

1st MARINE BOARD FORUM

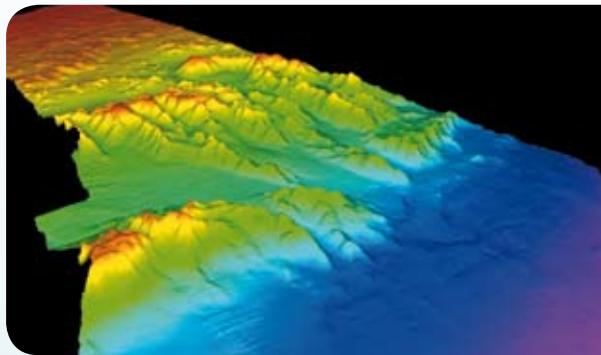
Marine Data Challenges: from Observation to Information

15 May 2008, Ostend, Belgium

PROCEEDINGS

Hypotheses come and go but data remain

Santiago Ramón y Cajal,
Nobel Prize 1906



www.esf.org/marineboard

Marine Board profile

The increasing interdependence of marine research policies and programmes at national and at European levels, as well as the rapidly changing environment of European marine sciences, call for a new approach to the development of European research strategies. To this end, the Marine Board, established in 1995 by its Member Organisations, facilitates enhanced collaboration between the directors of European marine science organisations (research institutes, funding agencies and research councils) and the development of strategies for marine science in Europe.

As an independent non-governmental advisory body, the Marine Board is motivated by, and dedicated to the opportunity of building cooperation in marine research. The Marine Board develops insight, recognising opportunities and trends, presenting compelling and persuasive arguments that shape the future of marine research in Europe.

The Marine Board provides the essential components for transferring knowledge for leadership in marine research in Europe. Adopting a strategic role, the Marine Board serves its Member Organisations by providing a forum within which policy advice to national agencies and to the European Commission is developed, with the objective of providing comparable research strategies at the European level. As a major science policy think-tank, the Marine Board:

- *Unites the outputs of advanced marine research;*
- *Provides insights necessary to transfer research to knowledge for leadership and decision making;*

- *Develops foresight initiatives to secure future research capability and to support informed policy making;*
- *Places marine research within the European socio-political and economic issues that profoundly affect Europe.*

The Marine Board operates via four principal approaches:

Forum: bringing together 30 marine research organisations from 20 European countries to share information, to identify common issues and approaches, to develop common positions and perspectives, and to cooperate;

Synergy: fostering European added value to component national programmes, facilitating access and shared use of national marine research facilities, and promoting synergy with international programmes and organisations.

Strategy: identifying and prioritising emergent disciplinary and interdisciplinary marine scientific issues of strategic European importance, initiating analysis and studies (where relevant, in close association with the European Commission) in order to contribute to a European strategy for marine research.

Voice: expressing a collective vision of the future for European marine science in relation to developments in Europe and world-wide.

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Mr. Lars Horn, Marine Board Chair opening the 1st Marine Board Forum (15 May 2008, Ostend)

MARINE BOARD FORUM

Principle and Objectives

Principle

The Marine Board provides a platform for the European marine science community. A large number of European marine science-related bodies express interest in establishing information exchange, or receiving endorsement for their activities or positions from the Marine Board. Furthermore, there is a growing need to link with European universities and industry stakeholders. In this regard, the Marine Board developed an instrument, the Marine Board Forum, which allows interactions and involvement between the Marine Board and other pan-European organisations, networks and individual scientists.

Objectives

In line with its Principle, the Marine Board Forum supports the Marine Board's philosophy to:

- Reduce duplication of initiatives;
- Limit fragmentation within the European marine science landscape;
- Facilitate information exchange;
- Enhance synergy among actors;
- Provide a focal point for institutions and individual scientists to meet;
- Gather and synthesise information to optimise the delivery of the voice of the European marine science community.

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Programme (15 May 2008, Ostend)

05

Opening:

Lars Horn (Marine Board Chair)

Setting the Scene:

Kostas Nittis (MedGOOS)

Morning Session:

Observation and Data Providers

Moderator:

Kostas Nittis (MedGOOS)

1. Marine data and observation management:
European Commission Perspectives
Alan Edwards on behalf of Manuela Soares (Director, Directorate I - DG Research)
2. From observation to data to information for scientists and policymakers... and industry
Jean-François Minster (Total S.A.)
3. Operational oceanography, including GMES marine core services
Hans Dahlin (EuroGOOS)

General discussion

4. UNESCO/IOC's project office for International Oceanographic Data and Information Exchange (IODE)
Peter Pissierssens (Head of the UNESCO/IOC Project office for IODE)
5. Ecosystem aspects and how scientist networks handle data
Carlo Heip (MarBEF and NIOZ/NIOO)
6. SeaDataNet: pan-European infrastructure for ocean and marine data management - Perspectives towards EMODNET
Dick M.A. Schaap (MARIS, SeaDataNet - FP6 I3)
7. Presentations from the floor
 - Marine Board rationale for the Marine Board – EuroGOOS Panel on EMODNET
Antoine Dosdat (Ifremer, Marine Board vice-Chair)
 - Perspectives from ESONET, EMSO, EUR-OCEANS
Michael Diepenbroek (MARUM, Bremen)

General discussion

Afternoon session: **Data and Information for Policymakers**

Moderator:

Geoffrey O'Sullivan (Marine Institute - Ireland)

8. Transforming marine science into ecosystem advice for policy makers
Gerd Hubold (ICES)
9. WISE initiative - European Commission
Violeta Vinceviciene (DG Environment)
10. GEO and GEOSS
Alan Edwards (DG Research)
11. Data needs for shipbuilding industry
Willem Laros (Waterborne TP)

General discussion

12. Presentations from the floor
Marine Information Management: Identification and Analysis of the Marine FP6 Projects
Laurent d'Ozouville (EurOcean)

13. Data needs for offshore industry
Chris Shaw (OGP and Shell International)
14. EU Maritime Policy and marine data, European Commission
Iain Shepherd (DG MARE)

General discussion

Concluding remarks

Geoffrey O'Sullivan (Marine Institute - Ireland)

1ST MARINE BOARD FORUM

Introduction

The 1st Marine Board Forum, *Marine Data Challenges: from Observation to Information*, held on 15 May 2008, Ostend, brought together representatives of some of the key European marine observation and data centres, researchers, national and European policymakers and data end-users from the maritime and offshore industries. Forty nine individual organisations took part, themselves representatives of the wider marine and maritime communities. These included UNESCO/IOC project office for International Ocean Data Exchange (IODE), International Council for Exploration of the Sea (ICES), European infrastructure projects such as SeaDataNet, European FP6 Networks of Excellence MarBEF, ESONET, EMSO and EUR-OCEANS, Waterborne Technology Platform, EuroGOOS, EurOcean Internet Portal, International Association of Oil & Gas Producers (OGP), European Commission services (e.g. DG Research, DG MARE and DG Environment), a range of leading marine research funding and research performing organisations, and policymakers.

The participants debated the challenges necessary to the development of pan-European observation and data management systems, from acquisition through to informed use. The Forum was deemed to be timely given the recent policy developments and on-going and future initiatives concerning marine observation and data management policies. The Marine Board had already undertaken a proactive role in launching, together with EuroGOOS, a panel of experts to prepare a Vision Document addressing what the proposed European Marine Observation and Data Network (EMODNET) should look like (see page 16). Building on its 1st Forum, the Marine Board is ready to foster updates and further interactions among the marine science community, marine science and maritime policymakers and maritime industry stakeholders on this topic and related matters.

Starting from the fundamental premise that observational data should be readily available to those who need it, key recommendations from the 1st Marine Board Forum include:

- A call to develop a strategy that enables proper planning of marine observations;
- A drive to address the technological challenges, ensuring appropriate quality assurance at all levels;
- A need to address the requirement for long-term sustainable funding for observation and data management, necessary to provide a reliable basis for end-users to invest in transforming observations into useful operational products.

To effectively achieve the above, the interfaces between observers, data producers and end-users, as well as between scientists and policymakers, need to be enhanced through partnerships. Such partnerships are necessary to improve the quality and availability of data and ensure that observations reflect what users need. Research can provide the basic knowledge to sustainably exploit and manage the oceans, but new multidisciplinary expertise and multi-sectoral partnerships are necessary, making physical and biological observations available for management of fisheries, transport and socio-economic interest. As not all data provision is driven by science, with much originating from the obligations inherent within regulatory regimes, these should also be included in a wider European marine and maritime data and observation network.

Outputs from the 1st Marine Board Forum **presentations** and **discussions** are published here as proceedings.

In addition, some European initiative developments, which occurred subsequently to the 1st Marine Board Forum, are also presented – see:



Poster panels, computer simulations and a dummy Argo float at the Marine Board Inaugural Exhibition (Ostend, May 2008)

- European Strategy for Marine and Maritime Research (September 2008) (page 10)
- MarBEF Legacy (2004 -2008) (page 14)
- LifeWatch: e-Science and Technology Infrastructure for Biodiversity Research (page 15)
- Launch of Marine Board and EuroGOOS Vision Document on EMODNET (October 2008) (page 17)
- “Google Ocean” launched (February 2009) (page 18)
- European Atlas of the Seas (page 18)
- EMODNET and WISE-Marine links (page 20)
- FP7 Support Actions for Marine and Maritime Research Communities (page 23)
- Towards EMODNET (page 25)
- Seabed Mapping Initiatives (page 26)

All documents and materials related to the 1st Marine Board Forum (i.e. presentations, videos, press releases, articles, pictures) are available at: www.esf.org/marineboard/forum

The conclusions of the 1st Marine Board Forum were published in Research Europe (Research Europe 29/5/08, p8).



Inauguration of the Marine Board offices at the InnovOcean site (14 May 2008, Ostend). From left to right: Jan Mees (VLIZ Director), Kathrine Angell-Hansen (DG MARE), Rudy Herman (Researcher, EWI - Government of Flanders), John Marks (Director of Science and Strategy, ESF), Niamh Connolly (Executive Scientific Secretary, Marine Board), Koen Verlaeckt (Secretary General, Flemish Department of Foreign Affairs), Lars Horn (Chair, Marine Board), Jean-François Minster (Science Director, Total S.A.).

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Opening and Setting the Scene

Opening

Lars Horn (**Marine Board Chair**) opened the Forum by welcoming speakers and participants to the newly inaugurated Marine Board facilities within the InnovOcean site in Ostend (see pictures on previous page). He reminded the participants that the Aberdeen Declaration (2007) formulated a Vision of the role of marine science and technology in the Integrated Maritime Policy for the European Union. Challenges ahead are substantial and this Forum provides an opportunity to discuss ideas, and requirements necessary to develop shared approaches that would allow Europe to optimise its investments in marine observation and monitoring.



"There is an unprecedent policy emphasis placed on marine data issues within Europe today; the aim is to improve the quantity, quality and accessibility of marine information available for decision making and to open up new economic opportunities in the marine information sector in Europe, to the benefit of the European citizen and the global community."

Lars Horn
(15 May 2008, Ostend)

Setting the Scene - Marine Data and Observation: a Challenging Topic



"It is of utmost importance to enhance the interface between marine data providers and users [policymakers, industry]".

Kostas Nittis
(15 May 2008, Ostend)

Kostas Nittis (**MedGOOS Chair; Marine Board vice-Chair**) set out the need for the establishment of a monitoring strategy at the European level, highlighting the increasing need for well planned sustainable observations. While new technological challenges (including sensors, platforms, IT, telecommunications) offer both novel and more cost-effective ways to sample the marine environment, they bring their own challenges, including aspects, such as:

- Quality assurance of observations and data (at all levels);
- Need for a long-term sustained commitment for funding;
- Intelligent interpretation of the collected observations to transform them into long-term valuable information products that can be used by policymakers, industry and wider society while fulfilling the needs of the scientific community.

Kostas Nittis reminded the participants that the purpose of this 1st Marine Board Forum was to foster discussions on the need to:

- Ensure that policy and industry decisions are informed by sound knowledge, based on accurate information;
- Improve the quantity, quality and accessibility of marine information available for decision making by bringing scientists into the policy and industry interface and provide opportunities to transform their results into an information format of relevance to users;
- Inform scientists of the needs of data users, and to identify new opportunities in the marine information sector in Europe.

Observation and Data Providers

Marine data and observation management: European Commission Perspectives: Alan Edwards (on behalf of Manuela Soares Director, Directorate I “Environment”, Research Directorate General) spoke in the context of the Integrated Maritime Policy, as presented by the European Commission in October 2007. All matters relating to Europe’s oceans and seas are interlinked, and sea-related policies must develop in a cohesive way in order to reap the desired results. Acknowledging that there were many relevant policies, he emphasised that the purpose of the Integrated Maritime Policy was to bring these policies together and maximise the synergies between them. Since well designed policy solutions require appropriate data, information and networks, he stressed the need for increased research effort and a related strategic context within which to undertake it. The main stimulus at EU level is the European Research Area, implemented primarily through the Framework Programmes. The Commission called for a partnership approach between various

research communities, as well as between the European Commission and the Member States (and national research programmes), together with the private sector, which is increasingly involved in research and making its data available.



“While differences occur between technology-led and user-led interests; from the European Commission’s perspectives marine observations must meet the users’ needs and not the technology push.”

Alan Edwards
(15 May 2008, Ostend)

Alan Edwards concluded that:

- An integrated governance framework for maritime affairs requires tools for policy-making;
- The availability of, and easy access to, a comprehensive range of natural and human-activity data and information on the oceans is critical as a basis for strategic decision-making on maritime policy;
- The development of a European Marine Observation and Data Network (EMODNET), together with associated maritime observing and information systems, will provide an important tool in the implementation of an Integrated Maritime Policy for the European Union.

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Observation and Data Providers

European Strategy for Marine and Maritime Research (September 2008)

In September 2008, the European Commission adopted the European Strategy for Marine and Maritime Research: A coherent European Research Area framework in support of a sustainable use of oceans and seas. The strategy is one of 65 key actions designed to support the implementation of the Integrated Maritime Policy for the European Union (adopted in October 2007) and aims at “*finding mechanisms for the sustainable support and management of data on the seas, including mapping of European waters and the integration of maritime surveillance systems.*”

The Marine Board officially welcomed the Strategy, emphasising the importance of implementing mechanisms to improve efficiency and reduce fragmentation. The Marine Board is actively involved in initiating new opportunities to enhance interaction between marine and maritime research communities and industry to develop innovative solutions to existing and emerging questions.

From observation to data to information for scientists and policymakers... and industry:

According to **Jean-François Minster (Total S.A.)** the enhancement and sustainability of ocean exploitation needs understanding of, and information on, the oceans. Major progresses have been achieved in recent years: marine sciences were identified as a key element of ecosystem-based maritime policies; comprehensive marine sciences now encompass the whole set of socio-economic issues; assessment and benchmarking of European marine infrastructures have been undertaken; operational oceanography is being established as a core element of GMES. Yet, a number of elements still require improvement, including:

- Assessment of the information requirements (by all stakeholders including media, education and NGOs);
- Understanding of scientific issues requiring long-term observations; assessment of the necessary operational *in situ* infrastructures;
- Interfacing of the marine core service with downstream services for end-users.



“The implementation of tools to facilitate work at the European scale such as the Ostend [InnovOcean] offices should help to progress towards the interlinking of end-users and scientific developments.”

Jean-François Minster
(15 May 2008, Ostend)

Jean-François Minster emphasised that ocean information requires multidisciplinarity and the availability of a large suite of technologies. According to him, this requires a shift in approach from “*what science is traditionally best organised to do – small projects – moving to large integrated programmes running over long-term duration*”. Marine sciences require the largest variety of infrastructures (e.g. ships, satellites, moorings, high performance computing, etc), which represents typically 50% of their costs. “*Hence*”, Jean François Minster noted, “*there is need to broaden the access to, and use of, operational infrastructures*”. Information

systems have mostly come from the science base: strategic evolution is required to specify systems which are not yet in place; they can take decades to implement and have long lead-in times. Jean-François Minster stressed the need to keep this evolution in perspective: *"We must not reinvent what has already been worked on. Marine science must be a strategic component of the maritime policy, with a comprehensive science perspective, shared approaches to infrastructure investment and management"*. Networking, and even for some aspects a real integration at the European scale – not just coordination or cooperation – is particularly needed for operational oceanography infrastructures, in both the public and private sectors. Integration is needed so that the infrastructures are efficient in terms of the research they consume and the critical data parameters they need, such as the data on ocean currents. Safety of operation and risk reduction are at the top of the offshore operators' agenda: offshore operators need a broad variety of information to allow the development of long-term designs. Industry is risk adverse, it values reliability and accumulated expertise above all else.

Policymakers are beginning to recognize and acknowledge that they need an integrated research base. This represents a significant development from the 'science push' of the past and requires further improvement of coherence between the objectives of the European Commission and national plans. The relationships, networks, and coordinating structures in the marine world are not well understood by key stakeholders; they cannot see where best to interact. A strategic vision must be defined, common approaches must be implemented and expertise must be shared to enable the interlinking of end-users and scientific developments.

As the effectiveness of the European policies to tackle the matter of old data sets was questioned, Jean-François Minster highlighted that the best Quality Assurance for those data can only occur

when they start being re-used, and possibly compared with models.



"It is critical to make sure that national funding is sustained to maintain good data centres in Europe and ensure that the data are taken care of."

Hans Dahlin
(15 May 2008, Ostend)

Operational oceanography, including GMES marine core services: Hans Dahlin (EuroGOOS)

gave the perspective from those who have to make operational oceanography work. He contended that operational oceanography could be categorised as user-driven oceanography. There is a long history of need and development over many centuries, for information on tides, currents, etc. International exchange of these data eventually led to the development of the World Meteorological Organisation (WMO). Activities to address issues such as water quality and to develop spill response actions and emergency response and rescue systems have reached an operational level during more recent decades.

Yet despite this, most of the ocean remains undersampled. Observations are needed in order to develop and challenge the models. The challenges are to:

- Make the necessary observations;

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Observation and Data Providers

- Safeguard the observations and make them accessible;
- Produce jointly as far as possible the required information and services;
- Understand user requirements.

Once these challenges have been addressed, we as operational oceanographers can focus on the continued development of the science. The EuroGOOS objectives are to build on scientific successes and investments and to see how to develop more operational tools and services from the existing science.

Sustainability is a problem. “Often, sustained monitoring at individual stations relies on just a few dedicated individuals,” Hans Dahlin said, “the sustained funding is decreasing and it is difficult to get and to retain operational oceanographers. It is not a well-defined or rewarding career and the work is continuous and not varied. For an oceanographer working with services there is little opportunity to look more deeply into the science.”

Co-operation is a way to mitigate the problems. There is a need to work together on a global, European and regional scale. EuroGOOS works mainly with the European regions to continue to develop and implement observational oceanography within Europe. This engages many European partners, for example as part of the development of GMES. The EuroGOOS Regions are now strongly involved in the implementation process, including projects such as MyOcean, to ensure that data is used to develop the core services, that there are interfaces to intermediate users of the data and products from models and then to turn these into the downstream services required by end-users. The requests are now focussing on what is needed by scientists as well as end-users, on the need for long-term time series and other data that scientists will need to be able to carry on in the future.



Marine Board Forum panelists, from left to right: Kostas Nittis (MedGOOS), Hans Dahlin (EuroGOOS), Jean-François Minster (Total S.A.) and Alan Edwards (European Commission).

UNESCO/IOC's project office for International Oceanographic Data and Information Ex-change (IODE) was presented by **Peter Pissierssens (Head of the UNESCO/IOC Project office for IODE)**. The Intergovernmental Oceanographic Commission (IOC) is a body with functional autonomy within the United Nations Educational, Scientific and Cultural Organisation (UNESCO). The International Oceanographic Data and Information Exchange (IODE) programme of the IOC was established in 1961 to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products – including textual information components. Since 1961, the IODE has developed a formal network of 76 National Oceanographic Data Centres (NODCs) as well as an informal network of marine information management (library) experts.

The IOC Strategic Plan for oceanographic data and information management focuses on the adoption of standards and formats, the saving of old data (through the oceans data recovery and archive project), easy discovery and access, and equitable access to information.

Capacity building and development has traditionally been a core component of IODE and this has translated in recent years in the development of Ocean Data and Information Networks (ODINs).



"The ambition should be to have the same sort of worldwide easy access system for oceanographic data as we enjoy when we use an ATM to withdraw money from bank accounts."

Peter Pissierssens
(15 May 2008, Ostend)

These are self-driven, regional network projects (started in Africa, the Caribbean, the Indian Ocean and the Pacific islands) that provide training, equipment and operational support. Underpinning the training element, an expert training resource for marine data and information management (OceanTeacher) has been developed, that combines the expertise available from the IODE data and information experts for students. In many university curricula there is no data management activity, the students do not realise the importance of data and data management centres. In order to provide a permanent facility for training courses, expert meetings and IODE web-based products and services, the IOC Project Office for IODE was established in 2005.

IODE is a partner in SeaDataNet and responds to the need to integrate within Europe. However, there

is a strong need to ensure interoperability with the international schemes, otherwise it will be very costly to retrospectively engineer these systems later. Peter Pissierssens concluded with some questions to the audience and the community:

- Is the Integrated Maritime Policy for the EU sufficiently outward looking?
- Is there a plan for the long-term archival and preservation of data in the EU?
- Is the medium-term project based approach leading to long-term stable systems and infrastructures in the EU?
- Is there a long-term vision on data and information management in the EU?
- Is data management sufficiently entrenched in the marine science and observation research community? Do we use a carrot or stick approach – and which might work?
- Is data management education included in the university curriculum?
- To what extent do technological developments trickle down within centres and is expertise efficiently shared?

Ecosystem aspects and how scientist networks handle data: Carlo Heip (MarBEF and NIOZ/NIOO) stressed that *"the various FP6 Networks of Excellence have had to deal with data acquisition; one of their main challenges is now to ensure that the marine data they have collected are maintained in the future".*

Biodiversity deals with three levels of biological organisation: genes, species, and habitats. The huge amount of information, in principle stored in open access databases, is rapidly increasing thanks to:

- Barcoding and DNA sequencing (e.g. the "barcode of life", where 4,000 species have already been coded);
- Species identification (e.g. 41,000 names of marine species are now in the European Register of Marine Species); and
- Habitats mapping.

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Observation and Data Providers

Data on species and habitats are used for a wide range of applications, including: stock assessment, environmental impact assessment and as indicators for ecosystem health.

Carlo Heip highlighted that "*biologists are often reluctant to release their data; hence within MarBEF, we had to encourage scientists to donate their biological data by indicating the higher scientific value of integrating data*".



"In five years time we will have 10 times the current amount of data to deal with."

Carlo Heip
(15 May 2009, Ostend)

The MarBEF data policy relied on the following three main principles:

- (i) Free and open access to data in a partnership approach, based on IOC policy and Ocean Biodiversity Informatics (OBI) Hamburg conference statement;
- (ii) Scientist or team generating the data should have an opportunity to have 1st publication of the data, and analysis based on them (moratorium period of two years);
- (iii) MarBEF does not claim ownership of the data, only the participating institutes, organisations or the funder of the data collection will do this.

MarBEF Legacy (2004 – 2008)

The MarBEF Legacy includes:

- Taxonomy (World and European Register of Marine Species - WoRMS and ERMS);
- Geography and Biogeography (European Ocean Biogeographic Information System - EurOBIS and thematic integrated databases);
- Metadata (register of resources); and
- Literature (MarBEF open archive).

"After five years of MarBEF, Europe is now in a position to take the lead in marine biodiversity research. The MarBEF community has built the world's largest databases on macrobenthos, meiobenthos and pelagic marine species. Well over 100 scientists from 54 institutions in 17 countries have contributed not less than 223 datasets to the MarBEF data system. This has resulted in 4.3 million distribution records of 17,000 species in all the European seas and many of the world's oceans. The oldest record dates back to 1768."

Abstract of The future of MarBEF Legacy, MarBEF newsletter 8: 14-15, 2008

See: www.marbef.org

Carlo Heip emphasised that many challenges remain, including the need to:

- Sustain the effort of continuing to build the databases, maintain open and free access in order to find out how to couple genetic and species information with habitat information and allow prediction of where species will occur;
- Link and integrate with other networks in Europe and in the world in order to ensure that data is fed from biodiversity observatories to potential users (GEO-BON, LifeWatch);

- Support new developments such as the use of tagged mammals, birds, turtles and fish as platform for data collecting sensors.

LifeWatch: e-Science and Technology Infrastructure for Biodiversity Research

The LifeWatch infrastructure for biodiversity research addresses the huge gaps which are faced in the understanding of life on Earth. Its innovative design supports a large-scale methodological approach to data resources, advanced algorithms and computational capability. LifeWatch will support the scientific research, the understanding and the rational management of the ecosystems by policy makers, the private sector and the general public.

See: www.lifewatch.eu

Perspectives from SeaDataNet: Dick M.A. Schaap (MARIS, SeaDataNet Technical Coordinator) presented SeaDataNet (FP6 I3 2006 – 2011) a pan-European and EU-funded project, undertaken by the National Oceanographic Data Centres (NODCs), and information services of major national institutes, from nearly all coastal states bordering the European seas. SeaDataNet focuses on addressing fragmentation by interconnecting the data centres to provide integrated on-line access to the most comprehensive sets of multidisciplinary *in situ* and remote sensing marine data, meta-data and products. The consortium comprises 49 partners of major oceanographic institutes of the 35 participating countries, representing NODCs, Satellite Data Centres, expert modeling centres, IOC, ICES, and JRC. Dick Schaap emphasised that “*data centres are highly skilled and actively engaged in data management for several decades and have the basic capabilities and facilities for data quality control, perennial*

safeguarding, retrieval and dissemination to both intermediate users (value adding organisations) and end-users.”



“The design and implementation of EMODNET will require actively engaging with and building upon on-going and established groups and networks [such as SeaDataNet].”

Dick M.A. Schaap
(15 May 2008, Ostend)

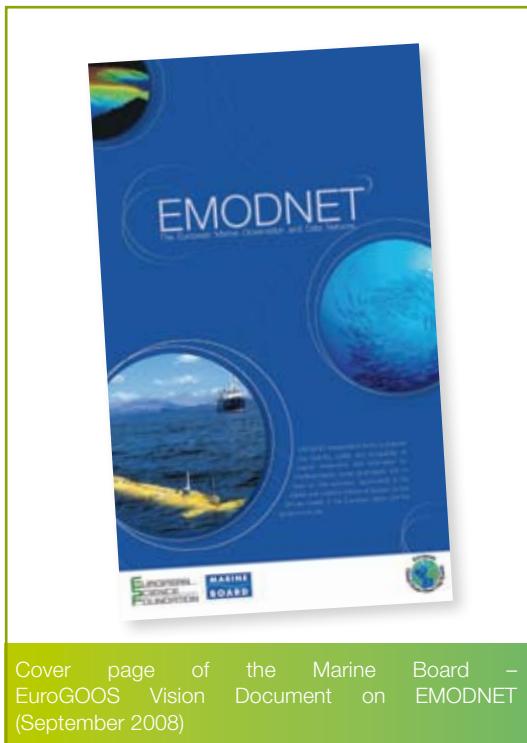
“SeaDataNet has a fair coverage regarding physical oceanography data,” informed Dick Schaap, “however further cooperation is required to share standards and interoperability principles; for biological data for instance, we have approached MarBEF to address this”. SeaDataNet cooperates and provides services for many other European and international groups and projects, contributing and safeguarding good data management for initiatives including:

- EuroGOOS: SeaDataNet maintains the European Directory of Ocean Observing Systems (EDIOS) and improves access to real-time data (see www.edios.org);
- POGO: SeaDataNet collects and provides information on ocean-going research vessels, and their operators, planned and completed cruises (see www.pogo-oceancruises.org);

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- Marine Core Services: SeaDataNet streamlines the provision of long-term archives for optimising marine forecast services and SeaDataNet is cooperating with MERSEA and ECOOP (operational oceanography projects) to tune the handling of real-time and near-real-time data in those projects.



Cover page of the Marine Board – EuroGOOS Vision Document on EMODNET (September 2008)

SeaDataNet is well qualified for an active role in the design, implementation and future operation of the European Marine Observation and Data Network (EMODNET). As stressed in the Marine Board – EuroGOOS Vision Document on EMODNET (see below) a harmonisation based on the following three key elements is required:

- (i) Common data policy which enables free and open access to data, preferably without restriction on use;
- (ii) Common standards for quality control procedures, metadata formats and description, and data exchange formats;

- (iii) System of systems approach with interoperability achieved through INSPIRE Directive principles.



"In establishing the Marine Board – EuroGOOS panel on EMODNET, we adopted a partnership approach with the policymakers."

Antoine Dosdat
(15 May 2008, Ostend)

The Marine Board – EuroGOOS Panel on EMODNET: was profiled by **Antoine Dosdat (Ifremer, Marine Board vice-Chair)**. In February 2008, the Marine Board and EuroGOOS set up a panel of European experts on marine observation and data collection and management. The panel was established to prepare a visionary paper addressing what a fully integrated, interoperable marine monitoring and observation system at the EU level should look like in the next five to ten years. The resulting publication, the Marine Board – EuroGOOS Vision Document on the European Marine Observations and Data Network (EMODNET), profiles EMODNET as “an end-to-end, integrated and inter-operable network of systems of European marine observations and data communications, management and delivery systems, supported by a comprehensive user oriented toolkit to enable implementation of the Integrated Maritime Policy for Europe”.

Launch of the Marine Board – EuroGOOS Vision Document on EMODNET (October 2008)

The Marine Board–EuroGOOS Vision Document on EMODNET was officially presented to Commissioner Joe Borg on 24 October 2008 during the French EU presidency Conference, BioMarine in Marseille. This publication was formally welcomed by Mr. Fokion Fotiadis, Director General of DG MARE, who stated that it was an expression of “the considered opinion of knowledgeable and articulate stakeholders” which would contribute to the work of the European Commission’s MODEG group and the Roadmap for EMODNET.

Available at:

www.esf.org/marineboard/publications



Marine Board – EuroGOOS launch event
– from left to right: Maud Evrard (Marine Board), Niamh Connolly (Marine Board), Commissioner Joe Borg (EC DG MARE), Lars Horn (Marine Board Chair), Fokion Fotiadis (EC DG MARE) and Geoffrey O'Sullivan (Marine Institute Ireland)- credit: European Commission

Perspectives from ESONET, EMSO, EUR-OCEANS: key challenges for interoperability between numerous data management and long-term archiving systems, catalogues,

protocols, compiled catalogues and front-end portals were stressed by **Michael Diepenbroek (MARUM, Bremen)** as follows:

- Data capture should be conducted through flexible, science controlled network of observatories (sea floor to sea surface, mobile to cabled). Targeted rescue activities should be conducted in order to ensure that data produced is made available;
- Data centres are our data libraries and as such they should be certified using OAIS standard (as established under the ISO frame);
- Interoperability is needed for e-infrastructures which have to be networked; to achieve the latter, facilities with higher capabilities have to be used as broker between systems, as not all facilities will have the necessary resources;
- Publication of data product publications should follow OECD principles and guidelines for access to research data (2007). Data and observation services have to be integrated in the design and implementation of European virtual scientific institute(s).



“Scientists search data using Google; the data management community has to get ready to address this.”

Michael Diepenbroek
(15 May 2008, Ostend)

1ST MARINE BOARD FORUM

Observation and Data Providers

'Google Ocean' launched (February 2009)

In February 2009, the Ocean Component of Google Earth was launched. It is a 3D map, which allows the users to:

- Dive beneath the surface and visit the deepest part of the ocean;
- Explore the ocean floor;
- Learn about ocean observations, climate change and endangered species;
- Discover new recreational areas as well as shipwrecks.

Further data and information is continuously being added.

Increasing awareness of the seas and knowledge of the oceans is a central objective of the EU Integrated Maritime Policy. In this respect the Ocean component of Google Earth will contribute to making marine knowledge more accessible to the interested or concerned citizen as well as to other stakeholders.

The European Commission is currently setting up the EMODNET to process fragmented data on seabed geology, living species and chemical pollution in order to build up complete sea-basin pictures. The European Commission also plans to publish a prototype "European Atlas of the Seas" to raise awareness of Europe's maritime heritage, of economic opportunities existing in sea-related activities, and of the fragility of our marine environment. Ideally EMODNET, the European Atlas of the Seas and Google Ocean should be complementary initiatives.



Participants at the 1st Marine Board Forum
(15 May 2008, Ostend)

European Atlas of the Seas

In September 2008, the Marine Board provided the European Commission with some points for consideration with regard to a European Atlas of the Sea. In line with the Aberdeen Declaration, the Marine Board considers "*the preparation of a 4D digital European Atlas of the Seas, as a highly desirable, high level and high profile initiative for marine and coastal spatial planning, business and nature conservation purposes, as an educational and promotional tool and as a mechanism for outreach to reinforce public awareness of our shared maritime heritage. A 4D digital European Atlas of the Seas is essential to assist in the creation of the marine and maritime component of the ERA.*"

1ST MARINE BOARD FORUM

Data and Information for Policymakers

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Data and Information for Policymakers

Transforming marine science into ecosystem advice for policymakers: Gerd Hubold (ICES) presented the International Council for the Exploration of the Sea (ICES). The ICES network of about 200 marine science institutes was created more than 100 years ago, established as an intergovernmental organisation in 1964, and its mandate was revised in 2002 to:

- Promote and encourage marine research;
- Draw up programmes required for this purpose;
- Publish or otherwise disseminate the results;
- Give unbiased, sound, reliable, and credible scientific advice on human activities affecting, and affected by, marine ecosystems.



"Sustainable management needs credible advice; scientific advice needs robust science; marine science needs reliable data."

Gerd Hubold
(15 May 2008, Ostend)

Based on the Science Programme, ICES established its Advisory Services. Guiding Principles for the Advisory Services are: objectivity and integrity, openness and transparency, quality assurance and peer review, integrated advice – based on an

ecosystem approach, efficiency and flexibility, and national consensus. These principles are met by a structure comprised of an Advisory Committee, Advice Drafting Groups, Review Groups, Expert Groups, and data compilation workshops. ICES advice is requested on a regular basis by member states and partner commissions. It draws on support from the ICES Data Centre.

The ICES Data Centre is part of international data network and participates in specialised projects. It serves the scientific community with tailored products, e.g. input parameters for fish population models.

The ICES Science Network, ICES Advisory Services, and the ICES Data Centre are services which the organisation offers to the marine science community, stakeholders and marine managers in Europe and beyond.

WISE initiative - European Commission: according to **Violeta Vinceviciene (DG Environment)** the Water Information System for Europe (WISE) initiative aims to simplify reporting of EU water-related data and information, and facilitate enhanced use of that information. Violeta Vinceviciene stressed that the European Commission will ensure coherence and adequate partnerships to maximise usefulness of outcomes. She also referred to the relevance of links between EMODNET and WISE-Marine.



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Data and Information for Policymakers

EMODNET and WISE-Marine links

EMODNET and WISE-Marine are both in line with the EU's INSPIRE Directive and contribute to its implementation. WISE-Marine intends to derive a maximum of data from EMODNET, but will focus its attention on the processing and presentation of derived data products for use in the Marine Strategy Framework Directive (MSFD) perspective or marine environmental management generally. The WISE-Marine user communities will, to different degrees, have direct relations with EMODNET, depending on how much they require raw data.

For this reason, EMODNET and WISE-Marine are linked in the Terms of Reference for the EMODNET tender published by DG-MARE on 1 July 2008:

"EMODNET will provide data on scales defined by the regions and sub-regions of the Marine Strategy Framework Directive. The parameters to be collated within

the preparatory actions were chosen to fit in with the requirements of the Directive. One of the outcomes of this contract will be a better understanding of the ability of the present monitoring network to meet the needs of the Directive. EMODNET, as an open data system, is then also considered as a significant observation and monitoring data conduit for the part of the Water Information System for Europe (WISE) that will be developed for dealing with marine information (WISE-Marine) and supporting the data and indicator needs for the initial assessments required by member States in 2012 by the Marine Strategy Framework Directive. WISE and WISE-Marine are thematic branches of the envisaged Shared Environmental Information System (SEIS) based on INSPIRE principles. EMODNET data should be directly available for viewing through WISE-Marine. WISE-Marine is being developed along a timeline which is in parallel to this EMODNET preparatory action."

EMODNET and WISE-Marine intended comparative qualities:

EMODNET	WISE - Marine
Networking facility for maximizing added value from potentially any marine observation and data, supporting the 'services' dimensions of maritime sectors and the knowledge base of the maritime policy.	European portal for marine environmental information, in line with SEIS; Streamlined official reporting channel, reference centre for thematic marine environmental information.
Focus on becoming a 'data warehouse' for marine observations for all types of users.	Focus on becoming a 'common reporting and information sharing' facility for communities in the sphere of marine environmental policy.
Regionally coherent, streamlined, raw data sets accessible to all potential users. Discovery, viewing, retrieving. Extensive post-processing (into information products) not intended.	Prioritized entry levels in WISE-Marine are: 1. Indicators and thematic assessments 2. Access to underlying data 3. Interpretation in order to derive environmental meaning from data.

Extract from the EC Meeting of 23 July 2008 on the relation between EMODNET and WISE-Marine

GEO and GEOSS: Alan Edwards (DG Research)

presented the Group on Earth Observations (GEO) - a high-profile and growing international partnership of 72 governments and the European Commission, with the active involvement of 52 participating organisations. The GEO leads a global effort to create within the next ten years a Global Earth Observation System of Systems (GEOSS), to provide better information for decision-makers in the realms of the environment, climate and sustainable development. In so doing, it will seek to unite the Earth Observation efforts of its members in order to address priorities in the areas of natural and human-induced disasters, agriculture and desertification, human health and well-being, energy resources, climate variability and change, water cycle, weather, ecosystems, and biodiversity.

To address threats and ensure sustainable economic development, effective collaboration is required on a global scale. The GEO initiative provides a compelling answer, representing a striking example of international cooperation in science and technology to improve decision-making on essential issues for the well-being of the planet and its citizens.

The development of GEOSS over the next ten years will provide a better, more systematic monitoring of our planet and its resources. GEOSS will provide an improvement in our understanding of the Earth's system, markedly enhancing global policy and decision-making to promote the environment, human health, safety, and welfare. Its specific purpose is to achieve comprehensive, coordinated and sustained observations of the Earth's system, in order to improve monitoring of the state of the Earth, increase understanding of the Earth processes and enhance prediction of the behaviour of the Earth's system. GEOSS will meet the need for timely, high quality and long-term global



"Data sharing is a key factor for success; without this, it is not possible to deliver benefits towards a common policy for marine waters. So please get your system into GEOSS!"

Alan Edwards
(15 May 2008, Ostend)

observations, as a basis for information for sound decision-making. It will enhance delivery of benefits to society in the following areas: reduction of natural and human-induced disasters; human health and well-being; energy resources; climate variability and change; water cycle; weather; terrestrial, coastal and marine ecosystems; sustainable agriculture and desertification; and biodiversity.

Concluding, Alan Edwards stated that *"the GEO represents an important governance experiment, with its 'light' and voluntary structure."* A GEOSS initial operating capability has already been established. The Initial Operating Capability Phase of the GEOSS Common Infrastructure (GCI) will bring the GCI into full operation during the 2nd part of 2009.

1ST MARINE BOARD FORUM

Data and Information for Policymakers

Data needs for Maritime Transport: according to **Willem Laros (Community of European Shipyards Associations – CESA)** the three driving force for the Maritime Research and Development are:

- (i) Technological push;
- (ii) Socio-economic developments;
- (iii) Market pull.

Those forces operate within four different sectors:

- (i) Maritime technology and shipbuilding;
- (ii) Maritime transport;
- (iii) Marine infrastructure and services;
- (iv) Dredging, offshore and energy services.

The maritime sector strongly supports co-operation and involvement with marine research institutes to meet the objective of the sustainable use of European seas whilst reaching maritime economic targets.



Participants at the 1st Marine Board Forum
(15 May 2008, Ostend)



"Waterborne TP provides a mature platform within which the stakeholders discuss and launch new larger common initiatives, both marine and maritime."

Willem Laros
(15 May 2008, Ostend)

For instance, the Waterborne TP Vision (2005) and related Waterborne TP Strategic Research Agenda (2006) identified the following key challenges:

- The equipment and shipbuilding sector progresses towards the development of engines running on new fuel types with more efficient propulsion. The future ship will be more economic and induce less stress on marine ecosystems;
- Emissions control requires from the maritime transport sector to focus on the deployment of the next generation of efficient ships, and on the prevention of spills and waste production. The current globalization trend and economic growth requires from the transport sector to use larger vessels which need larger ports and deeper water port access;
- The offshore energy services industry seeks to exploit alternative energy sources such as wind,

wave and tidal energy at sea. There is also a strong push for the development of technologies to allow the exploitation of conventional energy sources at increasing water depth;

- The marine infrastructure, services and dredging sector is currently trying to control and minimize impacts of large coastal and marine construction projects. Hydrodynamics, sediment transport and ecosystem interactions are the core matters. In parallel this sector will have to plan, design, construct and develop marine infrastructure so that it remains competitive. Coastal/port planning represents a huge challenge for both marine and maritime world.

As a result, the maritime sector has key data requirements in the following areas:

- Winds, currents and temperatures (short, medium and long term) to best address competitiveness and climate change matters;
- Ecological and socio-economic value of the sea and sea bottom to best identify exploitable resources;
- Potential for farming and energy generation;
- Structure and stability of the sea bottom to best address competitiveness and climate change, etc.

FP7 Support Actions for Marine and Maritime Research Communities:

- **EMAR²RES project - Cooperation between the Communities of European MARine and MARitime REsearch and Science:** The European Commission issued a call for proposals to fund the Integration of Marine and Maritime Sciences in Waterborne Transport in support of the European Research Area (reference: FP7-SST-2008-RTD-1). The Marine Board was invited by the maritime industry, represented by Waterborne TP, as their partner from the marine research sector, in the development of their proposal, entitled EMAR²RES. The five-partner consortium is coordinated by CESA, and the work is expected to start in autumn 2009. The Marine Board is tasked to: (i) provide key marine experts to participate in a range of foresight activities (workshops, etc.); and (ii) establish a Policy Interface Panel.

- **MARCOM+ proposal - Towards an Integrated Marine and Maritime Science Community:** The MARCOM+ proposal addresses the objectives of the Aberdeen Declaration (2007) to support the marine and maritime science communities to realize the concept of partnership through the establishment of a "European Marine Science Partnership that would contribute to developing interactions between partners (Member States, regional authorities, the research community, industry and other stakeholders)".

1ST MARINE BOARD FORUM

Data and Information for Policymakers

Marine Information Management: Identification and Analysis of the Marine Projects Funded under FP6: Laurent d'Ozouville (EurOcean Portal) presented EurOcean as a focal point source for information on marine science and technology in Europe. EurOcean Internet Portal (www.eurocean.org) aims to provide information on topics related to marine science and technology in Europe – mainly on the following: marine research infrastructures and European research, technology and development information.



"The access to a comprehensive source of data and information is necessary for an integrated and inter-sectoral approach to ocean affairs in Europe."

Laurent d'Ozouville
(15 May 2008, Ostend)

EurOcean_MaP, the information database of the European Marine Research Funded Projects, provides information on projects funded by COST, EUREKA, EUROCORES (ESF), 6th Framework Programme (EC), INTERREG III (EC), LIFE (EC) and SMAP (EC). The information compiled for each project includes: acronym, title, contact, coordinator country, participating countries, regional areas, activity area and type of instrument (for FP6 projects), total amount of funding per project and project summary.

EurOcean_MaP has gathered information on 543 projects, of which 267 were funded by the 6th Framework Programme. EurOcean is presently updating the FP6 projects of the information database to a total of 455 identified projects. A statistical analysis of these projects has been carried out, profiling:

- Budget awarded by FP6 activity area;
- Coordination by and participation of the European countries in the marine FP6 projects;
- Repartition of the projects per activity area and by coordinating countries;
- Evolution of the FP budget allocated to marine research from 1987 until now.

Maritime Policy Task Force, European Commission: Iain Shepherd (DG MARE) profiled the work of the European Commission in taking steps towards the implementation of the Integrated Maritime Policy. He emphasised the European Commission's will to:

- Take steps towards a European Marine Observation and Data Network, and towards the promotion of the multi-dimensional mapping of Member States' waters, in order to improve access to high quality data;
- Launch a European Atlas of the Seas - as an educational tool and as a means of highlighting our common maritime heritage.

An ocean of opportunity

"Europe is surrounded by seas and oceans; they are our past, present and future. The European Union needs an Integrated Maritime Policy to benefit from the full potential of our seas and oceans."

European Commission, 2007

Towards EMODNET

In order to provide a direct and specialised support on matters related to EMODNET, the European Commission has selected a group of independent specialists in the collection, processing and application of marine data. This group, the Marine Observation and Data Expert Group (MODEG), includes a broad cross-section of expertise in the different types of data - geological, physical, chemical, biological and the different maritime basins.

In June 2008 the Commission issued two calls for tender for preparatory actions (budget 3.45 million €) that would test the "proof of concept" of EMODNET based on the eight design principles outlined below:

- (i) Collect data once and share it many times
- (ii) Develop standards

- (iii) Process and validate at different levels
- (iv) Sustainable support at an EU level
- (v) Building on existing efforts
- (vi) User driven
- (vii) Clarify ownership, accuracy and precision
- (viii) Freedom of use

The first call was divided into different lots - hydrography, geology, chemistry, biology and habitats. The projects defined for each lot will:

- last for two years with a third year dedicated to maintenance; and
- focus on specific sea-basins.

The EMODNET roadmap, including part of the Marine Board EuroGOOS recommendations, was issued by the European Commission on 7 April 2009.

1ST MARINE BOARD FORUM

Data and Information for Policymakers

Seabed Mapping Initiatives

The Maritime Policy Action Plan includes a commitment by the European Commission to present a programme for the mapping of seabeds in 2008. EMODNET will include data on seabeds and the eight basic design principles proposed for EMODNET are identical to those for the production of seabed maps. Therefore, this roadmap for EMODNET implicitly encompasses a programme for mapping seabeds. A preparatory action starting in 2009 will develop a broad-scale seabed habitat map based on existing data for the Baltic, the greater North Sea and the Western Mediterranean, using a common approach and a common classification system.

<http://ec.europa.eu/maritimeaffairs/>

A scientific briefing on sea-bed mapping for the European Maritime Policy was co-organised by Ifremer (France), IFM-GEOMAR (Germany), and NOCS (UK) at the European Parliament in November 2008. The Irish and Norwegian seabed mapping programmes were referred to as

experiences to build upon for the rest of EU Member and Associated States. Some of the key messages delivered to the Member of the European Parliament were:

- Seabed mapping is a large task for the EU; it is timely because tight international and European legal obligations and similar in scope to efforts to make terrestrial maps several hundred years ago;
- EEZ of EU Member States is approximately 9 million km²; twice as much as its terrestrial landmass;
- States that have begun to map their offshore areas have also reaped benefits, including more controlled and less wasteful fishing, improved environmental quality, fuel savings, improved stock assessment;
- The estimated cost to map the deep waters is approximately 130 million € and the shelves approximately 900 million €.



Participants at the 1st Marine Board Forum
(15 May 2008, Ostend)

Data needs for offshore industry: Chris -level for metocean data and how the data are used to support various activities. Chris Shaw presented an overview of metocean as a discipline in the offshore (and onshore) business (e.g. how metocean data is used at different stages of a project's life cycle). He also highlighted the importance of field data to support real-time operations and to validate historical numerical databases. Key uses of those data are:

- Weather forecasting: a tailored product is needed to support the many operations that are carried out on a daily basis worldwide;
- Operational statistics: planning future offshore projects requires a good understanding of the climatic conditions that can be expected each month, each season;
- Design criteria: developing design criteria (nowadays often 10,000 year return period values are requested) is a challenging matter and requires good datasets as well as experienced people. A look at trends in data requirements is also provided.



"Can we make use of what (we think) we know about the changing climate, or is it premature?"

Chris Shaw
(15 May 2008, Ostend)

1ST MARINE BOARD FORUM

Discussions and Recommendations

The presentations delivered at the 1st Marine Board Forum described the many well developed research, observation and marine data networks in Europe, and the high degree of partnership and cooperation that already exists. Substantial progress, particularly in technology and integration, has been made in recent years, **yet the marine data community still recognises that its fragmentation is a key barrier to further development.**

Challenges for marine observation and data

Under the moderation of **Geoffrey O'Sullivan (Marine Institute, Ireland)** four key challenges were identified:

- (i) **Make the necessary observations** – recognising that much of the ocean is undersampled and that monitoring is expensive, technically challenging and requires a long-term and sustained commitment;
- (ii) **Store the observation data** – with associated quality control and metadata;
- (iii) **Make the observation data accessible;**
- (iv) **Produce the information and services required** at local, regional, European and global scales that meet identified commercial, societal and environmental needs in a cost efficient way.

Maintenance of long-term *in situ* observations:

Aspects of the technical and financial challenges inherent in maintaining long-term *in-situ* ocean monitoring devices, often in inaccessible and harsh ocean conditions, were discussed. The need to link existing data flows from public and private observations (e.g. from research vessels, data buoys, satellites, oil rigs and other coastal

and offshore structures) to maximise their use and benefit, was stated. Critical issues, such as climate change and the implementation of an ecosystem approach to environmental management, demand and greatly benefit from, these long-term datasets. The Forum agreed that **working in partnership would be essential to convince national governments and private sector funding bodies of the critical need for such data and data collection facilities.**

Data management, including curation and quality assurance: The Pandora's Box that is data management was evidenced by the variety and number of organisations involved and the advanced technologies employed in marine data management. Issues of standardisation and interoperability still abound. While efforts are being made to establish a number of portal sites to provide *single points of access*, the Forum was challenged to demonstrate that the marine data management community was playing its role as part of the data flow chain and not just managing data for the sake of management, in a self sustaining role.

Data accessibility: The Forum agreed that observational data, collected at great expense and often by public agencies, should, where possible, be made readily available to those who need it and in a format that they can use. Such data must carry the necessary Quality Assurance, giving confidence to end-users to invest in transforming observations into useful operational products.

Information: Data collection and management is futile unless it can be converted into both usable and useful information. Furthermore, not all data provision is driven by science; much comes from the policy and regulatory regimes, and from industry. These players should also be included in a wider European marine and maritime data and observation network.

Those in need of marine information were identified to include:

- Policymakers: to assist in evidence-based policy making;
- Private sector: to reduce risk, enhance productivity, provide forecasts, and develop and market new commercial knowledge-based products and services;
- Researchers: to prove/disprove their hypotheses, facilitate new discoveries, and provide a better understanding of the world around us;
- General public, who have an insatiable and genuine interest in the marine and maritime realm.

The 1st Marine Board Forum welcomed the European Commission's **European Marine Observation and Data Network (EMODNET)** initiative, a component part of the **Integrated Maritime Policy for the European Union** (October 2007). The Forum noted that the Aberdeen Declaration (EurOCEAN Conference, June 2007) had also endorsed EMODNET, stating that EMODNET should be a comprehensive marine observation system spanning the full chain from *in situ* data collection to the provision of usable information to end-users.

ANNEXES

Annex I - 1st Marine Board Forum Organisation

Forum Programme Committee

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Ed Hill (Marine Board vice-Chair)
Jan de Leeuw (Marine Board vice-Chair)
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Forum Organising Committee

Niamh Connolly (Marine Board Executive Scientific Secretary)
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- Text: Misjel Decler
- Cover page, credit to: NIOZ; ESA; NOCS

Forum material and presentations

available at: www.esf.org/marineboard/forum



1st Marine Board Forum Organising Committee



Marine Board Delegates prior to the 1st Marine Board Forum (14 May 2008, Ostend)

Annex II - List of acronyms

3D: three dimensional
4D: four dimensional
ATM: Automated Teller Machine
CESA: Community of European Shipyards Associations
COST: European Cooperation in Science and Technology
DG: Directorate General
DG MARE: Directorate General for Maritime Affairs and Fisheries
DNA: DesoxyriboNucleic Acid
EC: European Commission
ECOOP: European COastal Sea Operational observing and forecasting systems (FP6 IP)
EDIOS: European Directory of the Ocean-observing System
EEZ: Exclusive Economic Zone
EMAR²RES: European MARine and MARitime REsearch and Science (FP7 Support Action)
EMODNET: European Marine Observation and Data NETwork (EC)
EMSO: European Multidisciplinary Seafloor Observatory
ERA: European Research Area
ERMS: European Register for Marine Species
ESF: European Science Foundation
ESONET: European Seas Observatory Network of Excellence (FP6 NoE)
EU: European Union
EUREKA: pan-European network for market-oriented, industrial R&D
EurOBIS: European node of the Ocean Biogeographic Information System
EuroOcean: Marine information webportal
EuroOCEAN: Science Policy Conference series
EUR-OCEANS: Climate Change and Marine Ecosystems (FP6 NoE)
EUROCORES: European Collaborative Research (ESF funding scheme)

EuroGOOS: European Global Ocean Observing System
EWI: Flanders Economy, Science and Innovation Administration
FP: European Commission Framework Programme (EC)
GCI: GEOSS Common Infrastructure
GEO: Group on Earth Observations
GEOSS: Global Earth Observation System of Systems
GEO-BON: Group on Earth Observations Biodiversity Observation Network
GMES: Global Monitoring for Environment and Security (EU – European Space Agency)
ICES: International Council for the Exploration of the Sea
IFM-GEOMAR: Leibniz Institute of Marine Sciences at the University of Kiel (Germany)
Ifremer: French institute for the exploitation of the sea
INSPIRE: European Directive establishing Infrastructure for Spatial Information in the European Community
INTERREG: Interregional cooperation programme (EC)
IOC: Intergovernmental Oceanographic Commission
IODE: International Oceanographic Data and Information Exchange
IP: Integrated Project (FP funding scheme)
ISO: International Organisation for Standardisation
IT: Information Technology
I3: Integrated Infrastructure Initiative (FP funding scheme)
JCOMM: Joint WMO-IOC technical Commission for Oceanography and Marine Meteorology
JRC: Joint Research Center (EC)
LIFE: Financial instrument supporting environmental and nature conservation (EC)

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LOV: Laboratoire d'Océanographie de Villefranche (France)
MarBEF: Marine Biodiversity and Ecosystem Functioning (FP6 NoE)
MARCOM+: Towards an Integrated Marine and Maritime Science Community (FP7 Support Action proposal)
MARIS: Marine Information Service (private company)
MARUM: Center for marine environmental research (Germany)
MAST: Marine, Science and Technology Programme (FP funding scheme)
MB-ESF: Marine Board – European Science Foundation
MedGOOS: Mediterranean Global Ocean Observing System
MERSEA: Marine Environment and Security for the European Area (FP6 IP)
MI: Marine Institute (Ireland)
MODEG: Marine Observation and Data Expert Group (EC)
MSFD: Marine Strategy Framework Directive
NGO: Non Governmental Organisation
NIOO: Netherlands Institute of Ecology
NIOZ: Royal Netherlands Institute for Sea Research

NOCS: National Oceanography Centre, Southampton (UK)
NODCs: National Oceanographic Data Centres
NoE: Network of Excellence (FP funding scheme)
OAIS: Open Archival Information System
OBI: Ocean Biodiversity Informatics
ODINS: Ocean Data and Information Networks
OECD: Organisation for Economic Co-operation and Development
OGP: Oil and Gas Producers
POGO: Partnership for Observation of the Global Oceans
QA: Quality Assurance
S.A.: Public Limited Company
SeaDataNet: Pan-European infrastructure for ocean and marine data management (FP6 I3)
SEIS: Shared Environmental Information System
SMAP: Short and Medium-Term Priority Environmental Action Programme (EC)
TP: Technology Platform (EC scheme)
UNESCO: United Nations Educational, Scientific and Cultural Organisation
VLIZ: Flanders Marine Institute
WISE: Water Information System for Europe (EC)
WMO: World Meteorological Organisation
WoRMS: World and European Register of Marine Species

Annex III - List of participants

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d'Ozouville, Laurent	EurOcean
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Herzig, Peter	IFM-GEOMAR, Germany
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ANNEXES

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Nuevo-Alarcon, Miguel
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Parrilla-Barrera, Gregorio
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ESF
NOCS, UK
VLIZ, Belgium
MARUM, Germany
TOTAL
Institute of Marine Research, Norway
National Center for Scientific Research, France
HCMR, Greece
EC DG RTD
Marine Institute, Ireland
Instituto Español de Oceanografía, Spain
National Institute for Marine Research
and Development "Grigore Antipa", Romania
Ifremer, France
LOV, France
COST
UNESCO/IOC Project Office for IODE
TUBITAK, Turkey
MUMM, Belgium
Government of Flanders, Belgium
Ministry of Fisheries and Coastal Affairs, Norway
MUMM, Belgium
FCT, Portugal
EC DG MARE
Polish Academy of Sciences, Poland
University of Cyprus
Waterborne TP
EFARO
NOW, The Netherlands
VLIZ, Belgium
EC DG MARE

Soomere, Tarmo	Estonian Academy of Sciences
Tréguer, Paul	EUR-OCEANS
Van Hoof, Luc	EFARO
Van Lancker, Vera	Ghent University, Belgium
Vandepitte, Leen	VLIZ, Belgium
Versteeg, Willem	Ghent University, Belgium
Violeta Vinceviciene	EC DG ENV
von Bodungen, Bodo	DFG, Germany
Winkler-Nees, Stefan	DFG, Germany
Wood, Jacky	NOCS, UK

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