Volume 1 Spring 2012

NEWS FROM BOOS

FOCUS ON MEMBER INSTITUTES

IN THIS ISSUE

UPCOMING EVENTS

8-11 May, 2012
IEEE/OES Baltic 2012 International Symposium
Klaipeda

14-16 May, 2012
BOOS/HIROMB Annual Meeting
FMI, Helsinki

21-22 May, 2012
European Maritime Day 2012
Gothenburg

5-6 June, 2012
EuroGOOS extra General Members' Meeting
Belspo, Brussels

5-6 June, 2012
MyOcean2 Executive Committee meeting
Barcelona

21-23 November 2012
EuroGOOS Annual Meeting
Hamburg

NEWS FROM BOOS

is a publication of the Baltic Operational Oceanographic System. It is used to foster the co-operation between the BOOS members and to make the services and the information of operational oceanography in the Baltic visible for the public.

EDITORIAL

BOOS (Baltic Operational Oceanographic System) is a regional consortium of organisations from the countries surrounding the Baltic Sea to provide operational oceanographic services. Main activities and products of operational oceanography can be defined as systematic measurements of the Baltic Sea with rapid interpretation and dissemination of results including continuous nowcasts and forecasts of the sea state. Our vision is that BOOS will be the key provider of services and information to European and regional users in Baltic Sea area. BOOS members provide the relevant basic and necessary information to national and local users according to their needs and requests.

This is the first issue of BOOS Newsletter. The issue introduces some of the member institutes and recent developments in the field of operational oceanography. More members are to be presented in the upcoming issues. The newsletter will be published twice a year and it is put together to promote the activities of BOOS and attract new users for its services. An electronic version of the publication is available on the BOOS website (www.boos.org).
Enjoy the first issue!

Urmas Lips, BOOS chair

Baltic Operational Oceanographic System

describes the actual, anticipates the future, and classifies the state of the Baltic Sea!

MARINE SYSTEMS INSTITUTE IN BRIEF

Urmas Lips, Tarmo Kõuts, Inga Lips

Marine Systems Institute was founded in 2002 as an autonomous research unit affiliated to the Tallinn University of Technology. The institute is a leading national research body to study the physical forcing of the Baltic Sea ecosystem. Research topics deal with water exchange processes in changing climatic conditions, including coastal processes, eco-hydrodynamics and marine optics. The results of basic research are used for the applied tasks like operational and scenario forecasting of storm surges and floods, harmful algal blooms, oil spills, sediment dynamics and ecological effects of changing pollution load. Based on the storm surge forecast system for Estonian waters developed by MSI, the storm surge forecasts are officially delivered via the Estonian Meteorological and Hydrological Institute. In the frames of BOOS-HIROMB co-operation MSI has committed itself to deliver near real time data from tide gauges, Ferrybox systems and autonomous buoy stations. MSI is also one of the contract partners to the Ministry of the Environment of Estonia to carry out national marine monitoring program. The institute is very well equipped for the monitoring work: it operates a regional research vessel SALME (the real-time location of the R/V Salme can be viewed at http://on-line.msi.ttu.ee/gmaplaev2/), a network of on-line sea level stations, variety of autonomous systems such as Ferryboxes, profiling buoy stations, wave and meteorological stations at navigational buoys, drifters etc.

Fig. 2.
Typical navigational buoy installed nearby a marine fairway.

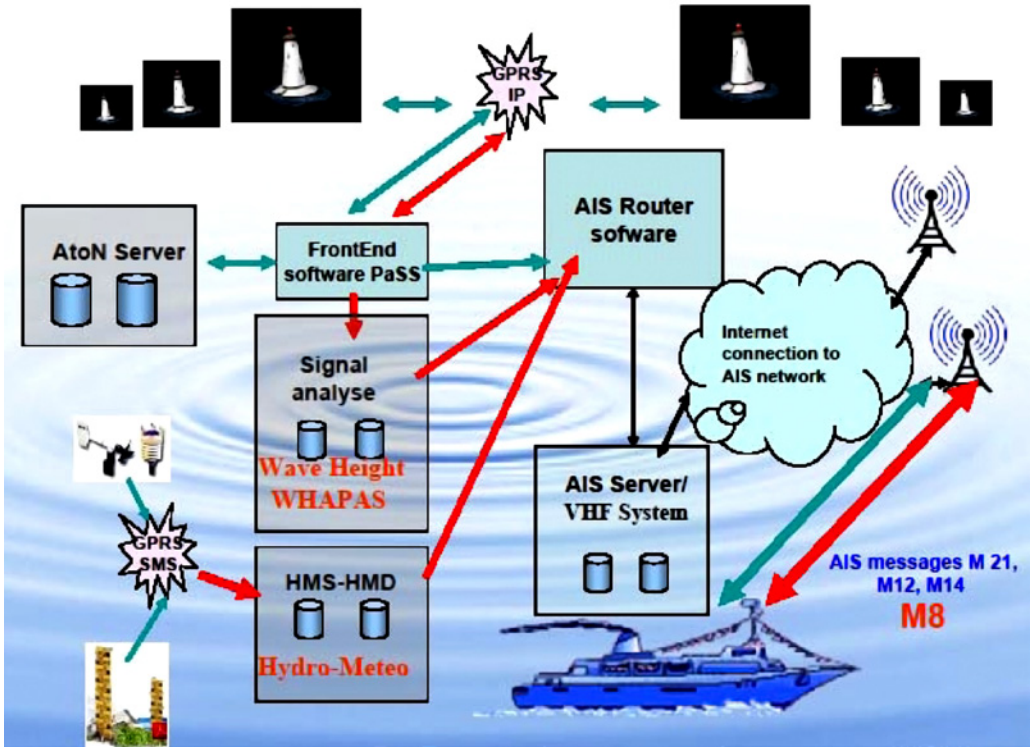


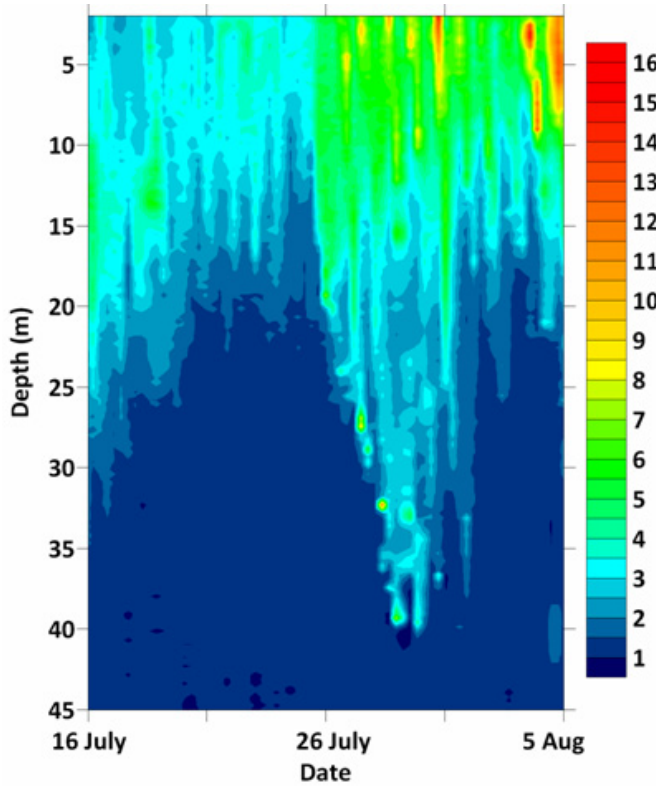
Fig. 1. Block scheme showing flow of operational METOC data AIS service (source: Estonian Maritime administration)

Recent developments

Automation of meteorological and oceanographic measurements during the recent years has made data easily accessible for users in real time. Nevertheless, measuring equipment is still frequently used only for local purposes. On Estonian coast and in coastal sea different organizations run number of automatic measuring stations. In order to provide users with integrated operational oceanographic and weather services, the Estonian Maritime Administration (EMA) has launched an EU project called EfficienSea. As a work result of the project a portal collecting all operational data from nearly all measurement stations in Estonia (first version of the web site: http://on-line.msi.ttu.ee/metoc/) was designed and programmed by MSI. The same data is also made available for Automatic Identification System (AIS) and broadcasted as M8 message directly to mariners (Fig. 1). Within the same project a pilot study by the EMA is underway in Estonia for using navigational buoy movement data obtained from buoys online (Fig. 2). The buoys are equipped with acceleration sensors AtoN telematics devices, calculating the significant wave height on the shore side by the use of a specially designed software WHAPAS (Wave Height and Period Analysis Software), and making the results available to the mariners. The MSI contributes to the study by validation experiments and development of calculation methodology.

About future plans

In the near future MSI will further develop the off-shore operational observation systems for both operational forecasts and continuous assessment of the state of the marine areas. The plans in 2012-2013 include deployment of wave buoys and a new autonomous buoy profiler in Estonian waters and installation of a new Ferrybox system onboard the research vessel Salme. The institute is one of the partner institutions in the project "Estonian Environmental Observatory" (2011-2014) in the frames of the Estonian Research Infrastructure Roadmap program where the institute's responsibility is to develop and maintain a deep sea cabled observatory in the Gulf of Finland. MSI focuses increasingly also to the assessment of the ecological status of marine areas using autonomous platforms and adaptive sampling onboard research vessel. As an example of such results, in Fig. 3 vertical migration of phytoplankton detected by the autonomous buoy profiler in the Gulf of Finland in 2009 is presented.



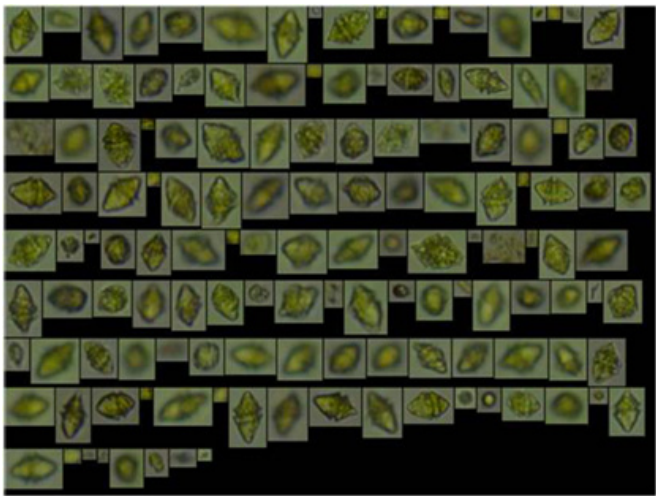


Fig. 3.

Vertical dynamics of chlorophyll a in the Gulf of Finland (at a station between Tallinn and Helsinki) in summer 2009 and image gallery of phytoplankton cells in a water sample collected from the sub-surface biomass maximum where up to 2.5 million cells per litre were counted
(image gallery made by FlowCAM).

SMHI OPERATIONAL EXPERIMENTS

Henrik Lindh, Olle Petersson, Fredrik Waldh

It is well-known to oceanographers that it is difficult to collect real-time data from the water-profile. At SMHI we have come up with the idea that it could be possible to use Argo floats in the Baltic. Today they can measure not only water temperature and salinity but also oxygen, chlorophyll, etc. However, it is a problem that the Baltic is too small and even too shallow for many standard Argo floats.

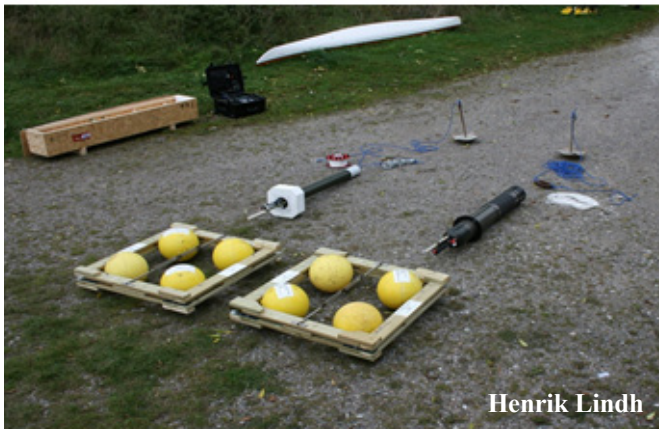
Some features of the floats are that they are not so expensive and they can be deployed and recovered from smaller vessels.

At SMHI, we have therefore started to evaluate whether it could be possible to use a mooring for an Argo float. That could work in the Baltic! During the summer and autumn 2011 two floats were purchased and a field experiment was carried out in a protected but rather deep area (75 m) in the southern Stockholm archipelago. Simple mooring systems were designed and built.

The result of this first experiment is that the ARVOR-C, which is designed for coastal waters, managed to execute all the expected profiles (every 90 minutes) and to transmit them by Iridium satellite/e-mail to SMHI.

The next step in this project is to develop a more professional design for the mooring system. Special care will be paid when constructing the surface buoy. This system will then be deployed for several months in the north-western Baltic during the spring. The Argo floats will also be tested as free-floating drifters.

The top of the ARVOR-C, seen in the middle of the experimental float, has come up to the surface and transmits information to the satellite after a successful profile measurement



Argo floats with simple mooring systems ready for deployment.

DMI ANNOUNCES NEW ACTIVITIES

Palle Bo Nielsen

Recently, new activities were added to the tasks of the Danish Meteorological Institute (DMI). In October 2011, the Danish Maritime Safety Administration (DaMSA) was closed down and its tasks were transferred to four ministries. The responsibility for civil oceanography was transferred to the Ministry of Climate, Energy and Building to which DMI belongs. An electronics technician and a physical oceanographer consequently moved from DaMSA to DMI.

Oceanographic observations

DaMSA operated 9 tide gauges, 3 oceanographic buoys and 2 temperature-salinity stations in Danish waters. These instruments have been transferred to DMI and are now being operated by their technicians. Maintenance is carried out in co-operation with the Danish Maritime Authority (DMA) which provides workshop facilities and ships for instrument deployment and service. The instruments add to the network of tide gauges that DMI already operates and enables transmission of data to users in real time.

Current meter on a traditional navigation buoy

One of transferred electronics technician Finn Milvertz' first jobs was to test a prototype of a traditional navigation buoy equipped with a current meter. "The test is showing promising results. Reliable data on current speed and direction are being transmitted ashore," Finn Milvertz says.

A current meter mounted at/on the bottom of a/the navigation buoy (to the right) measures the current in the Great Belt. The current meter is tested on a position next to an oceanographic buoy (to the left) also measuring the current. The collected data are transmitted to the Danish Meterological Institute, where the quality is checked.

The project, ProOcean, implies that in the future, existing expensive oceanographic buoys will be replaced by much cheaper traditional navigation buoys with current meters mounted. The navigation buoy is made of iron and is thus highly resistant to sea ice. An important implication is therefore that current data can be collected during periods when the oceanographic buoys (made of plastic) otherwise would have to be withdrawn.
The project started two years ago in DaMSA and is now continued by DMI and DMA in co-operation.

Publication of tide tables

The transfer also implies that the tide tables for Danish, Faroese and Greenland waters will now be computed and published by DMI. As before, the tide tables are freely available to users on the Internet and can also be ordered on memory stick. Activities and services related to tides have also been transferred to the Centre for Ocean and Ice (COI) at DMI.

The tide tables for Danish, Faroese and Greenlandic waters are now computed and published by the Centre for Ocean and ice at the Danish Meteorological Institute. The tables are available for free via the DMI web site or can be ordered on a memory stick.

THE CENTRE FOR OCEAN AND ICE AT THE DANISH METEOROLOGICAL INSTITUTE

The Centre for Ocean and Ice (COI) staff is comprised of 50 experts specialised within observation, remote sensing, sea ice charting and modelling of the sea. COI employees include oceanographers, engineers, navigators, geographers and students.

The centre manages the Danish Meteorological Institute's obligations pertaining to the sea and the marine environment. Some of the responsibilities are:

- **Storm surge warning for Danish waters**
- **Forecasting waves, current, temperature and salinity in the North Atlantic, the North Sea and the Baltic Sea**
- **Sea ice charting in Greenlandic waters based on the analysis of satellite images**
- **Charting of the sea surface temperature globally with a focus on the North Atlantic, the North Sea and the Baltic Sea**
- **Forecasting the drift of oil spills, sea ice and floating objects such as icebergs**
- **Charting of algae distribution in the North Sea and the Baltic Sea**
- **Marine research into the sea's influence on climate change and vice versa**

In COI we develop our professional knowledge through extensive activities within science and development. Our focus is on the use of data from satellites, physical and ecological ocean modelling and the marine climate. The activities are conducted in national and international partnerships and supported by research and development fund from the EU, the Nordic Council of Ministers and national foundations.

BSH IN A NUTSHELL

Jan Hinrich Reißmann

The Federal Maritime and Hydrographic Agency (Bundesamt für Seeschifffahrt und Hydrographie - BSH) is a governmental authority associated with the German Federal Ministry of Transport, Building and Urban Development. The BSH has about 840 members of staff. The head office (see photo) is located in Hamburg, another main office is located in Rostock. The BSH is responsible for the German waters (EEZ) under several legal aspects and consequently defines itself as a main maritime service provider in Germany. Among others, its responsibilities comprise environmental protection and security in the sea traffic, compiling sea charts, approving nautical information systems, proof of competence for seafarers, the law of the flag, the spatial planning in the EEZ including approval processes for offshore windparks, pipelines etc., forecasts of the sea level and the tides, warnings against storm surges, monitoring of the marine environment, and the marine data centre. In the context of the latter items the BSH is a member of BOOS.

The BSH runs eleven fixed stations in the framework of the Marine Environmental Monitoring Network in the North Sea and Baltic Sea (MARNET). Five of them are located in the Baltic Sea.

Standard observations of temperature, salinity, oxygen content, and current at several depths as well as meteorological observations are made at these stations. Additionally, wave measurements are made at seven observation sites with two of them located in the Baltic Sea. Furthermore, the BSH provides data from 26 tide gauges owned and ran by three different Waterways and Shipping Agencies (WSA) to the BOOS data portal.

The forecasting services division of the BSH runs several circulation, storm surge, and dispersion models on different (nested) grids with resolutions up to 0.5 nm covering the North and the Baltic Sea. Forecasts for up to seven days are produced regularly up to four times a day. Products such as currents and transports are provided to the public via the internet. Other products available are weekly SST maps of the Baltic Sea and maps of several water constituents such as Chlorophyll-a, SPM, or CDOM deduced from MERIS data, for example.


© Bundesamt für Seeschifffahrt und Hydrographie

KLAIPEDA UNIVERSITY IN SHORT

Inga Dailidienė and Loreta Kelpsaite

Klaipeda University Coastal Research and Planning institute is the leading organisation in marine research in Lithuania. The main theme of the institute's scientific activity is "Interdisciplinary research for sustainable coastal zone management". The institute recently participated in different international projects in various marine science subjects. (http://www.corpi.ku.lt/international.html)

The main objective is to evaluate natural and anthropogenic impact to the coastal zone and to develop the background for sustainable use and protection of the coastal resources as well as for effective solutions of the socio-economical conflicts, related to port industry development, fishery, recreation, pollution, coastal erosion etc.
Field studies are directed towards the hydrodynamic and sedimentation processes. Mathematical modelers together with biologists develop ecological models for lagoon and coastal ecosystems, with particular reference on hydrodynamics, coupling between physical and biological processes, trophic interactions, population dynamics and invasive species impact on recipient ecosystems. Modern computer based methods are involved in development of scientific software, spatial databases and analysis tools.

CORPI takes part in environmental monitoring programs of all three levels that are enforced in Lithuania: national, municipality and industry oriented. Environmental information and experience of the scientists of Klaipeda University is actively used for planning of the coastal zone development and undertaking management measures.

CORPI is also a member of the Nordic Marine Academy since July 2006, ECSA, Estuarine and Coastal Sciences Association since 2006, and MARS, The European Marine Research Stations Network. CORPI's scientists also participate in HELCOM expert groups, works on Baltic Sea Action Plan.

INTRODUCING ENVIRONMENTAL PROTECTION AGENCY

Neringa Stončaitienė

ENVIRONMENTAL PROTECTION AGENCY (EPA) is a subordinate institution to the Ministry of Environment of Lithuania. EPA was reorganized joining separate institutions and since 2010 EPA has been composed of 4 departments - Environmental Protection State control; Environmental Status Assessment; Marine Research and Environmental Research.

According to the competence EPA ensures continuous and complex monitoring, evaluation, forecast and information providing on environmental quality and nature resources use.

EPA organizes, coordinates and performs state environmental monitoring; submits proposals for the formation and implementation of environmental protection policy with respect to the protection and management of surface water bodies in accordance to the river basin district management principle; ensures the implementation of the policy of the control of chemical substances and preparations; collects data on use of water resources, discharges of waste water, waste generation and treatment, pollution of ambient air and surface water; manages the available registers and databases.

Department of Marine Research (DMR) (former - Center of Marine Research (CMR)) is responsible for the permanent environmental research into the Baltic Sea and the Curonian Lagoon and for the monitoring of surface fresh water bodies, wastewater and air quality in the western part of Lithuania as well.

- Hydrology Division - observes and evaluates hydrological and meteorological regime, long-term changes and their regularity in the Baltic Sea and the Curonian Lagoon, measures hydrological parameters in surface fresh water bodies and investigates the dynamics of the coasts of the Baltic Sea and the Curonian Lagoon, simulates the drift of a slick of spilled oil and other chemical pollutants; maintains coastal observation stations: 4 stations - at the coastal zone of the Baltic sea, 1 station - at the Klaipeda Strait, 4 stations - at the Curonian lagoon (station at the Klaipeda Strait is automated since 2005, all other stations - since 2011 October).

Department of Marine Research of Environmental Protection Agency

- Hydrochemistry Division - analyses and evaluates the regime of the hydrochemical conditions analyses and evaluates pollution of the environment and living organisms by specific pollutants of the surface fresh and marine water, changes in its concentrations, the extent of anthropogenic pollution, distribution and influence on ecosystems.

- Biological Analysis Division - evaluates hydrobiological processes in the surface fresh and marine water bodies, analyses seasonal and long-term changes, influenced by natural and anthropogenic factors.

- Analytic Control Division - ensures the state laboratory control caused by pollution sources of industrial objects by carrying out the measurements of pollutants emitted and discharged by stationary and mobile pollution sources and observations of the impact of pollutants on air, water, soil and other environmental components, maintains automatic air quality observation stations.

• Data Management and Programs Division-performs the management of the Marine Environmental Data Fund, coordinates data and information submission to the national and international organisations, public; participates in the implementation process of EC Water Framework Directive in the coastal and transitional waters, Marine Strategy Framework Directive in the marine waters, HELCOM Baltic Sea Action Plan; handling and analysis of geographical information, performs data statistical analysis, modelling of the ecosystems of the Baltic Sea and the Curonian Lagoon.

Vessels, owned by EPA: Scientific research catamaran 'VĖJŪNAS', expedition cutter '"MARINIS".

OPERATIONAL ACTIVITY OF IMWM-NIR

Magdalena Kamińska

The history of the Institute of Meteorology and Water Management – National Research Institute, Maritime Branch in Gdynia dates back to 1920 in Gdansk with the foundation of the early Meteorological Branch as its former stage. The Department of Oceanography of the National Hydrological-Meteorological Institute, which would later become the present IMWM-NIR, was established in 1952.

In accordance with the marine protection, the activity of the institute is, among others, regulated by the Water Law. Under the Water Law the institute provides meteorological, hydrological and oceanographic services for the purposes of the government and society. The Maritime Branch of the institute supplies meteorological and hydrological forecasts as well as warnings for the shore, coastal zone and the Baltic Sea. A narrow collaboration with the Polish Navy, by means of common research cruises, oceanographic and meteorological data and information exchange, is carried out by the Department of Oceanography.

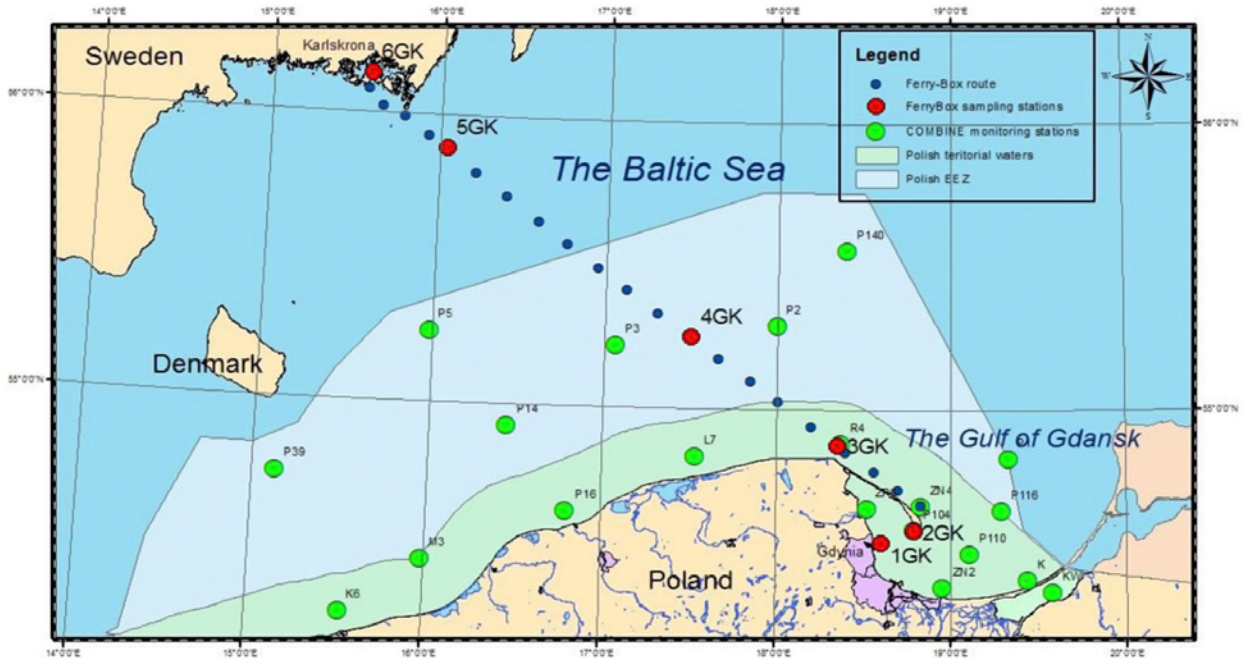
Within the oceanographic service, forecasts of hydrodynamic parameters of the Polish sector of the Baltic Sea, resulting from the HIROMB model simulation are published in the internet (http://baltyk.imgw.gdynia.pl). Additionally, MIKE3D FM model was adopted for the Gulf of Gdansk and Vistula Lagoon, presenting daily forecasts of hydrodynamic conditions and ecological state.

Forecasts are published in the internet (http://www.baltyk.pogodynka.pl).

The above referred Department provides HELCOM monitoring of the Polish sector of the Baltic Sea as a part of the National Programme of the Environment Monitoring. Systematical measurements of physical, chemical, biological and radiochemical characteristics of the marine environment are conducted during monitoring cruises. Metadata of the cruises are available in Cruise Summary Report (CSR) webpage within the SeaDataNet2 project. In the frame of the monitoring activity, the Depart-

Work is conducted under different weather conditions

Blue-Box – Ferry-Box display and recorder



Ferry-Box route between Gdynia (Poland) and Karlskrona (Sweden) **W. Krzyminski**

ment of Oceanography is continuously giving support in the development of measures which shall lead to the Water Framework Directive (WFD) and Marine Framework Strategy Directive (MFSD) implementation.

Moreover, an autonomous measurement system (FerryBox) is installed on one of the ferries of the Stena Line company, operated between Gdynia and Karlskrona. Data will be available on the web page in the middle of 2012.

Simultaneously, processes, changes and trends as well as quality assessment of the Baltic Sea, including airborne, riverine and point sources of pollution, are currently investigated. The results are disseminated in the form of reports, bulletins and publications which ultimately reach to target national administration institutions and international organisations, such as HELCOM, ICES, EEA.

J. Woron & R. Moroz sampling oxygen with horizontal bathometer

SURVEY CRUISE SCHEDULES

MSI - http://www.msi.ttu.ee/index.php?toc=48

IMWM-NIR - http://www.mir.gdynia.pl/?page_id=12

R/V Salme

More BOOS members will be introduced in the coming issues!

All contributions to the newsletter (news, links to research cruise schedules, articles, photos, new projects etc.) are welcome to Mairi Uiboaed, project manager at Marine Systems Institute (mairi.uiboaed@msi.ttu.ee).

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