respect everybody’s rights in a group of co-authors of an article or conference presentation? How to avoid problems when sharing data in larger scientific consortia? These non-trivial situations familiar to almost every beginner in a science team were elegantly sorted out by the help of several real-life scenarios. To concluding the first workshop day, the young scientists received several reproduced materials on practical management of intellectual property rights.

The second topic, “Mechanisms of the marine environment protection”, was opened by one of the beginners in the Baltic Sea Environmental Protection Commission (HELCOM), Professor emeritus **Harald Velner** of Tallinn University of Technology. Professor Velner presented a comprehensive historical revue, spanning the emerging understanding of inseparability of the marine ecosystem and first collaboration among the Baltic Sea scientists in the early

20th century, and the evolution of contemporary principles of collective protection of marine environment, formulation of the Helsinki Convention and establishing HELCOM as an inter-governmental body in the 1970s and 1980s. The topic was taken up by the next lecturer, Dr. **Eeva-Liisa Poutanen**, Environment Counselor, Ministry of the Environment, Finland, by giving an insight into HELCOM’s current work. The Baltic Sea Action Plan now serves as a test case for the ways to achieve the ambitious goals of the EU Water Framework Directive and the Marine Strategy Framework Directive.

Increasing evidence points to the fact that fish are not only an important, yet unwisely exhausted, economic commodity, but also a crucial element shaping the whole marine ecosystem. The ecosystem approach to the management of human activities addresses fisheries as its most prominent subject. Mrs. **Stefanie Schmidt**, European Commission, DG MARE, introduced the workshop audience to the issues of sustainable exploitation of the commercial fish stocks of the Baltic Sea. The current condition of Baltic fish stocks is far from satisfactory. Such obvious drawbacks as fleet overcapacity, imprecise policy objectives resulting in insufficient guidance for decisions and implementation, a decision-making system that encourages a short-term focus, a framework that does not give sufficient responsibility to the industry, and a lack of political will to ensure compliance has led the Commission to pursue elaboration



Prof. H. Velner lecturing at the BONUS Young Scientist Workshop

of a new Common Fisheries Policy. The ‘green paper’ on the new CFP is now widely discussed, and young marine scientists from the Baltic are invited to have their say.

The Baltic Sea remains an extremely busy waterway. Ships threaten the environment by risk of accidents and, much more often, by continuous emissions of contaminants into the air and water. The workshop’s last speaker, Ms. **Monika Stankiewicz**, Professional Secretary, HELCOM, specializes in elaborating measures for environmentally safe marine transportation in the Baltic. Her lecture demonstrated that although a whole array of International Maritime Organization’s conventions regulates the general and environmental safety of shipping, HELCOM plays a crucial regional role introducing the same standards of shipping in the entire Baltic Sea, speeding up the implementation and enforcement of the IMO conventions. It also provides a platform for the Baltic Sea countries to jointly agree and propose to IMO new environmental regulations, and if necessary for the protection of environment it does not hesitate to go beyond the IMO legislation for ships flying flags of the Baltic Sea. The session was completed by a lively discussion on the Baltic Sea environmental issues among the experts and young researchers.

A full collection of workshop materials is available through www.bonusportal.org to every registered member of the BONUS Young Scientist Club’s mailing list.

Andris Andrusaitis

JÜRI ELKEN, THE NEW CHAIR OF BONUS EEIG

The highest decision-making body of BONUS EEIG, its Steering Committee, has a rotating chairmanship, with the chair holding office for one year. The current chair, Professor Jüri Elken, Director of the Marine Systems Institute of the Tallinn University of Technology, Estonia, started his chairmanship on 1 July 2009.

What is your professional background?

I did my studies in physics at the University of Tartu. Being something of an adventurer, I never dreamt I’d be spending 11 months a year in the lab. When I had to choose a direction for my future, Professor Ain Aitsam had just started the Department of the Baltic Sea at one of the Estonian research institutes. That was a turning point for me. I defended my PhD in Physical Oceanography at the Shirshov Institute of Oceanology in Moscow.

By the beginning of the 1990s, I had spent more than 1000 ship-days on expeditions in the Baltic and in different parts of the Atlantic, studying circulation / water exchange and its mesoscale variability. But my initial engagement was in numerical modeling. My present scientific interests are direct expansions of physical oceanography and numerical modeling towards applied tasks like operational oceanography and scenario assessments of coastal (incl. harbors) and offshore activities. Presently, I am Director of the Marine Systems Institute at Tallinn University of Technology and a part-time Professor in Oceanography.

In your opinion, what has been the most significant event in the lifetime of the BONUS Programme so far? What are your expectations concerning the future of BONUS?

The BONUS+ Call and the launch of the 16 highly respected projects

was very successful. This process has to continue and expand. We are close to reaching a full Article 169 programme, which would present a challenge for the continuous progress of marine science in the region. The old boundaries of marine science are not applicable anymore. Are we speaking about the need to create synergy between traditional marine science (quite often dominated by biology or chemistry) and maritime research (quite often understood as ship engineering) or about the socio-economic dimensions? Instead of the traditional “defensive” ecosystem conservation approach, the new BONUS programme outline focuses on the positive philosophy of sustainable use of the goods and services of the Baltic Sea System.

The new programme has to be understandable also to our mothers-in-law, uncles etc., who are part of the policy electorate. I think we have

to build bridges not only towards socio-economics but also towards the technology. In such challenging interdisciplinary studies, concern, originating from my student-time, is that the teams should always include someone who understands what Newton’s Second Law means in the oceans.



R/V SALME – A RENOVATED RESEARCH VESSEL AVAILABLE FOR MARINE SCIENTISTS



Estonian marine scientists have had a fully renovated research vessel – R/V SALME – in their use since August 2009. The owner of the research vessel is Tallinn University of Technology. The working area of R/V SALME is the entire Baltic Sea while its size (overall length 31 m, draught 2.5 m, gross tonnage 223 tons) is not

too big in order to keep the running costs low. The ship was renovated in the framework of a governmentally funded infrastructure development project “Observatory of the Coastal Environment”.

Since 1994 no research vessel was available in Estonia, and field work was carried out by

marine researchers onboard chartered ships or in co-operation with research institutions from other countries surrounding the Baltic Sea. In 2002, the Marine System Institute (MSI) at Tallinn University of Technology stated in its development plan that MSI will seek solutions to get a secure access to research vessels. In 2005, an application was prepared to get funding for the marine research infrastructure development. In the same year, an EU measure was implemented in Estonia to reduce fishing capacities by offering fishing vessels to research and educational institutions. In 2006, a vessel, which best met the needs of marine researchers, was selected by the University. In early summer 2007, an agreement was signed by the Enterprise Estonia for funding of the infrastructure development project “Observatory for the Coastal Environment” including the reconstruction of the research vessel. Tallinn University of Technology decided to give an equal sum as co-financing for reconstruction, and the ship was renovated in 2008-2009 by an Estonian company Ship Repair and Conversion (SRC Ltd.), which made the best offer after a tender was issued in 2008.

R/V SALME can accommodate a maximum of 12 researchers and has two laboratories onboard – a wet laboratory and a chemical-biological laboratory. A working place for a CTD / rosette sampler operator is equipped in the mess room. A special winch and A-frame is available for car-

rying out geological vibrocoreing. A crane with a working capacity of 10.5 ton-meters is available for buoy deployment and recovery. A cable winch to work with CTD and sampling equipment or to use for towed instruments is installed onboard. A standard set of equipment includes an Idronaut Ocean Seven 320Plus CTD probe with a General Oceanics Rosette Sampler 1014, SBE19plus CTD probe, different optical probes (RAMSES from TriOS, ac-spectra from WET Labs) and laboratory equipment for sample handling and analyses. Flow through measurements can be conducted, and different optional equipment can be installed.

In 2009, first research cruises have been conducted to study the sub-surface maxima of phytoplankton, to deploy and maintain an autonomous buoy station and bottom mounted ADCPs in the Gulf of Finland, and to monitor the construction works in the Tallinn, Muuga and Paldiski Bay. It is planned that the research vessel will be in the sea at least 120 days a year. R/V SALME is one of the regional research vessels that will be available for international research teams in the framework of open calls arranged by the EU project Eurofleets (“Towards an alliance of European research fleets”, see www.eurofleets.eu) in 2010-2012.

Urmas Lips
Marine Systems Institute at Tallinn University of Technology
Member of the BOOS Steering Group

GETTING TO THE BOTTOM OF THE HYPOXIA PROBLEM IN THE BALTIC SEA – SUCCESSFUL COMPLETION OF THE HYPER CRUISE



The Baltic Sea is in a very sad state. There may be some signs of improvement at the surface, but vast areas of the deeper bottoms in the open Baltic Sea are currently hypoxic or anoxic, with no macroscopic benthic life and heavily modified biogeochemical cycles. HYPER aims at providing new information on the mechanisms and feedbacks that act to sustain the hypoxia problem so that we can improve management of the Baltic.

Hypoxia has been present in the Baltic Sea from time to time ever since the formation of the modern Baltic about 8000 years ago. It is clear, however, that both the spatial extent and the severity of hypoxia have increased due to human-induced eutrophication. Increased nutrient input increases primary production, which we can see as large algal blooms at the surface, and as the increasing amounts of algae sink to the bottom and decompose, more and more oxygen is consumed in the deeper parts of the sea. Consequently, hypoxia (oxygen < 2 mL / L) is currently the main environmental factor stressing the benthic communities in the deeper areas of the Baltic.

But to what degree has human activity (eutrophication) altered the bottom water oxygen conditions in the Baltic Sea and how will projected climate changes affect the spatial extent of hypoxia in the future? Although excessive nutrient inputs are the direct cause of the recent reduced ecosystem health, understanding hypoxia on long time-scales is the key to improving predictions about the Baltic Sea ecosystem's response to climate changes that may take place in the near future.

It is known that benthic invertebrates mix organic material downward and irrigate the sediments with stimulatory effects on processes counteracting eutrophication, e.g. denitrification and increased phosphorus retention. We know that there has been a causal relationship between climate change and hypoxia in the past, we know that nutrients can be either buried in or released from the sediments, and we know that benthic animals have the potential to affect these processes. Nevertheless, we do not have a good understanding of how these processes are linked and how they differ between different areas of the Baltic Sea.

In May-June 2009, a team of scientists participated in an almost four week long research cruise onboard the Finnish research vessel *Aranda*. The cruise started from Helsinki and covered all the main sea areas of the Baltic, from the Arkona and Bornholm basins in the south to the Bothnian Bay in the north. The HYPER research cruise was conducted in conjunction with the annual HELCOM monitoring cruise of benthic fauna and bottom water oxygen conditions. The HYPER team

consisted of an international group of geologists, sediment chemists and benthic ecologists. The general objective of the HYPER cruise was to quantify the relationships between oxygen concentrations, benthic organisms and biogeochemical processes. More specifically the aims were to (a) obtain geological records of the extent of hypoxia under different periods in the development of the Baltic Sea, (b) quantify nitrogen and phosphorus removal by burial and microbial processes in the water column and sediments with contrasting redox conditions and (c) quantify the role of macrobenthic communities in nutrient cycling along hypoxic gradients. In addition, samples were obtained to measure ecophysiological responses of fauna to hypoxia.

The cruise was a great success, and more work than originally anticipated could be completed. During the cruise a total of 85 stations were visited. HYPER successfully obtained 27 gravity long cores, collected samples for measurements of sediment chemistry and conducted experiments to measure benthic nutrient fluxes across gradients of oxygen and salinity at 26 stations throughout the Baltic Sea.

The results from the cruise this year showed that the oxygen conditions in the Åland Sea and in the Gulf of Bothnia were still good and the benthic fauna was healthy. However, like in previous years, the oxygen conditions in the Baltic



Sampling onboard R/V Aranda during the HYPER cruise

HYPER Project

proper were very poor, and below depths of around 80-90 meters there was no oxygen and no macroscopic life, and in most of the deeper areas there was toxic hydrogen sulphide in the bottom water. Results from the cruise show that the overall oxygen conditions in the Baltic have in fact deteriorated since 2008 (early summer comparison), which last year was one of the worst on record. Most notably, conditions in the southern Baltic have deteriorated and the spatial extent of hypoxic water increased.

It will take a couple of years to analyse and synthesise all the data collected during the research cruise, but already the initial results indicate that the interactions between benthic animals and sediment chemistry are complex and highly variable both between the

sub-basins in the Baltic and between hypoxic and normoxic areas within the same basin. The cruise was a success, and the combined data and the subsequent modelling is likely to provide very important new insights into how the hypoxia in the Baltic Sea works. Eventually this information will be provided to decision-makers and hopefully used for better management of nutrient loadings into the Baltic Sea.

Alf Norkko
Marine Research Centre,
Finnish Environment Institute

Lovisa Zillén
Department of Geology,
Lund University

Joanna Norkko
Marine Research Centre,
Finnish Environment Institute

BONUS Newsletter

Editor-in-chief	Kaisa Kononen
Editor	Tiina Tembe
Editorial board	Andris Andrusaitis, Elise Oukka firstname.lastname@bonuseeig.fi
Publisher	BONUS EEIG Hämeentie 33 FI-00500 Helsinki, Finland
Webpage	www.bonusportal.org Newsletters are available in pdf format on the webpage
Layout Printing	Sole Lätti Kirjapaino Uusimaa