

Annual Report 2017

EUROPEAN MARINE BOARD

The European Marine Board provides a pan-European platform for its member organizations to develop common priorities, to advance marine research and to bridge the gap between science and policy, in order to meet future marine science and societal challenges and opportunities.

The European Marine Board was established in 1995 to facilitate enhanced cooperation between European organizations involved in marine science. In 2017, EMB represented 33 member organizations (research funding bodies, research institutes and nationally-based consortia of third-level institutes) from 19 countries. Through the EMB, these organizations are working together towards a common European vision on the research priorities and strategies for marine science.

The EMB provides the essential components for transferring knowledge from the scientific community to decision makers, promoting Europe's leadership in marine research and technology. Adopting a strategic role, the EMB provides a unique forum within which marine research policy advice to national agencies and to the European Institutions is developed, with the objective of promoting the establishment of the European Marine Research Area.

www.marineboard.eu



Contents

Highlights 2017	5
Message from the Chair	7
Executive Director's report	8
EMB mission, structure and governance	10
Plenary meetings 2017	15
EMB Flagship activities and events	20
Thematic science policy activities	24
EMB Publications in 2017	33
European projects	36
EMB panels	39
Communication and Outreach	41
Finances	42
Annexes	43



Highlights 2017

1. **EOOS Steering Group 3rd Meeting**, 9 February, Brussels

2. **Launch of Science Commentary 2, Ticking Time Bomb of Climate Change**, 3 March, Bruges

3. **China-EU Visit**, 3 March, Bruges

4. **EMB Spring Plenary**, 26-27 April, Tenerife

5. **University Consortium Panel Meeting**, 27 April, Tenerife

6. **EMBCP Meeting**, 3-4 May, Genova

7. **European Maritime Day (EMD)**, 18-19 May, Poole

8. **EMD Workshop “Citizen science and the Future of Coastal monitoring”**, 18 May, Poole

9. **EMB Working Group BIO OBS Kick-Off Meeting**, 22-23 June, Pisa

10. **Marine Ecosystem Modelling and Policy Workshop**, 7 July, Plymouth

11. **Blue Enlightenment Conference**, 12-14 July, Lisbon

12. **EOOS Steering Group 4th Meeting**, 20 September, Brussels

13. **EuroGOOS International Conference**, 3-5 October, Bergen

14. **Sea Change General Assembly**, 11-12 October, Malta

15. **EMBCP meeting**, 16-17 October, Galway

16. **EMB Autumn Plenary**, 18-19 October, Galway

17. **University Consortium Panel Meeting**, 19 October, Galway

18. **NFV Brainstorming session**, 9 November, Brussels

19. **AtlantOS 3rd General Assembly**, 21-23 November, Gran Canaria

20. **6th EMB Forum**, 6 December, Brussels

21. **EOOS Steering Group 5th Meeting**, 19 December, Brussels

Images from some of these highlight events are shown on the left (page 4) and throughout the report.

Message from the Chair



The year 2017 has been an evolving year in the history of the European Marine Board (EMB). Not only was it the first year that EMB had to operate as an independent legal entity without the support and back-up from the European Science Foundation (ESF), it was also marked by a huge turnover in EMB Secretariat staff members, not least the EMB Executive Director, Niall McDonough, who decided to move back to his home country of Ireland in July 2017. I would hereby like to thank Niall for his excellent leadership and coordination of EMB, and constructive collaboration with the entire ExCom and myself over the past 8 years.

Notwithstanding the changes in the EMB Secretariat, 2017 was a year of high output. We managed to successfully finalise concise publications on diverse topics such as climate change and sea level rise; decommissioning of offshore structures; and marine biotechnology. EMB also launched an in-depth position paper on a highly important and sometimes undervalued topic, Citizen Science. Launched with a workshop at European Maritime Day in May 2017, this study was very well received and proved popular. Furthermore, we kicked off one of our most renowned publications, the Navigating the Future series. In a two-day brainstorming session in November 2017, 18 marine foresight experts agreed on the topics to include in the next Navigating the Future V (NFV). NFV will be a longer-term horizon scanning document focussing on future priorities for marine research in Europe to 2030. The work on NFV is timely as the European Commission are currently deciding on the funding priorities and calls for the coming 5-10 years.

Another highlight in 2017 was the EMB 6th Forum, 'Implementing the UN 2030 Agenda: What role for Marine Science' held on 6 December 2017. Well attended by representatives from different organisations, institutes and countries; panellists and participants discussed how marine science could further contribute to the Sustainable Development Goals (SDG's) and the implementation of the UN 2030 Agenda. During this Forum, Vladimir Ryabinin, the Executive Director of the IOC-UNESCO called upon all ocean stakeholders to develop a common Implementation Plan for the UN Decade of Ocean Science, as the Decade had that day received the formal support of the United Nations General Assembly. EMB will definitely answer this call and contribute from our own strengths and values to make this project a success.

Besides the open, large-scale events, we should not forget EMB's own Plenary meetings, which are the core of EMB's strength as they form the main tool for our member organisations to put forward new topics, priorities and exchange ideas amongst experts. I would like to thank the Spanish Institute of Oceanography (IEO), and in particular Carlos García Soto and Luis López Abellán; and the Irish Marine Institute (MI) and in particular Fiona Grant for hosting and co-organising the Spring and Autumn Plenary meetings.

Many challenges still lie ahead for EMB in 2018 with the continuation of NFV, the organisation of the EuroOCEAN 2019 conference and the work in progress on topics such as Biological Observation, the European Ocean Observation System (EOOS), Marine Ecosystem Modelling, Marine Graduate Training and the Valuation of Ecosystem Services, but I am confident that the new Executive Director, Prof. Sheila JJ Heymans and her team will do a great job in continuing to deliver on the high standard of EMB outputs.

Prof. Jan Mees, EMB Chair

Executive Director's report



It is my great pleasure to present to you the European Marine Board Annual Report for 2017. This is my first Executive Director's Report for EMB, and as I only took up office in January 2018 it will be a report by proxy. However, I have been involved with the EMB Working Group on Ecosystem Modelling since July 2017, so I feel that I have been part of the team since then. Obviously 2017 was another year of significant change for EMB, with my predecessor Dr Niall McDonough moving back to Ireland to take up a post at the Marine Institute as the Director of Policy, Innovation and Research Support Services. Niall was able to lead the EMB directorate through a very challenging and exciting time with the move from the European Science Foundation, and he left the team in the very good hands of Dr Kate Larkin until I could take up my post. I therefore wish to thank both Niall and Kate for the wonderful team that they accumulated and kept together over the past 8 years.

Despite these challenging operational changes, the strategic work programme continued and there were several highlights in 2017. During 2017 the team successfully completed both a position paper and a policy brief on Citizen Science, providing recommendations for engaging citizens in marine science whilst strengthening the scientific rigour of such projects. Two further policy briefs were produced on blue economy-related topics, namely on marine biotechnology (in collaboration with ERA-NET) and on decommissioning of offshore structures (in collaboration with INSITE). These were all very well received at National and European level. Strategically we started the planning for the Navigating the Future V foresight document that we will be working on mainly in 2018. The NFV brainstorming was a very enjoyable meeting with some of the leading scientists in Europe, in a historic hotel in Brussels. The last event EMB hosted in 2017 was our 6th Forum in December. This was also very successful and highlighted the contributions that marine science can make to the UN 2030 Agenda and 17 Sustainable Development Goals.

In 2017 EMB also initiated new foresight documents, including one on Marine Ecosystem Modelling, which I co-chair. It was helpful to see the process of writing a policy brief from the other side before I started leading EMB in 2018. Other documents the EMB team are busy with include the Biological Observations, Valuing Marine Ecosystems and European Research Vessels. We thank all our Working Group members for their hard work in making the position papers, future science briefs, and policy briefs the successful documents they are. EMB also co-chairs the European Ocean Observing System (EOOS) Steering Group, in collaboration with EuroGOOS, and partners in 3 EU projects, AtlantOS, Sea Change and SOPHIE. These projects enable EMB to undertake strategic science-policy knowledge exchange activities that are within our general brief.

Prof. Sheila Heymans, EMB Executive Director

EMB EXECUTIVE DIRECTOR, NIALL MCDONOUGH MOVING TO A NEW CHALLENGE

After serving the European Marine Board for 8 consecutive years (2009-2017), EMB Executive Director Niall McDonough decided to return to Ireland in July 2017 to take on the position of Director of Policy, Innovation and Research Support Services at the Marine Institute in Galway, Ireland. However, EMB quickly caught back up with him as the EMB Autumn Plenary Meeting was hosted by the Marine Institute in Galway, Ireland. This created the ideal setting for providing a personal thank you from the entire EMB Board for all his years of commitment and service. EMB Chair Jan Mees handed him a small farewell gift.



“Working for the EMB was a great experience and an important part of my career. The success of the Board is driven by the passion and enthusiasm of its delegates for advancing marine science and promoting a collaborative approach to addressing ocean research challenges. This was also reflected in the calibre and commitment of the many great colleagues and friends with whom I served in the Secretariat during the course of my eight years in Oostende. I will miss being involved but I know that the Board is in very good hands and will be at the heart of the major developments in European marine science in the years to come”

Niall McDonough



EMB also used the opportunity to invite EMB Executive Secretary preceding Niall, Niamh Connelly (2002-2009), now at the University College of Cork (UCC), Ireland. This resulted in a unique picture of three consecutive EMB Executive Directors:

- Left: Niall McDonough, EMB Executive Director 2009-2017
- Middle: Sheila JJ Heymans, EMB Executive Director as of January 2018
- Right: Niamh Connelly, EMB Executive Secretary 2002-2009



EMB mission, structure and governance

MISSION

The European Marine Board (EMB) provides an independent platform for organizations involved in supporting, delivering and using marine research and technology to promote common positions on research priorities and strategies in Europe.

EMB is a unique marine science forum which develops scientific foresight by initiating state-of-the-art analysis and studies and translating them into clear policy recommendations to national agencies and governments as well as to European institutions.

Where EMB identifies a topic of strategic interest as the basis for a new activity, it applies a range of instruments to deliver a tailored impact. Targeted at European and national research programme managers, strategy developers, policymakers and the marine research community, EMB outputs drive future European and national marine research agendas, programmes and supporting strategies and policies.

EMB acts as a science-policy interface, transferring and translating scientific knowledge to policy makers, and channelling policy needs back to the research community.

STRUCTURE AND GOVERNANCE

The European Marine Board is a pan-European partnership of national organizations which are either research funding organizations (e.g. research councils or ministries), research performing organizations (e.g. national marine research institutes) or nationally-based consortia of third-level institutes. EMB activities and the operation of its Secretariat are funded through annual member contributions and EMB external contracts. In 2017, EMB represented 33 organizations from 19 countries. A full list of EMB member organizations and delegates is available on the website: www.marineboard.eu/members, and in Annex 1 of this report.

EMB DELEGATES

Representing the major organizations involved in marine research in Europe, the Board's member organization delegates: (i) provide a high-level overview of national science policy priorities, (ii) guarantee multidisciplinary and high-quality scientific expertise for the Board's activities, and (iii) ensure high-level uptake of the Board's strategic recommendations at national and European levels.

The EMB's mixed membership of research performing organisations (RPOs), research funding organisations (RFOs) and national university consortia, ensures its unique capacity to deliver science policy advice on issues of identified strategic importance and to influence European marine research agendas.

EMB delegates meet twice a year at plenary meetings to share knowledge, to define common priorities, and to agree on activities and outputs. Observers and guests are invited to attend EMB plenary meetings on an ad hoc basis. These include the European Commission (EC), the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), and other international and European marine science networks.



EMB Autumn Plenary meeting (18 October 2017, Galway, Ireland)

EXECUTIVE COMMITTEE

EMB operations are overseen by the Executive Committee (ExCom). The ExCom meets three times per year to follow up on the implementation of the actions agreed by the Board at plenary meetings, make operational and financial decisions and give strategic guidance to the Board and Secretariat.

ExCom members and their mandates in 2017:



Jan Mees – Chair
Research Foundation – Flanders,
Belgium
May 2014-May 2019



Gilles Lericolais – vice-Chair
French Research Institute for the
Exploration of the Sea (Ifremer), France
October 2013-October 2018



Mark James – vice-Chair
Marine Alliance for Science and
Technology Scotland (MASTS), UK
May 2015-May 2018



Jan-Stefan Fritz – vice-Chair
Konsortium Deutsche
Meeresforschung (KDM), Germany
May 2015-May 2018



Carlos Carcía Soto – vice-chair
Spanish Oceanographic Institute
(IEO), Spain
April 2017-April 2020



Ferdinando Boero – vice-chair
CoNISMa, Italy
April 2017-April 2020



Erlend Moksness - vice-Chair
Institute of Marine Research (IMR),
Norway
May 2014-October 2017



**Niall McDonough - Executive
Director (until July 2017)**
Ex officio member



**Kate Larkin – Acting Executive
Director (August - December 2017)**
Ex officio member

SECRETARIAT

The strategic and operational decisions and activities proposed by the Board and ExCom are implemented by the Secretariat, based at the in Ostend, Belgium. A full list of the current EMB Secretariat team is available on the website:

www.marineboard.eu/about/secretariat

EMB Secretariat staff members in 2017:



Niall McDonough
Executive Director (until July 2017)



Kate Larkin
Senior Science Officer
Acting Executive Director (as of
August 2017)



Ángel Muñoz Piniella
Science Officer



Paula Kellett
Science Officer



Joke Coopman
Executive and Finance Officer



Charlotte Simon
Junior Science Officer
(July – December 2017)



Karen Donaldson
Scientific Administrator
(until January 2017)



Plenary meetings 2017

European Marine Board plenary meetings, held twice a year in spring and autumn, gather EMB member organizations to reflect and agree on topical marine science and technology issues, and propose future strategic actions. During these meetings, EMB delegates also benefit from interactions with invited speakers and guests and with plenary observers from the European Commission and the UNESCO's Intergovernmental Oceanographic Commission.

SPRING PLENARY MEETING (26-27 APRIL, TENERIFE, SPAIN)

The Spring Plenary Meeting was hosted by the Spanish Institute for Oceanography (IEO) at the Oceanographic centre in Tenerife, Spain. The meeting was attended by 24 EMB delegates, 2 observers and 7 invited guests (see participants list in Annex 2).

Governance

- The membership application from the University of Gothenburg (UGOT) was approved;
- Erlend Moksness was reinstated as a vice-Chair on the EMB Executive Committee for a further two-year term;
- Carlos Garcia Soto and Ferdinando Boero were elected as ExCom vice-chairs for an initial 3-year period, replacing Tarmo Soomere and Alessandro Crise who both served a maximum mandate of 5 years;
- 4 member organizations were approved as members of the new EMB-IVZW;
- The annual accounts 2016 were approved.

Science activities

- The EMB position paper 23: Advancing Citizen Science for Coastal and Ocean Research was presented to the Board;
- The Board approved the outlined agenda for the EMB's 6th Forum;
- The Board approved the establishment of a new Working Group on European Research Vessels;
- The Board approved the establishment of a new Working Group on Geohazards.

The open session of the meeting welcomed representatives of EMB stakeholders, observers and partners. The programme included:

- Welcome by Prof. Luis López Abellán, Director of COC-IEO, Tenerife
- Presentation on the IOC 'International Decade of Ocean Science for Sustainability'
- The Submarine Eruption of Tagoro Volcano: Physical-Chemical Perturbations and Biological Response by Eugenio Fraile Nuez, Researcher at IEO
- European Polar Board: Science, Policy and Coordination in the Polar Regions, Renuka Badhe, Executive Director, European Polar Board
- The OECD Future Ocean Economy Report and Follow-Up Actions, Claire Jolly, Head of IPSO Unit, OECD
- Exploitation of Marine Microorganisms as Source of Novel Drugs, Donatella de Pascale, Institute of Protein Biochemistry, CNR, Italy
- Marine Biodiscovery in the Arctic, Jeanette Andersen, University of Tromsø and Marbio, Norway
- Next Generation Collagen Biomaterials – From the Seabed to the Sickbed, Andrew Mearns Spragg, Jellagen, UK



Spring Plenary Evening Lecture: *"Trans-disciplinary approach to inform Marine Ecosystem-based management: Unifying social science and humanities research in processes of integrated ecosystem assessments"* by Dr Dorothy Dankel, University of Bergen, Norway.

AUTUMN PLENARY MEETING (18-19 OCTOBER GALWAY, IRELAND)

The Autumn Plenary Meeting, hosted by the Marine Institute (MI) in Galway, Ireland was attended by 16 EMB delegates and 13 observers and guests (participant list in Annex 2).

Governance

- The new EMB Executive Director, Prof. Sheila Heymans was introduced to the Board, before taking up office on 10 January 2018;
- 3 member organizations were approved as members of the new EMB-IVZW;
- The 2018 budget was provisionally approved (no quorum was achieved at the meeting due to flight cancellations caused by bad weather, remote approval was sought after the meeting).

Science activities

- Presentation by the EMB Communications Panel;
- Terms of Reference for a new Working Group on European Research Vessels were approved;
- Terms of Reference for a new Working Group on Geohazards were approved;
- An analysis of the impact assessment of the position paper and policy brief on 'Delving Deeper' was presented to the Board.



The open session of the meeting welcomed representatives of EMB stakeholders, observers and partners. The programme included:

- Updates from several partner networks (JPI Oceans, EMODnet, EuroGOOS and the Atlantic Ocean Research Organisation (AORA)) and EMB observers (the European Commission (DG RTD) and IOC-Unesco);
- IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), Katia Mintenbeck - Science Officer, IPCC WGII Technical Support Unit
- Current state of Marine Energy by Oliver Wragg, Commercial Director from The European Marine Energy Centre Ltd (EMEC)
- The Irish wave energy projects and Marinet 2 project by Gerry Sutton, Senior Research Fellow, Centre for Marine and Renewable Energy Ireland (MaREI)
- Environmental effects of ocean energy: state of science summary by Teresa Simas, Head of the Marine Environmental and Public Policies area, WavEC
- Simulation of offshore renewable energy devices: an industry perspective by Aengus Connolly, Senior Consultant, Wood Group Ireland



Speakers at the EMB Autumn Plenary Open Session. From left to right: Gerry Sutton, Teresa Simas, Aengus Connolly, Oliver Wragg



EMB Autumn Plenary Evening Lecture: 'The North Atlantic Fish Revolution, c1500 AD – climate, ocean productivity, and catches of cod and herring' by Poul Holm, Professor of Environmental History, Trinity College Dublin, Ireland

At the plenary reception two early stage researchers from the Marine Institute provided flash presentations on their PhD research investigating the biodiversity and ecology of the Celtic Sea, specifically referencing the rise in gelatinous organisms in the region, including jelly fish; and the rise in microplastic pollution and microplastic fibers specifically, in the Arctic Ocean. Interviews with them are presented below.

LaDaana Kanhai

Phd Student, Galway Mayo Institute of Technology (GMIT)



- 1. How did you get into your field of research?** From the time I was in high school I knew that I wanted to be an Environmental Scientist. The natural world fascinated me and it was this passion that propelled me to learn more about it. During my undergraduate years, the issue of environmental pollution captured my interest. My early research days were spent investigating chemical contaminants in wetland ecosystems in the Caribbean. In my quest to continue in the field of marine pollution, I applied for and was granted an Erasmus Mundus Scholarship to pursue a PhD in Marine Ecosystem Health and Conservation (MARES). Under the MARES program, my research is focused on microplastics in the world's oceans.
- 2. What's the most exciting thing you've learnt or discovered?** Every component of my research about microplastics in the oceans has held an element of excitement for me because it was something which we previously didn't know or which we didn't have in-depth information about. Previous studies indicated that microplastics had been transported to the remote and seemingly pristine Arctic Ocean. Yet, to have had the opportunity to sample the various environmental matrices (sub-surface waters, sea ice, sediments) of the Arctic Ocean during the Arctic Ocean 2016 expedition onboard the Swedish icebreaker Oden and to discover the ubiquity of these particles in the Arctic region really brought the point home.
- 3. What's the biggest challenge facing your field?** Environmental scientists have discovered that microplastics are present in every single environmental matrix (water, sediment, sea ice, biota) of the world's oceans and that these particles may potentially threaten the health of marine organisms. Despite having this information, I would say that as a society we are 'dragging our feet' on implementing measures to reduce the entry of plastic debris into the world's oceans. Furthermore, there is still much to be done to engage the general public about the issue and influence changes in behaviours (e.g. reduce, reuse, recycle). The issue of plastic in the world's oceans is one that originated on land and we as a society need to take concerted action and focus on timely solutions.
- 4. Does your research include any European collaboration, and if so, who does it involve?** Under the Doctoral Program of Marine Ecosystem Health and Conservation, I am primarily based at Marine and Freshwater Research Centre (MFRC), Galway Mayo Institute of Technology (GMIT), Ireland (supervisor Dr. Ian O'Connor). I also have mobility to Plymouth University in the UK where I conduct FT-IR analyses (supervisor Professor Richard Thompson). My first microplastic sampling in the Atlantic Ocean was conducted onboard the RV Polarstern during the 2015 Floating Summer School on Biological Oceanography (organized by the Alfred Wegner Institute, AWI and the SMART School, Ireland). Sampling in the Arctic Ocean was conducted during the Arctic Ocean 2016 expedition onboard the Swedish icebreaker Oden (under the Early Career Scientist Program of the Swedish Polar Research Secretariat, SPRS). My mentor for the AO16 expedition and current collaborator regarding this research is Dr. Katarina Gardfeldt of Chalmers University, Sweden. I also had mobility to the Sven Løven Centre, Kristineberg, Sweden for FT-IR analyses (collaborator Professor Martin Hasselov, University of Gothenburg, Sweden).

Damien Haberlin

Phd Student, University College Cork (UCC)

- 1. How did you get into your field of research?** I have taken a somewhat circuitous route into research. When I left school I studied mechanical engineering, but I was always fascinated by the natural world, even from a young age, and I returned to university to study zoology as a mature student. I remember completing an assignment on jellyfish in the Black Sea and it found it fascinating. The combination of biology, oceanography and the interaction with human activities was incredibly interesting. Soon afterwards and by coincidence, I met my M.Sc. supervisor, who studies jellyfish and I have been in the field since. So I guess an innate interest and meeting the right person at the right time were two important factors.
- 2. What's the most exciting thing you've learnt or discovered?** I am currently writing up some research conducted in the Celtic Sea, where we have been investigating the influence of the Celtic Sea Front on gelatinous zooplankton and in fact we are the first to do so. That in itself is kind of cool, and more importantly we have found that gelatinous zooplankton contributes substantially to the zooplankton biomass in the region. In addition, a particular group of jellyfish called siphonophores were far more abundant than previously thought. We don't know if this represents a changing system or a natural fluctuation, but either way it has important implications for the pelagic ecosystem, which of course includes important commercial fish species.
- 3. What's the biggest challenge facing your field?** I think the biggest challenges facing our field are time and money. For many years the study of jellyfish had languished in relative obscurity and jellyfish as a group were considered a 'trophic dead end' and unimportant in pelagic ecology. This is now of course demonstrably not the case. We lack the long term datasets with which to accurately analyse jellyfish populations, and there is no short cut to accumulating this type of data. Money, whatever the source, needs to be allocated for long term monitoring projects that specifically target gelatinous zooplankton.
- 4. Does your research include any European collaboration, and if so, who does it involve?** My research is largely funded by Science Foundation Ireland and Marine Harvest Ireland, in order to investigate the ecology of jellyfish which impact on salmon farming. I have collaborated with Plymouth Marine Laboratories, in the U.K., to investigate links between zooplankton in the Western English Channel and zooplankton in Irish coastal waters (published in 2016). I also work with colleagues in the London Natural History Museum, University Museum of Bergen and University of Gdansk, investigating the genetic sub-populations of a siphonophore species.



EMB Flagship activities and events

NAVIGATING THE FUTURE V

The EMB Navigating the Future series provides regular pan-European summaries of the current status of marine research, priority recommendations and future scientific challenges in the context of European societal needs. Navigating the Future is a blueprint to guide both the research and the science policy agendas at European and national level. It has been widely recognized, both by researchers and science policymakers, as providing critical periodic foresight and recommendations on emerging marine science topics and needs, and associated societal challenges and opportunities.

In 2017, the EMB Secretariat launched the preparations for the fifth position paper in the Navigating the Future series, in short NFV. Twenty leading European marine science and policy experts were invited to participate in the NFV brainstorming workshop to discuss the current state-of-the-art and future directions of marine science to 2030 and beyond. The Workshop took place on 8-9 November 2017 at the famous Hôtel Métropole Brussels, a historical hotel that hosted the first international Physics Solvay Congress in 1911. That same conference led to “the most intelligent picture ever taken” in 1927, where 17 of the 29 attendees were already or later became Nobel Prize winners, including Einstein, Bohr, Skłodowska-Curie, Planck, Schrödinger, Heisenberg and Auguste Piccard. The latter built the Bathyscaphe Trieste, the underwater vehicle that brought his son Jacques Picard and the American mariner Don Walsh to the very depth of the Challenger Deep.



At the NFV meeting, professional facilitator Lizzie Crudgington, led the discussions between the experts, and after two days of intense brainstorming and debating, five key areas of marine science were identified as future science aims by the experts:

- Improve the knowledge of a 4-Dimensional Ocean (a volume that changes in time) and its role in the earth and climate system, including the human component;
- Assess impacts of multiple and cumulative human stressors to the dynamic, non-linear and rapidly changing Ocean system;
- Improve understanding and predictability of extreme events through an integrated approach, including natural hazards and climate induced impacts affecting the Ocean;
- Advance capabilities in ocean technologies leading to wider developments in Information Technology and Artificial Intelligence;
- Foster sustainability science as an integrated field with marine science as a core component of natural and social sciences.

These five key areas have been communicated in official letters to different Director-Generals of the European Commission, calling for a Mission Ocean under the EC's next framework programme. This letter was also sent to the Special Advisor on Mission Driven Science and Innovation, Prof. Dr Mariana Mazzucato, and to the Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans).

In parallel, an official letter was sent to Dr Vladimir Ryabinin, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, calling the international marine scientific community to consider the NFV themes and approach in the development of the Implementation Plan for the UN Decade of Ocean Science.

The resulting Navigating the Future publication, expected in Spring 2019, will be written by the marine scientific community in a format accessible to International, European and national research programme managers, policy-makers, industry and the marine and wider earth system science community itself.

You can keep track of the latest NFV developments via the EMB website:

<http://www.marineboard.eu/navigating-future-0>



Workshop participants (from left to right): Sitting down: Jan Mees, Ferdinando Boero, Anne-Marie Tréguier, Colin Janssen, Francesca Malfatti, Sheila Heymans, Ralph Schneider, Valerie Cummins Standing up: Denis Lacroix, Paula Kellett, Jan Marcin Węslawski, Jeremy Gault, Sybille Van den Hove, Luiz Menezes Pinheiro, Kate Larkin, Geir Huse, Charlotte Simon, Joke Coopman, Ed Hill, Lizzie Crudgington, Sukru Besiktepe, Michiel VanDeGehuchte, Ángel Muñoz Piniella. Not in picture: Jan De Leeuw, Katja Philippart, Ann-Katrien Lescauwaeet

6TH EMB FORUM

'Implementing the UN 2030 Agenda: What role for Marine Science'

On 6 December 2017, 115 representatives from marine science organizations, NGOs and Government from 21 countries gathered in the Royal Flemish Academy for Science and the Arts in Brussels to attend the 6th EMB Forum and to discuss how marine science could further contribute to the sustainable development goals and the implementation of the UN 2030 Agenda.

Moderator Quentin Cooper, a science journalist for the BBC (UK), guided the Forum participants through three panel sessions, focussing on the Ocean and the UN 2030 Agenda, Ocean science needs for implementing the SDG's and strengthening the evidence base for international ocean governance.

At the Forum, Vladimir Ryabinin, the Executive Secretary of the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) announced that the '*Decade of Ocean Science for Sustainable Development 2021-2030*' had received the formal support of the United Nations General Assembly. Therefore, IOC-UNESCO called upon all ocean stakeholders to develop a common Implementation Plan for the UN Decade of Ocean Science. This Ocean decade represents both a huge opportunity and a challenge to the marine science community. The preparations during the coming three years must be used to develop initiatives designed to ensure that marine science is aligned with and actively contributes to the achievement of the SDG's during the Decade of Ocean Science. Keynote speaker Professor Joyeeta Gupta from the University of Amsterdam added that the relationship between the Ocean and governance on land is very important and there is a need to look at the ocean not just from a European but from a global perspective.



The forum participants further highlighted the need to support:

- **Science integration** through multi-disciplinary, collaborative and holistic approaches to marine science, taking in account ecosystem-based and precautionary approaches.
- **Scientific capacity building** through more effective training, knowledge exchange and technology transfer both locally and globally.
- **Science engagement with society** to promote better understanding of the marine environment, the role marine science can play in helping to inform decision makers and the need to engage relevant stakeholders in defining scientific priorities.
- **Science-based societal debate** on how best to develop governance of our seas and Ocean using science to inform the development of policy, law and sustainable economic development.



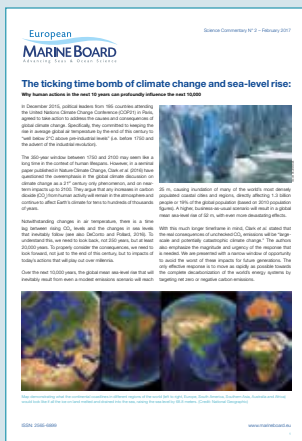
A Forum Message, highlighting these key needs and presenting clear commitments from EMB to address these needs, and the Forum Proceedings are available online <http://marineboard.eu/publication/6th-forum-proceedings>.



Credit: 6th Forum photos by Fred Guerdin, Scorpx

Thematic science policy activities

THE TICKING TIME BOMB OF CLIMATE CHANGE AND SEA LEVEL RISE



In March 2017, EMB finalized and published Science Commentary number 2: 'The ticking Time Bomb of Climate Change and Sea Level Rise: Why human actions in the next 10 years can profoundly influence the next 10,000.' The first draft of this policy brief, based on the seminal paper published in Nature Climate Change by Clark et al. (2016), was already promoted by EMB member, the Marine Universities of France, at the UNFCCC COP22 in Marrakech. The final paper was eventually finalized with support from colleagues in Royal Institute for Sea Research (NIOZ, the Netherlands) (Jan de Leeuw, Henk Brinkhuis and Jan Boon) and Peter Clark of Oregon State University. Hard copies were widely disseminated, including at the European Climate Research Alliance (ECRA) General Assembly in Brussels on 7-8 March 2017. Peter Clark took up further dissemination of the policy brief in the US as well.

DECOMMISSIONING OF OFFSHORE MAN-MADE INSTALLATIONS: TAKING AN ECOSYSTEM APPROACH

In April 2017, EMB published Policy Brief number 3 '*Decommissioning of offshore man-made installations*'. This policy brief was developed in close collaboration with the INSITE programme, in particular Richard Heard and Jan de Leeuw (Influence of Man-Made Structures in the Ecosystem). The document was formally launched on 18 May 2017 at the European Maritime Day in Poole, UK, at a workshop '*Blue growth data challenge part 2: offshore energy case studies*'.

Commissioner Vella was personally handed a copy of the EMB Policy Brief n°3 by EMB Executive Director, Niall McDonough at the EMB exhibition stand at European Maritime Day (EMD). Following the launch at EMD, the document has been widely disseminated with a press release, via social media and the website, through hard-copy dissemination to specific targets and to relevant events, and via email to stakeholders.



MARINE BIOTECHNOLOGY



Advancing Innovation in Europe's Bioeconomy

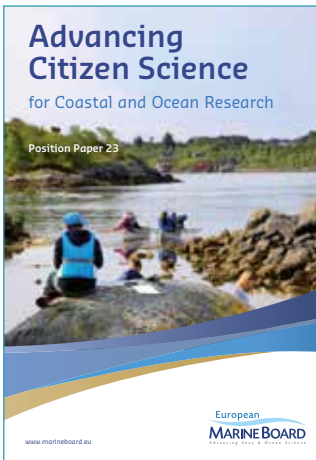
In January 2017, the EMB Secretariat was contacted by the Horizon 2020 ERA-NET on marine biotechnology, the ERA-MBT, to produce a joint policy brief building on the recently published ERA-MBT Marine Biotechnology Strategic and Innovation Roadmap: *Insights to the future direction of European marine biotechnology*. As EMB had played an important role in advancing marine biotechnology research in Europe through the publication of position paper 15: *Marine Biotechnology: A Vision and Strategy for Europe in 2010*, it was timely to produce an updated strategic position to guide future developments. EMB worked closely with representatives of the ERA-MBT to develop the joint Policy Brief 4: *Marine Biotechnology: Advancing Innovation in Europe's Bioeconomy*.

The Policy Brief assesses the latest advancements in marine biotechnology across five thematic areas identified by the ERA-NET roadmap. This includes long-term (2020-2030) opportunities where significant scientific, technological and other challenges remain. It also adds value by highlighting the continuing need for fundamental marine research and knowledge of marine ecosystems at the top of the biotechnology value chain. Finally, it summarizes latest updates from this emerging Blue Growth sector and presents examples of commercial applications of marine biotechnology, the resulting high-value products and services and examples of other European projects and initiatives that are seeking to streamline the marine biotechnology pipeline.

The joint EMB/ERA-MBT Policy Brief was officially launched on 12 September 2017 by ERA-MBT Coordinator Steinar Bergseth at a meeting of the EMBRIC network's General Assembly.



CITIZEN SCIENCE



Advancing Citizen Science for Seas and Ocean Research

In Spring 2017, the EMB's Citizen Science Working Group under the lead of Carlos García Sota (Spanish Institute of Oceanography (IEO, Spain)) and Gro Van Der Meeren (Institute of Marine Research (IMR, Norway)) completed position paper No. 23, '*Advancing Citizen Science for Seas and Ocean Research*'. The paper identifies types of marine research that are most amenable to Citizen Science input and assess the benefits and constraints involved in increasing Marine Citizen Science in the future.

The great benefit from Citizen Science is that a much greater number of people can be mobilized to gather a wealth of data and collaborate with scientists in order to develop new scientific knowledge and understanding. The sheer scale of coastal and ocean environments mean that it would take several lifetimes for scientists to study them alone. The variety of data types which are amenable to Citizen Science, as outlined in the position paper, are great, meaning that there could be a project to suit everyone. Citizen Science can also enable participants to improve their Ocean Literacy, gain new skills and experiences, and can also empower them to participate in the process of delivering future marine policy.

Opportunities, challenges and best practice in Marine Citizen Science are highlighted in the paper. Common concerns such as data quality and maintaining engagement are discussed, as are future opportunities such as increased use of technology and potential role of Marine Citizen Science in informing marine policy and conservation. The paper closes with a list of high-level strategic recommendations for the future development of Marine Citizen Science in Europe.

The position paper was formally launched on 18 May 2017 at the European Maritime Day in Poole, UK, at a dedicated workshop on '*Citizen Science and the Future of Coastal Monitoring*'. Members of the Working Group presented the main messages of the position paper and participated in a question and answer session.

To support the position paper, a shorter policy brief, number 5: '*Marine Citizen Science: Towards and engaged and ocean literate society*' was developed and released at the European Marine Science Educators Association (EMSEA) meeting from 7-10 October 2017. The EMB Secretariat disseminated both publications to a very wide range of relevant stakeholders, with particular targets within policy, the European Commission and to Citizen Science projects and organizations to reach wider society. With the subject of Citizen Science fast becoming a hot topic, the document has been very timely and well received.



LAUNCH OF THE CITIZEN SCIENCE POSITION PAPER AT THE EUROPEAN MARITIME DAY 2018 WORKSHOP – ‘CITIZEN SCIENCE AND THE FUTURE OF COASTAL MONITORING’

Three of the papers co-authors - Gro I. van der Meeren (Co-Chair), Jane Delany and Julia A. Busch, and Jon Parr (Marine Biological Association and coordinator of the H2020 Sea Change project in which EMB participates), presented the main results of the Citizen Science Position Paper. It was highlighted by the panellists that Citizen Science is a powerful tool to make significant contributions to marine sciences, especially where professional scientific activities are limited. Furthermore, Ocean Literacy is fundamental to the way citizens view, and consequently behave towards, the marine environment and Marine Citizen Science is a powerful tool for empowerment.

Strategic development and appropriate support should be provided to ensure that the full potential of Marine Citizen Science as a means of providing mutual benefits for science, society and the future can be realised. A European Marine Citizen Science platform should be established that will become a central hub for information and expertise, incorporating the full “landscape” of initiatives from every country and clearly presenting this to the public through appropriate means.

The workshop was attended by over 50 stakeholders.

Given the challenges facing the world’s ocean, increased awareness and consideration of Marine Citizen Science as a powerful tool for the co-generation of scientific knowledge is strongly encouraged.



Participants at the workshop ‘Citizen Science and the Future of Coastal Monitoring’ at the European Maritime Day on 18 May 2017 (Poole, UK)

MARINE ECOSYSTEM MODELLING

Advanced Marine Ecosystem Modelling

At the EMB 2017 Spring Plenary meeting, the Board approved the establishment of a new Working Group on Marine Ecosystem Modelling. The high-level goal of this Working Group is to assess and recommend R&D needs for future Marine Ecosystem Modelling for evidence-based policy making, with a particular emphasis on advances in end-to-end modelling. Morten Skogen (IMR, Norway) and Sheila Heymans (former SAMS, UK, now in position as EMB Executive Director) were selected to chair this Working Group.

To kick-off this activity, an expert workshop was organised on 7 July 2017 in Plymouth, UK, back-to-back with the international AMEMR (Advances in Marine Ecosystem Modelling Research) conference to gather expert community input on this topic. The workshop focused on End-to-End Marine Ecosystem Modelling: 'Current capabilities and R&D needs for Ecosystem-Based Management' and brought together international experts from 12 countries for interactive discussions. One of the outcomes of the workshop was that, although Europe has excellent capability in Marine Ecosystem Modelling, there remains a mismatch between scientific research and what policy makers need to know. It is therefore timely to conduct foresight activities at European level and communicate community-driven European research needs and priorities to policy makers and wider stakeholders. Key messages from the workshop, e.g. on knowledge gaps, are being taken forward into the working group publication.

A small writing group, led by the two WG Chairs and two additional experts Corinna Schrum (Helmholtz Institute, Germany) and Cosimo Solidoro (National Institute of Oceanography and Experimental Geophysics, Italy), are currently engaged in writing the Policy Brief on 'Enhancing Europe's capability in end-to-end marine ecosystem modelling for societal benefit, for publication by September 2018.



Working Group co-Chairs Morten Skogen and Sheila Heymans and EMB Secretariat staff Kate Larkin and Ángel Muñoz Piniella, 7 July 2017, Plymouth Marine Laboratory



Experts in marine ecosystem modelling at EMB workshop, 7 July 2017, Plymouth Marine Laboratory

BIOLOGICAL OCEAN OBSERVING

Strengthening Europe's Biological Ocean Observing Capacity

The European Marine Board decided to set up a new Working Group on Biological Observations. The goal of this Working Group is to produce a roadmap, assessing the gaps and priority actions to take for strengthening Europe's biological ocean observing capacity to achieve a multi-purpose integrated biological ocean observing capability for Europe. Such a system would underpin a move from science- to societal-driven observation needs that would eventually become a key component of the wider European Ocean Observing System (EOOS).

Twelve Working Group members were selected in January 2017 to participate in the Working Group, with Lisandro Benedetti-Cecchi (University of Pisa) and Tasman Crowe (University College Dublin) as Chair and vice-Chair. On 22 and 23 June 2017, the Working Group members convened for the kick-off meeting in Pisa, Italy, hosted by the University of Pisa. The experts produced a first draft of the Future Science Brief by the end of 2017 which was discussed during several teleconference meetings. The final publication is expected by Summer 2018.



Participants at the WG BIO OBS kick-off, 22-23 June 2017. Back row, left to right: Tasman Crowe (University College Dublin), Asbjørn Christensen (DTU Aqua), Francisco Hernandez (VLIZ), Jacco Kromkamp (NIOZ), Antoine Grémare (University of Bordeaux), Isabel Sousa Pinto (CIIMAR), Elena Maggi (University of Pisa), Lisandro Benedetti-Cecchi (University of Pisa). Not in the picture: Adriana Zingone (Stazione Zoologica Anton Dohrn)

MARINE GRADUATE TRAINING

Credit: EMB (Angel Muñoz Piniella)



Training the 21st century marine professional

In Europe, marine graduate programmes and career pathways sometimes lack the coordination and visibility that is crucial to inspire and recruit the next generation of marine and maritime professionals. Young graduates interested in an MSc or PhD training in marine sciences are presented with a highly fragmented array of specialized and generalist courses, some of which are explicitly marine or maritime, while other opportunities are often hidden within other graduate disciplines (e.g. biology, geography, physics, ecology).

In the context of Blue Growth and its need for people with the right skills able to establish a sustainable blue economy, the European Marine Board created a dedicated Working Group on Marine Graduate Training in 2014. The Working Group have met on several occasions and interacted with external stakeholders including policy makers and potential employers of marine graduates, including a dedicated workshop at European Maritime Day 2015 in Piraeus, Greece. In Autumn 2017, the European Marine Board engaged an external consultant and expert in graduate training and education in Europe, Conor O'Carroll, to finalise the draft Future Science Brief, in dialogue with WG members and the EMB Secretariat.

The Future Science Brief, to be published in Spring 2018, identifies and highlights the challenges and opportunities that characterize the training-employment mismatch in marine and maritime sciences and provides high-level recommendations on actions needed to advance the quality and relevance of training in these sectors, all in the context of Blue Growth.

Credit: Karen Hissmann, JAGO-Team, GEOMAR



EUROPEAN RESEARCH VESSELS

Following the EMB position paper n° 10 on *“European Ocean Research Fleets – Towards a Common Strategy and Enhanced Use”* of March 2007, In 2017, the European Marine Board and the European Research Vessel Operators (ERVO) agreed to work together on a new joint publication on the status of the European Research Vessels, in collaboration with other related European initiatives.



Credit: VLIZ (Misjel Decler)

As was stated by IOC-UNESCO in 2017, ocean science is ‘big science’, involving sophisticated and costly equipment, such as satellites, research vessels, and autonomous in-water systems from remotely operated vehicles (ROV’s) to gliders and fixed platforms such as moorings. Research vessels are a key research infrastructure offering vital access to our seas and global Ocean for conducting marine science and ocean observing. As the research landscape and the technologies have evolved significantly since 2007, it was timely and opportune to set up an EMB Working Group in order to produce an updated foresight report on European Research Vessels, assessing the progress made towards collaboration and interoperability and taking into account the latest technology and emerging areas of activity.

The Terms of Reference for this Working Group were developed by the EMB Secretariat, in cooperation with the ERVO Chair, and were approved by the EMB Board in October 2017. The Working Group will officially kick-off in Spring 2018, and the final publication is to be expected by Summer 2019.



Picture of the Celtic Voyager taken by the EMB Secretariat during the EMB Autumn Plenary 2017 in Galway, Ireland.

OCEAN OBSERVING



European
Ocean
Observing
System

Since 2015 EMB and EuroGOOS have been actively working together to promote and facilitate the establishment of the European Ocean Observing System (EOOS) (www.eoos-ocean.eu). Both networks co-Chair the EOOS Steering Group

which oversees the strategic planning of EOOS. Membership includes the European Commission (across three DGs), JPI-Oceans and national experts in ocean observation. A key focus in 2017 was the development of draft EOOS strategy and an implementation plan for the period 2018-2022. This has taken into account responses to the stakeholder consultation held at the end of 2016 and will include further stakeholder feedback in 2018.

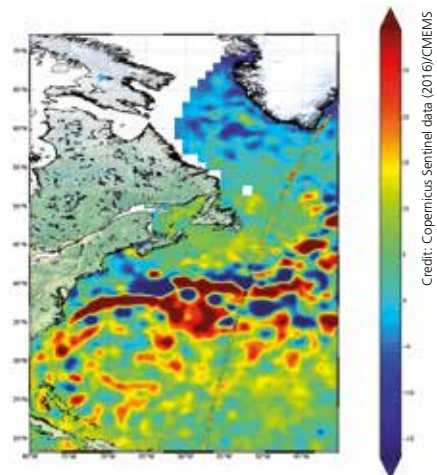
2017 also saw the start of Phase III of EMODnet which includes a specific task to support the European Ocean Observing System (EOOS). EMB are partners in this EC contract, with tasks including stakeholder mapping and engagement, stakeholder event planning and alignment activities.

With the momentum for EOOS growing, two stakeholder events are being held in 2018, namely:

- An EOOS Forum (8 March, 2018, Brussels), co-organized by EuroGOOS and EMB with a focus on sustainability of ocean observations, bringing together implementers, funders and users of ocean observatories.
- An EOOS multi-day Conference (21-23 November, 2018, Brussels) co-organized by EMODnet, EMB and EuroGOOS. This will look at the evolving EOOS and how to best connect the diverse stakeholder communities for a more inclusive, efficient and sustained EOOS.

Both stakeholder events are being planned by the EOOS Steering Group and EOOS Forum and Conference Advisory Committee, including wider stakeholders from a variety of communities spanning hydrographic offices to fisheries.

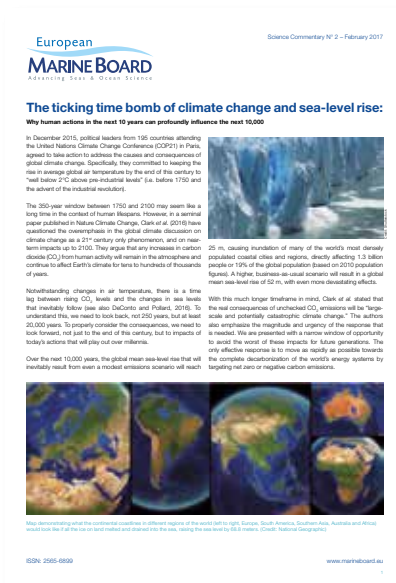
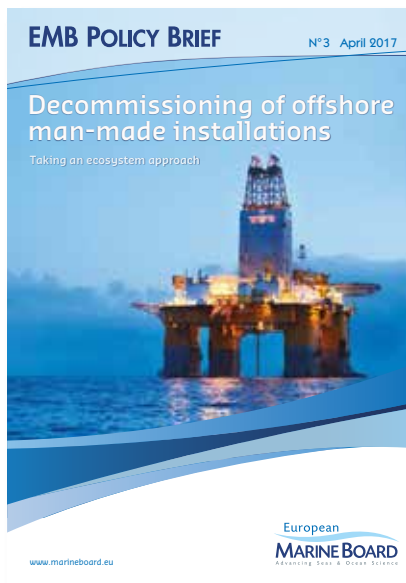
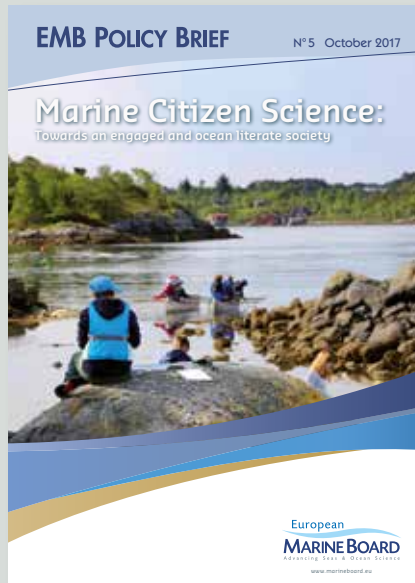
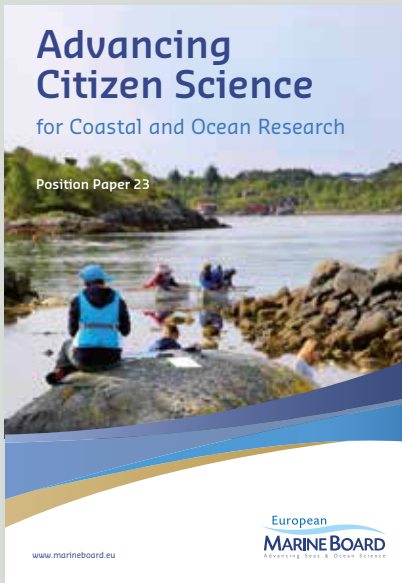
In addition, the EMB Secretariat is active in promoting EOOS through other activities. The EMB Secretariat presented on EMB's role and contribution to EOOS at the EuroGOOS General Assembly on 31 May 2017 in Brussels, and also presented at the EuroGOOS International Conference in Bergen, Norway on 3-5 October 2017. EMB vice-Chair Ferdinando Boero presented EOOS at a meeting organized by EurOcean and CNR, Italy, on ocean observing systems on 24 October 2017 on the island of Capri, Italy. Furthermore, EMB has a task within the H2020 AtlantOS project for assessing ocean observation coordination and governance at the European and basin-scale levels to be delivered in July 2018.



This is the first track measured by Sentinel-3A's Synthetic Aperture Radar Altimeter immediately after it was switched on. The instrument will be a vital tool for closely monitoring changes in surface ocean waters, sea-state and sea-ice thickness. The track, which captures features in the Gulf Stream current, compares well to the background data that comprises near-realtime data from the CryoSat, Jason-2 and Altika satellites.

EMB PUBLICATIONS IN 2017

Download at:
www.marineboard.eu



ADDITIONAL INTERNATIONAL UPDATES

EMB gained official observer status to the IPCC

Following the publication of our Science Commentary No. 2: The ticking time bomb of Climate change, the EMB Secretariat submitted a formal application to become an official observer to the International Panel on Climate Change (IPCC) at the beginning of April 2017.

The IPCC is the international body for assessing the science related to climate change. The IPCC was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP) to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

The EMB application was approved during the 46th Session of the IPCC on 6-10 September 2017. Through the observer status, the European Marine Board stays involved in the recent developments and calls for contributions on relevant issues, and can also attend meetings.

Global Ocean Science Report

In June 2017, the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) released the Global Ocean Science Report (GOSR). The GOSR assesses the status and trends in ocean science capacity around the world, and offers a global record of who, how, and where ocean science is conducted. The EMB Chair, Jan Mees, was on the Steering Group for the IOC Global Ocean Science Report. Niall McDonough acted as an external reviewer for Chapter 4 on international funding for ocean science. The report was published in time for The Ocean Conference (SDG 14), on the 5-9 June 2017 in New York, and can be found online.



Science strategy for space exploration of the outer solar system icy moons oceans

The European Space Sciences Committee in collaboration with the International Space Science Institute (ISSI) and US National Academy of Science Space Studies Board have set up a new 'ExOceans' Task Force which aims to identify the synergies that can appear between (Earth) marine biology/geology and astrobiology and habitability studies. The European Marine Board nominated Prof. Jan De Leeuw (NIOZ, The Netherlands) and Prof. Barbara Cavalazzi (University of Bologna, Italy) to take part in the expert group. EMB Chair, Jan Mees, also participated in the first meeting of the core group, which took place in Paris (Observatoire de Paris) on 13-14 November 2017. The outcome of this activity will be a book within the Space Science Series of ISSI published on the science results, and a Science Policy Briefing detailing a science strategy for space exploration of the outer solar system icy moons oceans.



European projects



AtlantOS (Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources) is a €20.65m project funded under the EU Horizon 2020 programme. Coordinated by GEOMAR

Helmholtz Centre for Ocean Research Kiel, Germany (Prof. Martin Visbeck), the project involves 62 partners from 18 countries (13 EU & 5 non-EU).

The overarching objective of AtlantOS is to achieve a transition from a loosely coordinated set of existing ocean observing activities to a sustainable, efficient, and fit-for-purpose Integrated Atlantic Ocean Observing System (IAOOS). The four year (2015-2019) project will aim to achieve this by defining requirements and systems design, improving the readiness of observing networks and data systems, and engaging stakeholders around the Atlantic; and leaving a legacy and strengthened contribution to the Global Ocean Observing System (GOOS), the Global Earth Observation System of Systems (GEOSS), and the emerging European Ocean Observing System (EOOS). AtlantOS will fill existing *in-situ* observing system gaps and will ensure that data are readily accessible and useable.

The European Marine Board, through its Secretariat, is a partner in AtlantOS, with responsibility for a task on coordination and governance of ocean observing systems, with a focus on the developing European Ocean Observing System in the context of basin-scale coordination, e.g. AtlantOS. This will contribute to the vision for an integrated and sustained European ocean observing system as articulated in the publications of EMB, including the strategic foresight paper Navigating the Future IV (2013). Meetings attended in 2017 include Executive Board tele-meetings, Steering Committee meetings and the 3rd General Assembly meeting from 21-23 November in Gran Canaria. EMB are also co-organizers of a European Vision workshop 2030 in June 2018 to produce a European contribution to the AtlantOS Blueprint legacy document.

The final conference for AtlantOS is proposed for 26-28 March 2019 in Paris at UNESCO. The developing Blue Print legacy document is proposed to be published and delivered to the International OceanObs conference in Hawaii in September 2019.



Sea Change is an EU Horizon 2020-funded project (Blue Growth Call 2013-2014) on the topic of Ocean Literacy. The overarching goal of Sea Change is to raise European citizens' awareness of the intrinsic links between the ocean and human health, and to empower the general public, as Ocean Literate citizens, to take direct and sustainable action towards a healthy ocean and seas, healthy communities and ultimately a healthy planet. Coordinated by the Marine Biological Association, UK, the project consortium comprises 17 European and international organizations. To meet its objectives, the Sea Change partnership is designing Ocean Literacy related activities and materials focused on education, community, and governance actors, and directly targeted at citizens.



In December 2017, the European Marine Board finalized its last remaining deliverable for the Sea Change project, entitled D5.3 Policy briefs on ocean health – human health delivered to relevant networks and WP7 under Work Package 5 (Mobilisation: Marine Governance, led by UNESCO). To optimize the impact of EMB's role, the deliverable scope was extended to encompass a review of the Fact Sheets produced by EMB, that may inform the development of a Roadmap (led by IOC-UNESCO). The European Marine Board participated in the virtual consortium meeting on 20 March, in the Sea Change Steering Committee virtual meeting on 21 September and in the Sea Change General Assembly meeting on 11 October 2017, in Valletta, Malta. The final Sea Change conference is planned on 15 February 2018 in Paris.

The EMB deliverables are available on the Sea Change project website at <http://www.seachangeproject.eu/>.



Participants to the Sea Change General Assembly on 11 October 2017, Malta

SOPHIE

In response to the Horizon 2020 framework call BG-06-2017: Interaction between people, oceans and seas: a strategic approach towards healthcare and well-being, the EMB Secretariat, together with a consortium of 7 other partners from the UK, Ireland, The Netherlands, Spain and Belgium developed a Coordinated Support Action (CSA) proposal entitled "Seas, Oceans and Public Health in Europe (SOPHIE)". The proposal was coordinated by University of Exeter's European Centre for Environmental and Human Health (Prof. Lora Fleming) and it addresses the wider topic of "Oceans and Human Health (OHH)". The main aim of the project is to advance significantly the coordination of multidisciplinary research and training in Europe to better manage the risks and opportunities presented by the complex interactions between the marine environment and human health and wellbeing. In June 2017, the consortium learned that the bid had been successful and that the project would be funded. The project will run for 2.5 years, starting on 1 December 2017. EMB are the work package leaders for WP6; "Building a Future Policy-Relevant Oceans and Human Health Research Effort in Europe". Their main tasks will include building a community of marine and health experts and practitioners, developing a strategic research agenda for Oceans and Human Health research in Europe, and organizing a dedicated conference on OHH.



EMB panels

EUROPEAN SCIENTIFIC DIVING PANEL

Since 2008, the European Marine Board's European Scientific Diving Panel (ESDP) has acted as a European operational platform to advance underwater scientific excellence and to promote and implement a practical support framework for scientific diving related activities.



The 18th ESDP meeting of 11 April 2017 was the last ESDP meeting supported by EMB, following the decision of the EMB Board to phase out its support to the ESDP by Spring 2017. The meeting was chaired by Jean-Pierre Ferral at the "Institut Méditerranéen d'Océanologie" in Marseille, France. It focused on the future of the ESDP, the approval of the consultation documents, the mission and objectives of the ESDP Terms of Reference and possible future membership criteria in order to take the next steps to become an independent organisation. The ESDP has evolved substantially over the past decade and is now a mature, autonomous panel which EMB wishes well into the future.

UNIVERSITY CONSORTIUM PANEL

Due to the growing membership within EMB of Higher Education Institution (HEIs) consortia, the University Consortium Panel was created to explore areas of mutual interest with regards to both research and education in the broadest sense. Some of the initial key objectives of the Panel include: establishing a forum within which HEI consortia that exist or are in development can meet, identifying and sharing best practice with respect to the governance and operation of these consortia, identifying and sharing opportunities for HEI consortia to collaborate across the EU or internationally, actively seeking to secure resources and funding to support graduate student and specifically PhD student training, promoting each other's consortia both nationally and internationally, and identifying where the respective resources and networks that exist within these consortia can add value to existing and future EMB activities.

After a kick-off meeting at the Spring 2016 plenary meeting, the UCP became an official EMB panel at the Autumn 2016 plenary meeting with 6 members. The UCP meets twice a year following each plenary meeting. With a view of the publication of the next EMB Future Science Brief on Marine Graduate Training, the UCP is currently focussing on the availability of information on training opportunities for marine students and career paths of marine graduates in different countries and how this could be tracked.

EUROPEAN MARINE BOARD COMMUNICATION PANEL

The European Marine Board Communications Panel (EMBCP) provides a pan-European platform for marine science communicators to promote European Marine Board activities, to synergize outreach activities and to advocate Ocean Literacy.

Following the conclusions of the external Review Committee in 2016, the EMBCP became a permanent EMB panel and elected 6 members to form a Steering Group. The Steering Group has the mandate to strengthen the relations with EMB and aims to increase the commitment of EMBCP members. Since then, the EMBCP met on 2 occasions in 2017, and the Steering Group met 4 times and drafted a Work Plan which described how the EMBCP can assist the European Marine Board with its communication and dissemination campaigns for future publications. This work plan was presented to the EMB ExCom and Board during the Autumn Plenary meeting in Galway in October 2017. EMBCP also announced that the next CommOCEAN conference in December 2018 in Southampton, will be hosted by NOC.

After 7 years of mandate as EMBCP Chair, Jan Seys (VLIZ) handed over to Lucy Calvert (NOC), who was elected as Chair at the EMBCP meeting in Galway in October 2017.



Communication and Outreach

The European Marine Board uses a variety of channels to reach its stakeholders, including disseminating publications at conferences, media campaigns for EMB events, and online outlets including a twitter feed and website.

In 2017, the European Marine Board twitter account gained 870 new followers, more than doubling the total number to 2,904. The account had 6,796 profile visits, with a monthly average of 566. The twitter feed is used to announce and promote EMB activities, as well as highlight updates from the marine science community. Two EMB activities that were particularly successfully promoted through Twitter were the 6th EMB Forum and the new EMB publications.

The twitter feed was also successfully used to communicate with other networks and individual stakeholders. The feed allowed EMB to instantly update member organizations and stakeholders on the events the Secretariat were attending.

The website is regularly updated with information on the expert Working Groups, the strategic areas, and the EU projects that EMB is involved in. All of EMB's publications are also available to download from the website free of charge.

In 2017, the website was visited almost 171,700 times, with over 128,800 unique visitors from over 130 countries. The top three documents downloaded were the Science Commentary 2, policy brief 5 on 'Marine Citizen Science: Towards an engaged an ocean literate society' and position paper 23 'Advancing Citizen Science for Coastal and Ocean Research' with 4,300 downloads combined.

Twitter: 2.904 followers



Finances

The EMB annual budget is based on member organization contributions and external contracts, e.g. EU framework projects. The Flemish Government of Belgium provides an in-kind contribution to the Board through the provision of office space and running costs and equipment at the InnovOcean site in Ostend, as well as the employment cost of one Secretariat staff member (figures not included in the tables below). Member organizations also provide in-kind contribution through support for participation of national experts in EMB activities, i.e. travel and subsistence to attend meetings.

The figures used are subject to final closure of 2017 accounts.

AVAILABLE FUNDS 2017

	EUR
Member Contributions ¹	365.000
FP drawdown on employment costs Staff time related to the external projects	21.902
Other income	431
Total available funds	387.332

EXPENDITURE 2017

	EUR
Secretariat employment costs	282.064
Meetings & Travel	33.825
EMB Strategic Events	20.870
Publications & dissemination	29.821
Running expenses and other costs	19.001
Doubtful debt impairments	8.000
Total	393.580

RESERVE FUND

	EUR
Available funds 2017	395.332
Expenditure 2017	385.580
Total 2017 balance	-6.248
2016 carry over	90.484
Total	84.236

¹ MASTS paid its 2017 membership contribution in 2015. This was already taken up in the accounts 2015

Annexes

ANNEX 1:

Marine Board member organizations, delegates and alternates

BELGIUM

Belgian Science Policy Office (BELSPO)

David Cox

Fonds National de la Recherche Scientifique (FNRS)

National Fund for Scientific Research

Jean-Marie Beckers

Fonds voor Wetenschappelijk Onderzoek -
Vlaanderen (FWO)

The Research Foundation - Flanders

Jan Mees (Chair)

Tina Mertens

CROATIA

Institut za oceanografiju i ribarstvo (IZOR)

Institute of Oceanography and Fisheries

Ivica Vilibic

Institut Ruđer Bošković (IRB)

Ruđer Bošković Institute

Robert Precali

DENMARK

Institut for Akvatiske Ressourcer (DTU Aqua)

National Institute for Aquatic Resources

Patrizio Mariani

Kirsten Thomsen

ESTONIA

Eesti Teaduste Akadeemia

Estonian Academy of Sciences

Tarmo Soomere

FRANCE

Centre National de la Recherche Scientifique
(CNRS)

National Centre for Scientific Research

Jean-Marie Flaud

Institut Français de Recherche pour l'Exploitation
de la Mer (IFREMER)

French Research Institute for Exploitation of the Sea

Gilles Lericolais (vice-Chair)

Aurélien Carbonière

Universités Marines

Marine Universities of France

Yves-Marie Paulet

Jean-Alain Pocard

Dominique Simon

GERMANY

Konsortium Deutsche Meeresforschung (KDM)

German Marine Research Institute

Jan-Stefan Fritz (vice-Chair)

Rolf Peinert

GREECE

Ελληνικό Κέντρο Θαλάσσιων Ερευνών (HCMR)

Hellenic Centre for Marine Research

Vasilios Lykousis

George Petihakis

IRELAND

Marine Institute

Fiona Grant

Irish Marine Universities Consortium

Jeremy Gault

Anthony Grehan

Colin Brown

ITALY

Consiglio Nazionale delle Ricerche (CNR)

National Research Council

Fabio Trincardi

Katrin Schroeder

Istituto Nazionale di Oceanografia e di Geofisica
Sperimentale (OGS)

National Institute of Oceanography and Experimental
Geophysics

Alessandro Crise

Cosimo Solidoro

Consorzio Nazionale Interuniversitario per le
Scienze del Mare (CoNISMa)

National Inter-University Consortium for Marine
Sciences

Ferdinando Boero (vice-chair)

Lisandro Benedetti-Cecchi

LITHUANIA

Klaipeda University

Artūras Razinkovas-Baziokas

THE NETHERLANDS

Nederlandse Organisatie voor
Wetenschappelijk Onderzoek (NWO)
Netherlands Organisation for Scientific Research
Josef F. Stuefer

Koninklijk Nederlands Instituut voor Onderzoek
der Zee
Royal Netherlands Institute for Sea Research (NIOZ)
Jan de Leeuw
Henk Brinkhuis

NORWAY

Havforskningsinstituttet
Institute of Marine Research (IMR)
Erlend Moksness (vice-Chair)
Geir Huse

Norges forskningsrad
The Research Council of Norway (RCN)
Christina Abildgaard

Norsk Marint Universitetskonsortium
Norwegian Marine University Consortium
Amund Mage
Jarl Giske

POLAND

Instytut Oceanologii Polskiej Akademii Nauk
(IO-PAN)
Institute of Oceanology of the Polish Academy of
Sciences
Slawomir Sagan

PORTUGAL

Centro de Investigação Marinha e Ambiental
(CIMAR)
Centre of Marine and Environmental Research
Vitor Vasconcelos

Fundação para a Ciência e a Tecnologia (FCT)
Foundation for Science and Technology
Sophia Ribeiro

ROMANIA

Romanian Black Sea Research Cluster
Vasile Patrascu

SPAIN

Instituto Espanol de Oceanografia (IEO)
Spanish Institute of Oceanography
Carlos Garcia Soto (vice-chair)

SWEDEN

Göteborgs universitet
University of Gothenburg (UGOT)
Per Hall
Katarina Abrahamson

TURKEY

Türkiye Bilimsel ve Teknik Arastirma Kurumu
(TUBITAK)
Scientific and Technological Research Council of
Turkey
Leyla Tolun

UNITED KINGDOM

Marine Alliance for Science and Technology
Scotland (MASTS)
Mark James (vice Chair)
David Paterson

National Oceanography Centre (NOC)
Edward Hill
Alan Evans

Natural Environment Research Council (NERC)
Mike Webb

ANNEX 2:

Participants of EMB plenary meetings 2017

Spring 2017 Plenary Meeting, 26-27 April 2017, Tenerife, Spain

EMB DELEGATES

Representative	Member Organization
JAN MEES – CHAIR	Research Foundation – Flanders (FWO), Belgium
ALAN EVANS	National Oceanography Centre (NOC), UK
ALESSANDRO CRISE	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Italy
CARLOS GARCIA SOTO	Instituto Español de Oceanografía (IEO), Spain
ERLEND MOKSNESS	Havforskningsinstituttet Institute of Marine Research (IMR), Norway
FIONA GRANT	Marine Institute (MI), Ireland
GILLES LERICOLAIS	Institut Français de Recherche pour L'exploitation de la Mer (IFREMER), France
IVICA VILIBIĆ	Institute of Oceanography and Fisheries (IZOR), Croatia
JAN DE LEEUW	Royal Netherlands Institute for Sea Research (NIOZ), The Netherlands
JAN-STEFAN FRITZ	Konsortium Deutsche Meeresforschung (KDM), Germany
JEAN-MARIE FLAUD	Centre National de la Recherche Scientifique (CNRS), France
JEREMY GAULT	Irish University Consortium (IMUC), Ireland
KATARINA ABRAHAMSSON	University of Gothenburg (UGOT), Sweden
LEYLA TOLUN	Scientific and Technological Research Council of Turkey (TÜBİTAK), Turkey
LISANDRO BENEDETTI-CECCHI	National Inter-University Consortium for Marine Sciences (CoNISMA), Italy
LOIS CALDER	Marine Alliance for Science & Technology for Scotland (MASTS), UK
PATRIZIO MARIANI	National Institute of Aquatic Resources (DTU Aqua), Denmark
RALPH SCHNEIDER	Konsortium Deutsche Meeresforschung (KDM), Germany
RAQUEL RIBEIRO	Fundação Para a Ciência e a Tecnologia (FCT), Portugal
ROBERT PRECALI	Institut Ruđer Bošković (IRB), Croatia
SLAWOMIR SAGAN	Institute of Oceanology Polish Academy of Sciences (IOPAN), Poland
TARMO SOOMERE	Estonian Academy of Sciences, Estonia
YVES-MARIE PAULET	Universtités Marines (UM), France

OBSERVERS, SPEAKERS AND GUESTS

Representative	Organization
ANDREW MEARNS SPRAGG	Jellagen
CLAIRE JOLLY	OECD
DONATELLA DE PASCALE	Institute of Protein Biochemistry
DOROTHY DANKEL	University of Bergen
EURGENIO FRAILE NUEZ	Instituto Español de Oceanografía (IEO)
JEANETTE HAMMER ANDERSEN	The Arctic University of Norway
LUIS LÓPEZ ABELLÁN	Instituto Español de Oceanografía (IEO)
RENUKA BADHE	European Polar Board

EMB SECRETARIAT

Name
NIALL MCDONOUGH
KATE LARKIN
PAULA KELLETT
ÁNGEL MUÑIZ PINIELLA
JOKE COOPMAN

Autumn 2017 Plenary Meeting, 18-19 October 2017, Galway, Ireland

EMB DELEGATES

Representative	Member Organization
JAN MEES – CHAIR	Research Foundation – Flanders (FWO), Belgium
ALAN EVANS	National Oceanography Centre (NOC), UK
ALESSANDRO CRISE	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Italy
ANTHONY GREHAN	Irish Marine University Consortium (IMUC), Ireland
DOMINIQUE SIMON	Universtîtés Marines (UM), France
ELENA STOICA	Romanian Black Sea Research Cluster (RBSR), Romania
FERDINANDO BOERO	National Inter-University Consortium for Marine Sciences (CoNISMA), Italy
FIONA GRANT	Marine Institute (MI), Ireland
GILLES LERICOLAIS	Institut Français de Recherche pour L'exploitation de la Mer (ifremer), France
IVICA VILIBIĆ	Institute of Oceanography and Fisheries (IZOR), Croatia
JAN DE LEEUW	Royal Netherlands Institute for Sea Research (NIOZ), The Netherlands
JAN-STEFAN FRITZ	Konsortium Deutsche Meeresforschung (KDM), Germany
LEYLA TOLUN	Scientific and Technological Research Council of Turkey (TÜBITAK), Turkey
LISANDRO BENEDETTI-CECCHI	National Inter-University Consortium for Marine Sciences (CoNISMA), Italy
MARC SAILLARD	Universtîtés Marines (UM), France
PATRIZIO MARIANI	Technical University of Denmark (DTU Aqua), Denmark
ROBERT PRECALI	Institut Ruđer Bošković (IRB), Croatia
YVES-MARIE PAULET	Universtîtés Marines (UM), France

OBSERVERS, SPEAKERS AND GUESTS

Representative	Member Organization
AENGUS CONNOLLY	Wood Group Ireland
DANIEL-CONSTANTIN STRUGARIU	DG RTD - European Commission
GERRY SUTTON	Centre For Marine And Renewable Energy Ireland (MareI)
GLENN NOLAN	EuroGOOS
JACKY WOOD	JPI Oceans
JAN SEYS	EMB Communications Panel
JAN-BART CALEWAERT	EMODnet
KATJA MINTENBECK	IPCC
LINE REEH	EMB Communications Panel
MARGARET RAE	Atlantic Ocean Research Alliance (Aora)
MARTHA PAPANASSIOU	EMB Communications Panel
OLIVER WRAGG	The European Marine Energy Centre Ltd (EMEC)
PETER HEFFERNAN	Marine Institute (MI), Ireland
POUL HOLM	Trinity College Dublin
SALVATORE ARCIO	IOC-UNESCO
TERESA SIMAS	Wavec
NIALL MCDONOUGH	Marine Institute (MI), Ireland (EMB Executive Director 2009 - July 2017)
NIAMH CONNELLY	University College Cork (UCC), Ireland (EMB Executive Director 2002 - 2009)

EMB SECRETARIAT

Name	
SHEILA HEYMANS	EMB SECRETARIAT (INCOMING EXECUTIVE DIRECTOR JANUARY 2018)
KATE LARKIN	EMB SECRETARIAT (ACTING DIRECTOR AUGUST-DECEMBER 2017)
PAULA KELLETT	EMB SECRETARIAT
ÁNGEL MUÑIZ PINIELLA	EMB SECRETARIAT
JOKE COOPMAN	EMB SECRETARIAT
CHARLOTTE SIMON	EMB SECRETARIAT

ANNEX 3: WORKING GROUP MEMBERS 2017

Working Group Citizen Science

Working Group Members:

- Carlos Garcia Soto, Spanish Institute of Oceanography (IEO), Spain – WG Chair
- Gro I. van der Meeren, Institute of Marine Research, Norway – WG co-Chair
- Oliver Zielinski, University of Oldenburg, Germany
- Jan Marcin Węśławski, Institute of Oceanology of the Polish Academy of Sciences, Poland
- Karin Dubsy, Trinity College Dublin, Ireland
- Gérald Mannaerts, Muséum national d'Histoire Naturelle, France
- Jan Seys, Flanders Marine Institute, Belgium
- Christine Domegan, National University of Ireland, Galway, Ireland
- Karen von Juterzenka, Kiel University, Germany
- Jane Delany, Newcastle University, UK
- Gabriel Gorsky, Université Pierre et Marie Curie, France
- Francesca Malfatti, National Institute of Oceanography and Experimental Geophysics, Italy

EMB Secretariat Support:

Niall McDonough, Paula Kellett

Working Group Marine Graduate Training

Working Group Members:

- Magda Vincx, Marine Biology Section, University Ghent, Belgium - WG Chair
- Øyvind Fiksen, University of Bergen, Norway
- Guillaume Rouillet, Université de Bretagne Occidentale - IUEM, France
- Avan Antia, University of Kiel, Germany
- Marja Koski, Technical University of Denmark, Denmark
- Pauhla McGrane, Galway-Mayo Institute of Technology, Ireland
- Bev Mackenzie, Institute of Marine Engineering, Science & Technology, UK
- Luís Menezes Pinheiro, University of Aveiro, Portugal
- Maurizio Ribera d'Alcalà, Stazione Zoologica Anton Dohrn, Italy
- Jeanine Olsen, University of Groningen, Netherlands
- Tim Deprez, Marine Biology Section, University Ghent, Belgium

EMB Secretariat Support:

Kate Larkin, Paula Kellett

Working Group Marine Ecosystem Modelling

Working Group Members:

- Morten Skøgen, Institute of Marine Research (IMR), Norway - WG Chair
- Sheila Heymans, previous Scottish Association for Marine Science (SAMS), UK (currently EMB Executive Director) - WG co-Chair
- Corinna Schrum, Helmholtz Association (HZG), Germany
- Cosimo Solidoro, National Institute of Oceanography and Experimental Geophysics (OGS), Italy

EMB Secretariat Support:

Kate Larkin

Working Group Biological Ocean Observing Capacity

Working Group Members:

- Lisandro Benedetti-Cecchi, University of Pisa, Italy – WG Chair
- Tasman Crowe, University College Dublin, Ireland – WG co-Chair
- Jacco Kromkamp, NIOZ, The Netherlands
- Ferdinando Boero, University of Salento, CoNISMa, Italy
- Antoine Grémare, University of Bordeaux, France
- Asbjørn Christensen, DTU Aqua, Denmark
- Isabel Sousa Pinto, CIIMAR, Portugal
- Adriana Zingone, Stazione Zoologica Anton Dohrn, Italy
- Francisco Hernandez, VLIZ, Belgium
- Lars Boehme, University of St Andrews, UK
- George Petihakis, HCMR, Greece
- Enrique Nogueira, García IEO, Spain

EMB Secretariat Support:

Ángel Muñoz Piniella

ANNEX 4: Panel members 2017

European Marine Board Communications Panel (EMBCP)

Panel Members:

- Jan Seys, Flanders Marine Institute (VLIZ), Belgium - Panel Chair
- Ferdinando Boero, National Inter-University Consortium for Marine Sciences (CoNISMa), Italy
- Jan Boon (till August 2017) & Kim Sauter, Royal Netherlands Institute for Sea Research (NIOZ), The Netherlands
- Lucy Calvert, National Oceanography Centre (NOC), United Kingdom
- Anne Ditlefsen, Research Council of Norway, Norway
- Marco Faimali, National Research Council, Institute of Marine Sciences (ISMAR, CNR), Italy
- Lisa Fitzpatrick, Marine Institute, Ireland
- Thomas Isaak (until April 2017), French Research Institute for Exploitation of the Sea (Ifremer), France
- Sigrid Maebe (until April 2017) & Kelle Moreau, Royal Belgian Institute of Natural Sciences (RBINS), Belgium
- Kjartan Mæstad, Institute of Marine Research (IMR), Norway
- Martha Papathanassiou, Hellenic Centre for Marine Research (HCMR), Greece
- Francesca Petrera, National Institute of Oceanography and Experimental Geophysics (OGS), Italy
- Joanna Piwowarczyk & Tymon Zielinski, Institute of Oceanology of the Polish Academy of Sciences (IO-PAN), Poland
- Line Reeh, National Institute of Aquatic Resources (DTU Aqua), Denmark
- Joana Saiote, Centre of Marine and Environmental Research (CIIMAR), Portugal
- Dominique Simon, Réseau des Universités Marines Françaises (Marine Universities of France), France
- Andreas Villwock, German Marine Research Consortium (KDM), Germany

EMB Secretariat Support:

Ángel Muñoz Piniella

University Consortiums Panel

Panel Members:

- Mark James, Marine Alliance for Science and Technology for Scotland (MASTS), United Kingdom - Panel Chair
- Yves-Marie Paulet, Universités Marines, France
- Dominique Simon, Universités Marines, France
- Lisandro Benedetti-Cecchi, CoNISMa, Italy
- Artūras Razinkovas-Baziukas, Klaipeda University, Lithuania
- Jeremy Gault, Irish Marine Universities Consortium, Ireland
- Anthony Grehan, Irish Marine Universities Consortium, Ireland
- Amund Mage, Norwegian Marine Universities Consortium (NMUC), Norway

EMB Secretariat Support:

Paula Kellett, Kate Larkin

European Scientific Diving Panel (ESDP)

Panel Members:

- Jean-Pierre Feral, National Centre for Scientific Research (CNRS), France – Panel Chair
- Martin Sayer, National Environment Research Council (NERC), United Kingdom
- Philipp Fisher, Alfred Wegener Institute for Polar and Marine Research (AWI), Germany
- Jouni Leinikki, Finnish Scientific Diving Steering Association, Finland
- Maria Asplund, Swedish Scientific Diving Committee (SSDC), Sweden
- Alain Norro, Management Unit of the North Sea Mathematical Models (MUMM) - Royal Belgian Institute of Natural Sciences (RBINS), Belgium
- Ditmar Berov, Bulgaria
- Massimo Ponti, Università di Bologna, Italian Association of Scientific Divers (AIOSS), Italy
- Donat Petricioli, Coordination of Scientific Divers of Croatia (CSDC), Croatia
- Thanos Dailianis, Hellenic Centre for Marine Research (HCMR), Greece
- Mats Waldey, Norwegian Institute for Water Research, Oslo, Norwegian Scientific Divers (NSD), Norway
- Pedro Neves, Portuguese Scientific Diving Association (APorMC), Portugal

EMB Secretariat Support:

Joke Coopman

ANNEX 5: Meetings and events organized in 2017 (including jointly)

Date	Event and Venue
19 January 2017	EMB ExCom, Brussels
9 February 2017	EOOS Steering Group Meeting, Brussels
11 April 2017	18 th ESDP Panel Meeting, Marseille
25 April 2017	EMB ExCom, Tenerife
26-27 April 2017	EMB Plenary Meeting, Tenerife
27 April 2017	EMB UCP Meeting, Tenerife
3-4 May 2017	EMBCP Meeting, Genoa
18-19 May 2017	European Maritime Day workshop Citizen Science and the future of coastal monitoring, Poole
22-23 June 2017	EMB WG BIO OBS Kick-Off Meeting, Pisa
7 July 2017	End-to-End Ecosystem Modelling Workshop, Plymouth
20 September 2017	EOOS Steering Group 4 th Meeting, Brussels (co-organized with EuroGOOS)
17 October 2017	EMB ExCom, Galway
18-29 October 2017	EMB Plenary Meeting, Galway
19 October 2017	EMB UCP Meeting, Galway
8-9 November 2017	Navigating the Future V Foresight Workshop
6 December 2017	6 th EMB Forum, Brussels
19 December 2017	EOOS Steering Group 5 th Meeting, Brussels (co-organized with EuroGOOS)

ANNEX 6:

Presentations to meetings by EMB Secretariat and ExCom members in 2017

Date	Event and Venue	Speaker(s)
8 February 2017	EuroMarine European Parliament Event, Brussels	Niall McDonough
14-15 February 2017	EMODnet Stakeholder Conference and Sea-Basin Workshop, Brussels	Niall McDonough
3 March 2017	China-EU Visit, Bruges	Niall McDonough
3 March 2017	VLIZ Marine Science Day, Bruges	Ángel Muñoz Piniella
8 March 2017	Science/Business round table: Seas, oceans and poles: How to get more innovation from maritime research?, Brussels	Niall McDonough
8 May 2017	SETAC OHH Presentation, Brussels	Niall McDonough
29 March 2017	JPI Oceans Management Board Meeting	Niall McDonough
19 May 2017	European Maritime Day: Blue growth data challenge part 2: offshore energy case studies	Niall McDonough
30 May-1 June 2017	Marseille-Aix University, Marseille	Niall McDonough
31 May 2017	EuroGOOS General Assembly (EOOS presentation)	Kate Larkin
3-6 July 2017	Advances in Marine Ecosystem Modelling Research conference	Kate Larkin
6 September 2017	VLIZ Science Symposium on Ocean and Human Health, Ostend	Paula Kellett
19 September 2017	VLIZ Blue Growth Summer School, Ostend	Kate Larkin
20 September 2017	European Ocean Observing System (EOOS) 4th Steering Committee Meeting	Kate Larkin (co-Chair) and Ángel Muñoz Piniella
21 September 2017	AtlantOS Steering Committee meeting	Kate Larkin
3-5 October 2017	EuroGOOS General Assembly, Bergen (EOOS and AtlantOS presentation)	Kate Larkin
24 October 2017	Perspectives for enhancing co-ordination and support of Europe's Ocean Observing System, EOOS meeting (EurOcean and CNR), Capri, Italy	Ferdinando Boero
26 October 2017	JPI Oceans Conference, Lisbon	Ángel Muñoz Piniella
20-21 November 2017	ERA-MBT Final Conference: Oceans of Opportunities	Ángel Muñoz Piniella
21-23 November 2017	AtlantOS General Assembly, Gran Canaria	Kate Larkin
19 December 2017	European Ocean Observing System (EOOS) 5th Steering Committee Meeting	Kate Larkin (co-Chair) and Ángel Muñoz Piniella

ANNEX 7: Member contributions 2017

Marine Board Member	Country	Contribution 2017 / €
Research Foundation Flanders, FWO	Belgium	12.000
National Fund for Scientific Research, FNRS	Belgium	12.000
Belgian Science Policy Office, BELSPO	Belgium	12.000
Institute of Oceanography and Fisheries, IZOR	Croatia	3.000
Insitute Ruđer Bošković, IRB	Croatia	3.000
National Institute for Aquatic Resources, DTU Aqua	Denmark	12.000
Estonian Academy of Sciences, ETA	Estonia	8.000
Universités Marines, UM	France	17.000
French Research Institute for Exploitation of the Sea, IFREMER	France	17.000
National Centre for Scientific Research, CNRS	France	17.000
German Marine Research Consortium, KDM	Germany	17.000
Hellenic Centre for Marine Research, HCMR	Greece	8.000
Marine Institute, MI	Ireland	12.000
Irish Marine Universities Consortium, IMUC	Ireland	12.000
National Institute of Oceanography and Experimental Geophysics, OGS	Italy	17.000
National Research Council, CNR	Italy	17.000
National Inter-University Consortium for Marine Sciences, CoNISMa	Italy	17.000
University of Klaipeda	Lithuania	0 ¹
Netherlands Organisation for Scientific Research, NWO	Netherlands	12.000
Royal Netherlands Institute for Sea Research, NIOZ	Netherlands	12.000
University of Bergen, UiB	Norway	12.000
Research Council of Norway, RCN	Norway	12.000
Institute of Marine Research, IMR ²	Norway	12.000
Institute of Oceanology - Polish Academy of Sciences, IO-PAN	Poland	8.000
Science and Technology Foundation, FCT	Portugal	8.000
Centre of Marine and Environmental Research, CIIMAR	Portugal	8.000
Romanian Black Sea Research Cluster, RBSR	Romania	8.000
Spanish Institute of Oceanography, IEO	Spain	12.000
University of Gothenburg, UGOT	Sweden	6.000
Scientific and Technological Research Council of Turkey, TÜBİTAK	Turkey	8.000
Natural Environment Research Council, NERC	UK	17.000
National Oceanography Centre, NOC ³	UK	17.000
Marine Alliance of Science and Technology Scotland, MASTS ⁴	UK	0
Total	33	365.000

¹ The 2017 membership contribution from Klaipeda University (8.000 EUR) has been written off due to membership suspension in early 2018.

² Paid by Research Council of Norway

³ Paid by NERC

⁴ MASTS 2017 contribution was paid in 2015

ANNEX 8:

Full list of EMB publications

PUBLICATIONS IN 2017:

- European Marine Board. **Marine Citizen Science: Towards an engaged and ocean literate society.** EMB Policy Brief No. 5, October 2017. ISSN: 0778-3590 ISBN: 978-94-92043-48-1
- McDonough, N., Donaldson, K., Kellett, P., Coopman, J., Muñiz Piniella, A., Larkin, K. **European Marine Board Annual Report 2016. European Marine Board, Ostend, Belgium.** 2017. ISBN: 978-94-920434-7-4, 54pp. ISSN: 2565-7402
- European Marine Board and Marin Biotechnology ERA-NET (2017). **Marine Biotechnology: Advancing Innovation in Europe's Bioeconomy.** EMB Policy Brief No. 4, September 2017. ISSN: 0778-3590 ISBN: 978-94-92043-35-1
- Garcia Soto, C., *et al.* (2017) **Advancing Citizen Science for Coastal and Ocean Research.** French, V., Kellett, P., Delany, J., McDonough, N. [Eds.] Position Paper 23 of the European Marine Board, Ostend, Belgium. 112pp. ISBN: 978-94-92043-30-6
Contribution Autors: Gro Van Der Meeren, Julia A. Busch, Jane Delany, Christine Domegan, Karin Dubsky, Géraldine Fauville, Gabriel Gorsky, Karen von Juterzenka, Francesca Malfatti, Gérald Mannaerts, Patricia McHugh, Pascal Monestiez, Jan Seys, Jan Marcin Węśławski, Oliver Zielinski
- European Marine Board (2017). **Decommissioning of offshore man-made installations: Taking an ecosystem approach.** EMB Policy Brief No. 3, April 2017. ISSN: 0778-3590 ISBN: 978-94-920433-1-3
- European Marine Board. **The ticking bomb of climate change: why human actions in the next 10 years can profoundly influence the next 10,000.** Science Commentary No.2 February 2017. ISSN 2565-6899

POSITION PAPERS:

- Garcia Soto, C., *et al.* (2017) **Advancing Citizen Science for Coastal and Ocean Research.** French, V., Kellett, P., Delany, J., McDonough, N. [Eds.] Position Paper 23 of the European Marine Board, Ostend, Belgium. 112pp. ISBN: 978-94-92043-30-6
Contribution Autors: Gro Van Der Meeren, Julia A. Busch, Jane Delany, Christine Domegan, Karin Dubsky, Géraldine Fauville, Gabriel Gorsky, Karen von Juterzenka, Francesca Malfatti, Gérald Mannaerts, Patricia McHugh, Pascal Monestiez, Jan Seys, Jan Marcin Węśławski, Oliver Zielinski
- Rogers A.D. *et al.* (2015) **Delving Deeper: Critical challenges for 21st century deep-sea research.** European Marine Board Position Paper 22. Larkin, KE, Donaldson K, McDonough, N (Eds). European Marine Board, Ostend, Belgium, 2014.
Coordinating author: Alex D. Rogers; Contributing authors: Andy Brierley, Peter Croot, Marina Cunha, Roberto Danovaro, Colin Devey, Alf Haakon Hoel, Henry Ruhl, Pierre-Marie Sarradin, Seline Trevisnaut, Helena Viera, Martin Visbeck
- Flemming N.C. *et al.* (2014) **Land beneath the waves: State of the art, key opportunities and recommendations to advance the European Continental Shelf Prehistoric Research.** European Marine Board Position Paper 21. McDonough N, Chu, NC (Eds). European Marine Board, Ostend, Belgium, 2014.
Coordinating author: Nicholas C. Flemming; Contributing authors: M. Namık Ça atay, Francesco Latino Chiocci, Nena Galanidou, Gilles Lericolais, Hauke Jöns, Tine Missiaen, Fionnbarr Moore, Alar Rosentau, Dimitris Sakellariou, Birgitte Skar, Alan Stevenson, and Henk Weerts. Special Contributions: Geoff Bailey and Deukalion Planning Group (Annex 2), Anders Fischer, Sunhild Kleingärtner and Ian Oxley
- European Marine Board (2013). **Navigating the Future IV.** Position Paper 20 of the European Marine Board, Ostend, Belgium. ISBN: 9789082093100

- Moore M., *et al.* (2013). **Linking Oceans and Human Health: A Strategic Research Priority for Europe**. Position Paper 19. McDonough N., Evrard M., Calewaert J.B., French V. (Eds). European Marine Board, Ostend, Belgium. 2013. Contributing authors: Michael N. Moore, Craig Baker-Austin, Michael H. Depledge, Iora Fleming, Philipp Hess, David Lees, Paul Leonard, Lise Madsen, Richard Owen, Hans Pirllet, Mathew White, Vitor Vasconcelos, Nicholas Boase, Nicholas Osborne, Aldo Viarengo
- Olsen E. M., *et al.* (2013). **Achieving Ecologically Coherent MPA Networks in Europe: Science Needs and Priorities**. Marine Board Position Paper 18. Larkin, K. E. and McDonough N. (Eds.). European Marine Board, Ostend, Belgium. ISBN 978-9-079528-19-6. 84pp. Contributing authors: Luciano Fonseca, Raquel Goñi, David Johnson, Stelios Katsanevakis, Enrique Macpherson, Esben Moland Olsen, Dominique Pelletier, Marijn Rabaut, Marta Chantal Ribeiro, Phil Weaver, Tania Zaharia
- Haugan, P. (2013). **Getting ready for an ice-free Arctic**. McDonough, N. & Larkin, K. E. (Eds.) Marine Board Science Commentary 1, European Marine Board, Ostend, Belgium.
- Heip, C., & McDonough, N. (2012). **Marine Biodiversity: A Science Roadmap for Europe**. Marine Board Future Science Brief 1, European Marine Board, Ostend, Belgium. ISBN: 978-2-918428-75-6.
- Glöckner, F. O. *et al.* (2012). **Marine Microbial Diversity and its role in Ecosystem Functioning and Environmental Change. Marine Board Position Paper 17**. McDonough N., Calewaert J-B. (Eds.). Marine Board-ESF, Ostend, Belgium. Contributing authors: Lucas J. Stal, Ruth-Anne Sandaa, Josep Maria Gasol, Fergal O’Gara, Francisco Hernandez, Matthias M. Labrenz, Elena Stoica, Marta Varela Rozados, Adriano Bordalo, Paraskevi Pitta.
- Roose, P. *et al.* (2011). **Monitoring chemical pollution in Europe’s Seas - programmes, practices and priorities for research**. McDonough N., Calewaert J-B. (Eds.). Marine Board-ESF, Ostend, Belgium. Contributing authors: Joan Albaigés, Maria João Bebianno, Kees Camphuysen, Margot Cronin, Jan de Leeuw, Geir Wing Gabrielsen, Thomas Hutchinson, Ketil Hylland, Colin Janssen, Bo Jansson, Bjørn Munro Jenssen, Patrick Roose, Detlef Schulz-Bull, Piotr Szefer.
- Querellou J. *et al.* (2010). **Marine Biotechnology: A Vision and New Strategy for Europe. Marine Board Position Paper 15**. McDonough N., Calewaert J-B. (Eds.). Marine Board-ESF, Ostend, Belgium. ISBN 978-2-918428-26-8, 94pp. Contributing authors: Torger Borresen, Catherine Boyen, Alan Dobson, Manfred Hofle, Adrianna Ianora, Marcel Jaspars, Anake Kijjoo, Jan Olafsen, Joel Querellou, George Rigos, Rene Wijffels. Special contributions: Chantal Compere, Michel Magot, Jeanine Olsen, Philippe Potin, Filip Volckaert.
- Rice J. *et al.* (2010). **Science Dimensions of an Ecosystem Approach to Management of Biotic Ocean Resources, SEAMBOR. Marine Board Position Paper 14**. McDonough N., Carbonnière A. (Eds). Marine Board-ESF, Ostend, Belgium. ISBN 978-2-918428-10-7, 90pp. Contributing authors: Maria de Fátima Borges, Anthony Grehan, Andrew Kenny, Harald Loeng, Francesc Maynou, Jake Rice, Ricardo Serrão Santos, Hein Rune, Skjoldal, Olivier Thébaud, Vassiliki Vassilopoulou, Filip Volckaert. External contributions: Olivier Curtil, Harold Levrel.
- Boyd I. *et al.* (2008). **The Effects of Anthropogenic Sounds on Marine Mammals. Marine Board Position Paper 13**. Connolly N., Calewaert J-B. (Eds). Marine Board-ESF, Ostend, Belgium. ISBN 2-912049-85-7, 94pp. Coordinating authors: Ian Boyd, Bob Brownell, Doug Cato, Chris Clark, Dan Costa, Peter Evans, Jason Gedamke, Roger Gentry, Bob Gisiner, Jonathan Gordon, Paul Jepson, Patrick Miller, Luke Rendell, Mark Tasker, Peter Tyack, Erin Vos, Hal Whitehead, Doug Wartzok, Walter Zimmer.
- Robinson I.S. *et al.* (2008). **Remote Sensing of Shelf Sea Ecosystems. Marine Board Position Paper 12**. Connolly N., Walter N., Calewaert J-B. (Eds). Marine Board-ESF, Strasbourg, France. ISBN 2-912049-77-6, 62pp. Contributing authors: David Antoine, Mirosław Darecki, Patrick Gorringer, Lasse Pettersson, Ian S. Robinson, Kevin Ruddick, Rosalia Santoleri, Herbert Siegel, Patrick Vincent, Marcel R. Wernand, Guy Westbrook, Giuseppe Zibordi.
- Connolly N. *et al.* (Eds) (2007). **Marine Board Responses to the European Commission’s Green Papers: (i) Towards a future Maritime Policy for the Union: A European vision for the oceans and seas and (ii) The European Research Area: New Perspectives EC’s Green Papers on: Maritime Policy, and the ERA. Marine Board Position Paper 11**. Marine Board-ESF, Strasbourg, France. ISBN 2-912049-73-3, 46pp.

Developed from existing Marine Board-ESF publications and discussions with Marine Board Delegates and Executive Committee.

- Binot J. *et al.* (2007). **European Ocean Research Fleets – Towards a Common Strategy and Enhanced Use.** Marine Board Position Paper 10. Connolly N., Carbonnière A. (Eds). Marine Board-ESF, Strasbourg, France. ISBN 2-912049-62-8, 62pp.
Contributing authors: Jacques Binot, Juanjo Dañobeita, Thomas Muller, Per Wilhelm Nieuwejaar, Marieke J. Rietveld, Paul Stone. Special contributions: Massimiliano di Bitteto, John Breslin, Klaus von Broeckel, Joao Coimbra, Dimitris Georgopoulos, Mick Gillooly, Hannu Gronvall, Jan Piechura, Frans Veenstra.
- Philippart C.J.M. *et al.* (2007). **Impacts of Climate Change on the European Marine and Coastal Environment – Ecosystems Approach. Marine Board Position Paper 9.** Connolly N., Walter N. (Eds). Marine Board-ESF, Strasbourg, France. ISBN 2-912049-63-6, 84pp.
Contributing authors: Ricardo Anadón, Roberto Danovaro, Joachim W. Dippner, Kenneth F. Drinkwater, Stephen J. Hawkins, Geoffrey O’Sullivan, Temel Oguz, Catharina J.M. Philippart, Philip C. Reid.
- Minster J-F., Connolly N. *et al.* (Eds) (2006). **Navigating the Future III. Marine Board Position Paper 8.** Marine Board-ESF, Strasbourg, France. ISBN 2-912049-59-8, 69pp.
Contributing editors: Aurélien Carbonnière, Niamh Connolly, Jan de Leeuw, Maud Evrard, Jan Mees, Jean-François Minster, Kostas Nittis, Geoffrey O’Sullivan, Nicolas Walter.
- Prandle D. *et al.* (2005). **Modelling in Coastal and Shelf Seas – European Challenges. Marine Board Position Paper 7.** Connolly N., Walter N. (Eds). Marine Board-ESF, Strasbourg, France. 30pp.
Contributing authors: João Gomes Ferreira, Wolfgang Fennel, Michael Hartnett, Peter Herman, Michiel Knaapen, Hans Los, Morten Pejrup, Thomas Pohlmann, David Prandle, Roger Proctor, Yann-Hervé de Roeck, Karline Soetaert, Takvor Soukissian, Tapani Stipa, Georg Umgieser, Waldemar Walczowski.
- Mantoura F., Boissonnas J., d’Ozouville L., Connolly N. (2003). **Navigating the Future II - Summary of Integrating Marine Science in Europe. Marine Board Position Paper 6.** Minster J-F. *et al.* (Eds). Marine Board-ESF, Strasbourg, France. 24pp.
Editors: John Marks, Jean-François Minster, Mario Ruivo, Silvana Vallerga; Other Contributors: Avan Antia, Laura Castellucci, Juanjo Dañobeitia, Jens Degett, Bob Dickson, Graham Edgar, Paul Galvin, David Griffith, Gwyn Griffiths, Harlyn Halvorson, Carlo Heip, Jean-Pierre Henriët, Catherine Jeandel, Frank Lamy, Jacques Legrand, Han Lindeboom, Karin Lochte, Jens Meincke, Geoffrey O’Sullivan, Nadia Pinardi, Gérard Riou, Douglas Wallace, Gerold Wefer, John Woods.
- Mantoura F., Boissonnas J., d’Ozouville L., Connolly N. (2002). **Integrating Marine Science in Europe. Marine Board Position Paper 5.** Minster J-F. *et al.* (Eds). Marine Board-ESF, Strasbourg, France. 148pp.
Editors: John Marks, Jean-François Minster, Mario Ruivo, Silvana Vallerga; Other Contributors: Avan Antia, Laura Castellucci, Juanjo Dañobeitia, Jens Degett, Bob Dickson, Graham Edgar, Paul Galvin, David Griffith, Gwyn Griffiths, Harlyn Halvorson, Carlo Heip, Jean-Pierre Henriët, Catherine Jeandel, Frank Lamy, Jacques Legrand, Han Lindeboom, Karin Lochte, Jens Meincke, Geoffrey O’Sullivan, Nadia Pinardi, Gérard Riou, Douglas Wallace, Gerold Wefer, John Woods.
- Halvorson H. *et al.* (2001). **Marine Biotechnology – A European Strategy for Marine Biotechnology. Marine Board Position Paper 4.** Mantoura F. (Ed). Marine Board-ESF, Strasbourg, France. ISBN 2-912049-29-6, 30pp.
Contributing authors: Maria Alexis, Grant Burgess, Joao Coimbra, Yves le Gal, Maura Grealy, David Gutnick, Harlyn Halvorson, Manfred Höfle, Zuzana Smolenicka, Bernt Walther, Roman Wenne; Special consultant: Jan A. Olafsen.
- Boissonnas J., d’Ozouville L. *et al.* (2001). **Navigating the Future – Towards a Marine European Research Area. Marine Board Position Paper 3.** Marine Board-ESF, Strasbourg, France. 14pp.
Core Drafting Group: J. Boissonnas, O.R. Godø, C. Jeandel, J.W. de Leeuw, K. Lochte, R.F.C. Mantoura, J. Marks, J.F. Minster, G. O’Sullivan, L. d’Ozouville, S. Vallerga, G. Wefer; Other contributors: H. Halvorson, C. Heip, B. B. Jørgensen.
- Boissonnas J., d’Ozouville L. *et al.* (2000). **Towards a European Marine Research Area. Marine Board Position Paper 2.** Marine Board-ESF, Strasbourg, France. 54pp.
Core Drafting Group: J. Boissonnas, O.R. Godø, C. Jeandel, J.W. de Leeuw, K. Lochte, R.F.C. Mantoura, J. Marks, J.F. Minster, G. O’Sullivan, L. d’Ozouville, S. Vallerga, G. Wefer; Other contributors: H. Halvorson, C. Heip, B. B. Jørgensen.

- Heip C., Hummel H. (2000). **Establishing a Framework for the Implementation of Marine Biodiversity Research in Europe. Marine Board Position Paper 1.** Mantoura F. (Ed). Marine Board-ESF, Strasbourg, France. ISBN 2-912049-13-X, 50pp.

FUTURE SCIENCE BRIEFS :

- Heip C., McDonough N. **Marine Biodiversity: A Science roadmap for Europe.** Marine Board Future Science Brief 1. European Marine Board, Ostend, Belgium. 2012. ISBN 978-2-918428-75-6, 32pp.

POLICY BRIEFS:

- European Marine Board. **Marine Citizen Science: Towards an engaged and ocean literate society.** EMB Policy Brief No. 5, October 2017. ISSN: 0778-3590 ISBN: 978-94-92043-48-1
- European Marine Board and Marine Biotechnology ERA-NET (2017). **Marine Biotechnology: Advancing Innovation in Europe's Bioeconomy.** EMB Policy Brief No. 4, September 2017. ISSN: 0778-3590 ISBN: 978-94-92043-35-1
- European Marine Board (2017). **Decommissioning of offshore man-made installations: Taking an ecosystem approach.** EMB Policy Brief No. 3, April 2017. ISSN: 0778-3590 ISBN: 978-94-920433-1-3
- Larkin, K.E., Donaldson, K., McDonough, N., Rogers, A.D. (2015) **Delving Deeper: How can we achieve sustainable management of our deep sea through integrated research?** EMB Policy Brief No.2, European Marine Board, Ostend, Belgium.
- Chu, N.C., McDonough, N., Flemming, N.C. (2014) **How did our ancestors adapt to sea-level change? Safeguard European underwater heritage through Continental Shelf Prehistoric Research,** EMB Policy Brief No.1, European Marine Board, Ostend, Belgium. ISSN 0778-3590

SCIENCE COMMENTARIES:

- European Marine Board. **The ticking bomb of climate change: why human actions in the next 10 years can profoundly influence the next 10,000.** Science Commentary No.2 February 2017. ISSN 2565-6899
- Schulz, M. *et al.* (2015) **The Critical Role of Ocean Science in Responding to Climate Change.** Chu, NC, McDonough, N. (Eds). European Marine Board, Ostend, Belgium. Coordinating Author: Michael Schulz; Contributing Authors: Hugues Goose, Eileen Hofmann, Pierre-Yves Le Traon, Susan Lozier, Baris Salihoglu, Isabel Sousa Pinto.
- Haugan P. **Getting Ready for an Ice-Free Arctic.** European Marine Board Science Commentary 1. European Marine Board, Ostend, Belgium. 2013

VISION DOCUMENTS:

- Le Boulluec M. *et al.* (2010). **Marine Renewable Energy – Research Challenges and Opportunities for a New Energy Era in Europe.** Marine Board Vision Document 2. McDonough N., Evrard M. (Eds). Marine Board-ESF, Ostend, Belgium. ISBN: 978-2-918428-27-5, 12pp.
Contributing Authors: Augusto Barata da Rocha, Cibran Camba Rey, Marc Le Boulluec, John Dalen, Henry Jeffrey, Finn Gunnar Nielsen, Geoffrey O'Sullivan, Nathalie Rousseau, Eoin Sweeney, Judith Wolf.
- Dosdat A., Ryder P. *et al.* (2008). **Marine Board – EuroGOOS Vision Document on EMODNET, The European Marine Observation and Data Network.** Marine Board Vision Document 1. Ryder P., Connolly N., Evrard M. (Eds). Marine Board-ESF, Ostend, Belgium. 10pp.
Contributing authors: Patrick Berthou, Taco de Bruin, Howard Cattle, Franciscus Colijn, Antoine Dosdat, Michael Gillooly, Johnny Johannessen, Juha Markku Leppanen, Giuseppe Manzella, Geoffrey O'Sullivan, Sylvie Pouliquen, Roger Proctor, Peter Ryder, Dick Schaap.

SPECIAL REPORTS:

- Heip C., *et al.* (2011). **Climate Change and Marine Ecosystem Research: Synthesis of European Research on the Effects of Climate Change on Marine Environments.** Marine Board – CLAMER Special Report. Calewaert J.B.,

Heip C., McDonough N., Philippart C. (Eds). Marine Board, Ostend, Belgium. 154pp.
Coordinating author: Carlo Heip. CLAMER Scientific Expert Panel Contributors: Carlo Heip, Manuel Barange, Roberto Danovaro, Marion Gehlen, Anthony Grehan, Filip Meysman, Temel Oguz, Vangelis Papathanassiou, Catharina Philippart, Jun She, Paul Treguer, Rachel Warren, Paul Wassmann, Phil Weaver, Rita Yu. Other Contributors: Justus van Beusekom, Philip Boyd, Andrew Cooper, Hein de Baar, Henk de Haas, Felix Janssen, Wolfgang Ludwig, Leif Toudal Pedersen, Michael Tsimplis, Hans Von Storch.

FORUM PROCEEDINGS:

- McDonough N., Vrench F., Chu N-N., Larkin, K.E., Eparkhina, D. (Eds) (2014). **4th EMB Forum Arctic 2050: Towards ecosystem-based management in a changing Arctic Ocean** (12 March 2014, Brussels). **Forum Proceedings**. European Marine Board, Ostend, Belgium
Forum rapporteurs: Veronica French, Dina Eparkhina, Kate Larkin, Nan-Chin Chu, Noémie Wouters
- McDonough N., Vrench F., Chu N-N., Larkin, K.E., Eparkhina, D. (Eds) (2014) **3rd EMB Forum, New Technologies for a Blue Future** (18 April 2012, Brussels). **Forum Proceedings**. European Marine Board, Ostend, Belgium.
Forum rapporteurs: Dina Eparkhina, Jan-Bart Calewaert, Nan-Chin Chu, Kate Larkin
- McDonough N., Larkin, K.E., Evrard, M., Calewaert, J-B, Eparkhina, D., Carbonnière, A. (Eds) (2012). **2nd Marine Board Forum Towards a European Network of Marine Observatories for Monitoring and Research** (16 September 2010, Brussels). **Forum Proceedings**. Marine Board-ESF, Ostend, Belgium.
Forum rapporteurs: Dina Eparkhina, Jan-Bart Calewaert, Maud Evrard, Kate Larkin
- Connolly N., Evrard M. (Eds). (2009) **1st Marine Board Forum Marine Data Challenges: from Observation to Information (15 May 2008, Ostend)**. **Forum Proceedings**. Marine Board-ESF, Ostend, Belgium. ISBN 2-912049-97-0, 36pp.
Forum rapporteurs: Erlend Moksness, Jacky Wood

ANNUAL REPORTS:

- McDonough, N., Donaldson, K., Kellett, P., Coopman, J., Muñoz Piniella, A., Larkin, K. **European Marine Board Annual Report 2016**. European Marine Board, Ostend, Belgium. 2017. ISBN: 978-94-920434-7-4, 54pp. ISSN: 2565-7402
- McDonough, N., Donaldson, K., Chu, N.C., French, V. & Larkin, K. **European Marine Board Annual Report 2015**. European Marine Board, Ostend, Belgium. 2016. ISBN: 978-94-920432-5-2, 58pp
- McDonough, N., Eparkhina, D. **European Marine Board Annual Report 2014**. European Marine Board, Ostend, Belgium. 2014. ISBN: 9789079528288, 52pp
- McDonough, N., Eparkhina, D. **European Marine Board Annual Report 2013**. European Marine Board, Ostend, Belgium. 2014. ISBN: 9789079528226, 64pp.
- McDonough, N., Eparkhina, D. **Marine Board Annual Report 2012**. Marine Board, Ostend, Belgium. 2013. ISBN: 9789079528196, 64pp.
- McDonough, N., Eparkhina, D. **Marine Board Annual Activity Report 2011**. Marine Board, Ostend, Belgium. 2012. ISBN: 9789079528141, 64pp.
- McDonough N., Eparkhina D. **Marine Board Annual Activity Report 2010**. Marine Board-ESF, Ostend, Belgium. 2011. ISBN: 9789079528141 72pp.
- McDonough N., Eparkhina D., Calewaert J-B. **Marine Board Annual Activity Report 2009**. Marine Board-ESF, Ostend, Belgium. 2010. 50pp.
- Connolly N., Eparkhina D., Calewaert J-B. **Marine Board Annual Activity Report 2008**. Marine Board-ESF, Ostend, Belgium. 2009. 44pp.
- Connolly N. **Marine Board Annual Report 2007**. Eparkhina D., Evrard M., Calewaert J-B., Carbonnière A. (Eds). Marine Board-ESF, Ostend, Belgium. 2009. 28pp.

EMAPS REPORTS:

- Heip C., Warwick R., d'Ozouville L. (Eds) (1998). **A European Science Plan on Marine Biodiversity. EMaPS Position Paper 2.** European Marine and Polar Science Secretariat, European Science Foundation, Strasbourg, France. ISBN 2-903148-97-X, 22pp.
- **EMaPS Annual Report 1997.** European Marine and Polar Science Secretariat, European Science Foundation, Strasbourg, France. 1998. 20pp.
- **European Initiatives in Science and Technology for Deep-sea Coring and Drilling. An EMaPS Position Paper.** European Marine and Polar Science Secretariat, European Science Foundation, Strasbourg, France. 1997. 34pp.

EUROCEAN CONFERENCE REPORTS:

- Larkin, K.E., Wouters, N., Caetano, A.T., McDonough, N. (Eds). 2014. **EurOCEAN 2014 Conference Report and Rome Declaration. EurOCEAN 2014 – Connecting Science, Policy and People.** CNR, Rome, Italy, 7-9 October 2014.
- McDonough, Niall and Jan-Bart Calewaert (Eds). 2010. **EurOcean 2010 Conference Report and Ostend Declaration. EurOCEAN 2010 – Grand challenges for marine research in the next decade.** Thermae Palace, Oostende, Belgium, 12-13 October 2010. Belgian Science Policy Office (BELSPO), Brussels. VLIZ Special Publication 49 – Flanders Marine Institute (VLIZ). Oostende, Belgium. ISSN 1377-0950
- O'Sullivan G., Angell-Hansen K., Connolly N. (Eds). **EurOCEAN 2007 (22 June 2007, Aberdeen, Scotland). Conference Report and Aberdeen Declaration.** Marine Institute, Ireland. 2007. 18pp.
Conference rapporteurs: Charlotte Jagot, Jacky Wood, Niall McDonough, Stephan Hall.
- Cieslikiewicz, W., Connolly, N., Ollier G., O'Sullivan G. (Eds). **Proceedings of the EurOCEAN 2004 European Conference on Marine Science and Ocean Technology (10-13 May 2004, Galway, Ireland).** Luxembourg: Office for Official Publications of the European Communities. 2007. ISBN 92-894-7727-X, 420pp.

Copies of Marine Board publications are available for download from: www.marineboard.eu/publications
For hard copies (subject to availability), please contact: info@marineboard.eu

Postal address:

European Marine Board IVZW
Wandelaarkaai 7,
8400 Oostende, Belgium

Telephone: +32 (0) 59 34 01 63

Email: info@marineboard.eu

Web: www.marineboard.eu

Series Editor:

Sheila JJ Heymans

Publication Coordinator:

Joke Coopman

Graphic Design:

Zoe@k – Marc Roets

Printing:

De Windroos

Photography:

All the images in this report are either property of the European Marine Board or have been specifically provided for use in EMB publications. They cannot be reproduced without the permission from the European Marine Board Secretariat. Contact info@marineboard.eu

Copyright:

Text of this report may not be reproduced without permission from the European Marine Board Secretariat. Contact info@marineboard.eu

Availability:

Hard copies are available free of charge at the European Marine Board Secretariat.

Contact info@marineboard.eu

Electronic version is available for download at the European Marine Board website:

www.marineboard.eu

To be cited as follows:

Heymans, J., Coopman, J., Kellett, P., Muñoz Piniella, A., Larkin, K. European Marine Board Annual Report 2017. European Marine Board, Ostend, Belgium. 2017. ISSN 2565-7402. 60pp

European Marine Board IVZW

Belgian Enterprise Number: 0650.608.890



