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EurOCEAN 2014

7-9 October,
Rome, Italy

*Conference Report and
Rome Declaration*

Research and
Innovation

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EurOCEAN²⁰¹⁴

Connecting Science, Policy and People

Conference report and Rome Declaration

7-9 October 2014, Rome, Italy

Edited by Kate Larkin, Noémie Wouters, Ana-Teresa Caetano and Niall McDonough

Organized by:



European
MARINE BOARD
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FOREWORD

I am delighted to introduce the EuroOCEAN 2014 Conference report. This publication documents the contributions and discussions that took place over three intensive days in Rome in October 2014. EuroOCEAN Conferences provide a unique window of opportunity for scientists, policy makers and stakeholders to come together to discuss the next challenges and opportunities in seas and ocean research. EuroOCEAN 2014 was an unqualified success, bringing together more than 340 participants and delivering the Rome Declaration, which sets out high-level priorities for seas and ocean science in a societal challenges context. The final Rome Declaration is reproduced in full at the start of this publication.

Marine science can address many of the major challenges that Europeans face today. We are only now emerging from the worst financial crisis in recent history. In 2012 the European Union adopted the Blue Growth strategy, which sets out an ambitious programme to deliver new jobs and economic growth through further development in key sectors of our maritime economy. It recognizes that marine science is an essential driver to deliver new innovations, knowledge and tools to underpin blue growth. During the course of the EuroOCEAN 2014 Conference we had the opportunity to hear from leading scientists on how marine science is essential for the sustainable development of sectors such as marine biotechnology, marine energy, aquaculture, fisheries and extraction of raw materials. Our community also recognizes that we need improved knowledge of the natural system upon which these economic sectors depend. Hence, many of the speakers at EuroOCEAN 2014 highlighted the need for basic science as an essential prerequisite for blue growth and achieving Good Environmental Status in European waters.

We hope that the EuroOCEAN Conference and the Rome Declaration, as a collaborative venture with the European Commission, has provided new insights to guide the next work programmes of Horizon 2020 and to emphasize the importance of research to support a sustainable interaction with our seas and global ocean. In fact, seas and ocean research is highly relevant across all of the societal challenges supported in Horizon 2020, from climate change to food, clean energy and human health.

I would like to pay tribute to the Italian Presidency of the European Union for recognizing the importance of marine science by including this event on the official Presidency calendar. I thank in particular the three European Marine Board Italian member organizations: the National Research Council of Italy (CNR), the National Institute of Oceanography and Experimental Geophysics (OGS) and the National Interuniversity Consortium for Marine Science (CoNISMa) for their work in the lead up to the Conference and for a warm welcome in Rome. I thank also our colleagues in the Marine Resources unit of the European Commission, Directorate-General for Research and Innovation. With the European Marine Board, these partners have worked together to make EuroOCEAN 2014 one of the most successful EuroOCEAN Conferences since the series began.

Jan Mees

Chair, European Marine Board

Rome Declaration

Setting a vision for seas and ocean science

Delivering impact, global leadership and sustainable blue growth for Europe

Europe is emerging from the worst financial crisis in recent history. Rebuilding our economies demands that we identify sustainable opportunities for jobs and economic growth. The ocean is a source of food, water, energy and raw materials; a medium for tourism, transport and commerce; and can provide solutions to many European and global policy challenges. But the ocean is neither inexhaustible nor immune to damage. In the context of rapid global change and human population growth, it is imperative to achieve human wellbeing by combining economic benefit with environmental protection. This presents a highly complex challenge. Collaborative and cross-disciplinary European research is the key to providing the knowledge and tools that we need to achieve ecosystem-based management and protection of valuable marine resources and services.



THE FOUR ROME DECLARATION GOALS

- 1. Valuing the ocean**
Promoting a wider awareness and understanding of the importance of the seas and ocean in the everyday lives of European citizens.
- 2. Capitalizing on European leadership**
Building on our strengths to reinforce Europe's position as a global leader in marine science and technology.
- 3. Advancing ocean knowledge**
Building a greater knowledge base through ocean observation and fundamental and applied research.
- 4. Breaking barriers**
Addressing the complex challenges of blue growth and ocean sustainability by combining expertise and drawing from a range of scientific disciplines and stakeholders.

EurOCEAN²⁰¹⁴



Connecting science, policy and people

Since the launch of the European Research Area in 2000, substantial progress has been made in integrating European marine science. This progress is based on a simple premise; that we can achieve greater impact if we work together, transcending national barriers to scientific cooperation. EU policy developments have significantly advanced an integrated approach to managing maritime space and resources. The EU Integrated Maritime Policy, its environmental pillar, the Marine Strategy Framework Directive, the Maritime Spatial Planning Directive, and reformed Common Fisheries Policy, have provided a powerful basis for Member State cooperation in addressing shared maritime challenges and responsibilities. Furthermore, the Blue Growth Strategy has set in context the contribution that science can make to develop a sustainable European maritime economy.



A recent policy statement by the European Commission President-elect¹, highlights the need to focus on the key challenges ahead for our economies and societies, *“be it with regard to the digital age, the race for innovation and skills, the scarcity of natural resources, the safety of our food, the cost of energy, the impact of climate change, the ageing of our population or the pain and poverty at Europe’s external borders.”*

This Declaration is a statement of intent by Europe’s marine scientific community for how we can work together in the next five years to undertake more integrated science that recognizes stakeholder needs, underpins policy needs, promotes environmental sustainability, achieves targeted societal impact and advances European leadership in a global context. We call on Member and Associated States, the European Commission and Parliament, the European Investment Bank, and the private sector to support us in promoting the following four high-level goals and associated actions.



¹ A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. Political Guidelines for the Next European Commission, Jean-Claude Juncker, Strasbourg, 15 July 2014 (http://ec.europa.eu/about/juncker-commission/docs/pg_en.pdf)

1. VALUING THE OCEAN

Goal: Promoting a wider awareness and understanding of the importance of the seas and ocean in the everyday lives of European citizens.

With the global population set to reach 9 billion people by 2050, we need new ways to provide food and energy and to ensure a safe and sustainable use of marine space. But many people have little awareness of the importance of the seas and ocean in their daily lives; the impact these have on human wellbeing; their role in global change; their rich natural and cultural heritage; the importance of the maritime economy; and the need to protect vital ocean resources. By achieving a transformation in appreciation and understanding of the ocean's role across society as a whole, we can create better conditions for investment and sustainable blue growth.



We call for:

- Sustained support for ocean literacy, best practice in science communication, citizen science initiatives and knowledge transfer to be embedded in marine research projects and programmes;
- A coordinated, cross-disciplinary and integrated programme on Oceans and Human Health, targeted at understanding and managing the risks and benefits to human physical and mental wellbeing from interactions with the seas;
- Further initiatives towards advanced and agreed methodologies for the evaluation and use of monetary and non-monetary (e.g. cultural, recreational, health promotion, etc.) value systems and indicators for marine ecosystem services and benefits;
- Recognition that regional seas diversity from the Atlantic Ocean and its links with the Arctic, to the Baltic Sea, North Sea, Black Sea, and outermost areas, is a European asset to be valued to promote Blue Growth. The specificity and sensitivity of the Mediterranean Sea calls for particular attention which is acknowledged by the proposed Blue Growth Research and Innovation Initiative for the Mediterranean.

2. CAPITALIZING ON EUROPEAN LEADERSHIP

Goal: Building on our strengths to reinforce Europe's position as a global leader in marine science and technology.

Europe is a truly maritime continent with an ocean jurisdiction that includes the largest part of the world's exclusive economic zone (EEZ). We are world leaders in shipping and ship-building, dredging, subsea drilling and mining technologies, ocean energy technologies, coastal tourism, seafood production systems, and have significant potential in blue biotechnology and ocean renewables. We are also developing and implementing advanced policies and practices for responsible management of our seas.

In the research domain, we are leaders in key fields in marine and maritime science and engineering. European nations own and operate the most advanced research fleet in the world and we are continually expanding our ocean observation capacities, a key goal of the EU Marine Knowledge 2020 initiative. Added to this, through EU Framework Programmes and coordinated national investments, Europe has built an unparalleled know-how in organizing research at international scale. With European leadership and expertise comes an opportunity and responsibility to foster a global perspective, engage in international dialogue, and exercise influence for the sustainable management of global ocean resources and services. To maintain our leadership and competitive advantage will require advanced knowledge and innovation.



We call for:

- A detailed assessment of whether the current level of European investment in marine and maritime research is sufficient, given the high value and importance of the European maritime economy²;
- Support for the development of public-private partnerships in research and innovation, focusing on strategic technologies, including data sharing, to underpin growth and jobs in crucial sectors for a resilient knowledge-based European blue economy and society;
- Increased support for collaborative research with partner countries, overcoming barriers to joint funding and capacity building, taking account of the progress already made by the Transatlantic Ocean Research Alliance³;
- Further development of transparent mechanisms for the use of science in supporting evidence-based policy making.

² The combined annual EU research investment in marine and maritime research is currently estimated at €2 billion. The EU Blue Growth Strategy estimates the gross value added (GVA) of the European maritime economy at €500 billion per year. The Barcelona target commits the EU to increasing its research investment to 3% of GDP, one third of which (i.e. 1%) should come from the public sector. In terms of the maritime economy, 1% would equate to a €5 billion annual investment, more than double the current level of investment.

³ Galway Statement on Atlantic Ocean Cooperation. Launching a European Union – Canada – United States of America Research Alliance. (<http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=transatlantic-alliance>)

3. ADVANCING OCEAN KNOWLEDGE

Goal: Building a greater knowledge base through ocean observation and fundamental and applied research.

Recent advances in our knowledge of the marine environment have served to illustrate the sheer complexity of the ocean, the enormous and changing diversity of marine life, and the interplay between ecological, biogeochemical, physical and social processes which regulate the ocean ecosystem. There remains a significant challenge to understand and quantify the role of the ocean in the Earth system and its influence on human populations in timescales from days to centuries, and on spatial scales from local to global. We urgently need to further map marine environments, to understand complex marine processes, to study the complex interactions between the ocean, seafloor and sub-seafloor, land, ice, and atmosphere, so that we can predict and prepare for future changes and cumulative impacts resulting from human and natural pressures. Moreover, actions are needed to address the rapidly-growing opportunities and challenges in advanced ocean measurement technology and effective management of increasing volumes and diversity of information, including physical, chemical and biological data from marine observing systems that are fit for purpose and capable of informing assessments of Good Environmental Status.



We call for:

- The inclusion of marine and maritime research topics across the full range of societal challenges in Horizon 2020 and across multiple thematic levels in national and regional research programmes;
- A significant further investment in collaborative cross-disciplinary research and technology development, designed to address complex challenges towards sustainably managing our ocean resources, identifying scenarios of change and associated adaptive strategies, and achieving Good Environmental Status in European regional seas;
- Better alignment and more effective use of a diverse range of funding and coordination mechanisms (including ESFRI, EU investment and Structural Funds), for the construction and long-term operation of key marine research infrastructures and facilities, addressing identified gaps;
- A fully operational European Marine Observation and Data Network (EMODnet), ensuring collected data are well managed and freely available, to support science, industry and policy, aligned with further development of the European Ocean Observing System (EOOS), integrated at the global level (including GOOS⁴, GEO⁵ and Copernicus).

⁴ Global Ocean Observing System (www.ioc-goos.org)

⁵ Group on Earth Observations (www.earthobservations.org)

4. BREAKING BARRIERS

Goal: Addressing the complex challenges of blue growth and ocean sustainability by combining expertise and drawing from a range of scientific disciplines and stakeholders.

By charting an ambitious course and continuing to break down barriers (disciplinary, practical, cultural, financial, legal and political), the European seas and ocean research community can set a standard for the broader European research community. We already have a strong track record in working together, but we aim to go further by transforming the way we do training and research; focusing on impact, engaging with stakeholders, creating a platform for sustainability, and boosting jobs. Innovation in the provision of undergraduate and postgraduate training and enhancing skill sets and career pathways for marine professionals will be essential, in line with the EC Communication on Innovation in the Blue Economy.



We call for:

- Education and training to encompass and foster cross-disciplinarity, the ability to work across science-policy interfaces, team-based approaches, entrepreneurship, and the broad range of specialist technical and ICT skills needed to underpin modern marine science;
- Improved support, incentives and recognition from higher education and research institutions, funding agencies, and professional bodies, for established researchers to undertake cross-disciplinary research and to engage with stakeholders and society;
- Europe to be the most attractive place for top talent by offering an internationally competitive environment, innovative career pathways across sectors, mobility, and blue jobs.

The EurOCEAN 2014 legacy: A vision for seas and ocean science in Europe

The European marine science and technology community can provide a crucial service to wider society, directly addressing the most pressing questions including food, water and energy security, climate change, and human wellbeing. Marine and maritime science can contribute towards advancing international sustainable development goals, supporting new jobs and growth, promoting resource efficiency including the circular economy, and achieving Good Environmental Status in European waters. A more detailed analysis of strategic research priorities in seas and oceans science is set out in the Navigating the Future IV⁶ paper, a key reference for the next research programmes at EU, macro-regional and Member State level.

With this vision, the European marine science community calls for the augmented, coherent and targeted support of Member and Associated States, the European Commission and Parliament, the European Investment Bank and the private sector, to shape together the future agenda for seas and ocean research.

⁶ European Marine Board (2013). Navigating the Future IV. Position Paper 20 of the European Marine Board, Ostend, Belgium.
ISBN: 9789082093100 (<http://www.marineboard.eu/publications-full-list>).

EurOCEAN²⁰¹⁴

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Pages 2-3: Pictures from the EurOCEAN 2014 Conference, 7-9 October 2014, Rome (CNR and European Marine Board)
Pages 4-7: Page 4, Man on beach: Josef Steufer; Page 5, Offshore wind turbine construction: Errichtung RePower; Page 6, Deep sea ROV arm: DOP-University of the Azores/EMEPC;
Page 7, Research vessel control room: CNR

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OPENING

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EuroOCEAN 2014 – Setting an Agenda for Seas and Oceans Science

Opening remarks from

Luigi Nicolais, President of the National Research Council of Italy (CNR), Italy

Maria Cristina Pedicchio, President of the National Institute of Oceanography and Experimental Geophysics (OGS), Italy

Angelo Tursi, President of the National Interuniversity Consortium for Marine Science (CoNISMa), Italy

Stefania Giannini, Italian Minister for Education, Universities and Research, Italy

Silvia Velo, Italian Deputy Minister for the Environment, Italy

Lowri Evans, Director-General, Directorate-General for Maritime Affairs and Fisheries (DG MARE), European Commission

Jan Mees, Chair, European Marine Board (EMB); Director, Flanders Marine Institute (VLIZ)

Tribute to Kostas Nittis by **Vangelis Papathanassiou**, Hellenic Centre for Marine Research (HCMR), Greece

EuroOCEAN 2014 film: Our marine environment...striving for the right balance

Introducing the Rome Declaration, **Edward Hill**, Chair of the Rome Declaration Drafting Group ; Director, National Oceanography Centre (NOC), UK

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European and global marine ecosystems in transition

Chair: **Peter Heffernan**, Marine Institute, Ireland

Panel: **Frederic Briand**, The Mediterranean Science Commission (CIESM), France

Roberto Danovaro, Stazione Zoologica Anton Dohrn of Naples, Italy

Ricardo Santos, Member of the European Parliament, University of the Azores, Portugal

Luis Valdes, Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO)

Karen Helen Wiltshire, The Alfred Wegener Institute (AWI), Germany

Followed by presentations

Marine ecosystems in Europe - policy objectives for healthy oceans.

Marianne Wenning, Director, Directorate C: Quality of Life, Water and Air, Directorate-General for the Environment (DG Environment), European Commission

The MSFD Competence Centre: supporting implementation of the EU Marine Strategy Framework Directive.

Maria Betti, Director, Institute for Environment and Sustainability, Joint Research Centre (JRC), European Commission.

One Planet, One Ocean: looking ahead to the IOC Barcelona Conference.

Luis Valdes, Intergovernmental Oceanographic Commission (IOC) of United Nations Educational, Scientific and Cultural Organization (UNESCO)

PARALLEL SESSION 1 ture

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Blue Growth 1: Creating a marine innovation cul-

Chair: **Gilles Lericolais**, French Research Institute for Exploitation of the Sea (Ifremer), France

Speakers: Research as a driver of blue growth in Europe
Edward Hill, National Oceanography Centre (NOC), UK

Promoting entrepreneurship in marine science
Helena Vieira, University of Lisbon, Portugal

Maritime geostrategic thinking

Valerie Cummins, Irish Maritime and Energy Cluster (iMERC), Ireland

Supporting maritime employment through ESI funds

Damien Périssé, Conference of Peripheral Maritime Regions (CPMR), France

36 **Towards Good Environmental Status in European Seas**

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Ana-Teresa Caetano, Directorate-General for Research and Innovation (DG RTD), European Commission

MSFD Progress Report

Anna Cheilari, Directorate-General for the Environment (DG Environment), European Commission

STAGES: Science in support of MSFD

Marisa Fernandez, Centre for Marine Technology (CETMAR), Spain

Regional Seas: implementing the MSFD

Darius Campbell, Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)

Establishing a European marine knowledge base for Good Environmental Status

Mark Dowell, Joint Research Centre (JRC), European Commission

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Chair: **Joachim Harms**, Forschungszentrum Jülich, Germany

Speakers: Marine biodiscovery: overview, hurdles and bottlenecks
Marcel Jaspars, University of Aberdeen, UK

Feeding the world: the role of the oceans
Alessandro Lovatelli, Fisheries and Aquaculture Department (FAO), Italy

The deep seafloor: large, rich and unexplored or a mirage
Fernando Barriga, Centre for Mineral Resources, Mineralogy and Crystallography, University of Lisbon, Portugal

Creating more favourable conditions for ship-based research in the EU: Time to tango with EU regulatory measures.
Ronán Long, National University of Ireland (NUI), Galway, Ireland

42 Unravelling the links between the oceans and human health

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Speakers: Submarine geohazards
Angelo Camerlenghi, National Institute of Oceanography and Experimental Geophysics (OGS), Italy

Harmful Algal Blooms
Philipp Hess, French Research Institute for Exploitation of the Sea (Ifremer), France

Get ready for ocean acidification
Sam Dupont, University of Gothenburg, Sweden

Health and wellbeing from the coast
Mathew White, University of Exeter, UK

Building an Oceans and Human Health research capacity in Europe
Niall McDonough, European Marine Board (EMB)

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Chair: **Tatjana Hema**, Mediterranean Pollution Assessment and Control Programme (MED POL), United Nations Environment Programme (UNEP)

Speakers: Snapshots of Mediterranean marine research and its cross-sector potential

Laura Giuliano, Mediterranean Science Commission (CIESM)

Synergistic impacts of multiple stressors on the Black Sea ecosystem from past to present

Temel Oguz, Institute of Marine Science, Turkey

Common challenges and strategic solutions for the Southern European Seas

Vangelis Papathanassiou, Hellenic Centre for Marine Research (HCMR), Greece

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Chair: **Kaisa Kononen**, Baltic Organisations' Network for Funding Science (BONUS EEIG), Finland

Speakers: The Baltic Sea Action Plan: Scientific support for policies
Jacob Carstensen, Aarhus University, Denmark

North Atlantic and North Sea ecosystems: research gaps, stressors and services

Mike St. John, National Institute of Aquatic Resources (DTU Aqua), Denmark

Climate change and marine ecosystems in the European Corridor to the Arctic Ocean: challenges for fisheries and ecosystem-based management

Paul Wassmann, University of Tromsø, Norway

PARALLEL SESSION 4

49 **Building a European Ocean Observing System (EOOS)**

Chair: **Alessandro Crise**, National Institute of Oceanography and Experimental Geophysics (OGS), Italy

A tribute to Kostas Nittis: a scientist, a diplomat, an initiator and a friend

Speakers: Making the EOOS vision a reality

Erik Buch, Chair, European Global Ocean Observing System (EuroGOOS)

and

Jan Mees, Chair, European Marine Board (EMB)

A strategy for making the best technology available for the European ocean observing system

Christoph Waldmann, Centre for Marine Environmental Sciences (MARUM), Germany

The science of ocean predictions: uncertainty estimates from operational forecasting systems

Nadia Pinardi, University of Bologna/National Institute of Geophysics and Volcanology (INGV), Italy

Biological observations: all things bright and beautiful

Michael Thorndyke, University of Gothenburg, Sweden

52 **Bridging the Gap – Linking marine science and society**

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Speakers: Training the next generation of marine experts
Tim Deprez, University of Ghent (UGent), Belgium

Monitoring, managing and transferring marine knowledge for sustainable blue growth

David Murphy, AquaTT, Ireland

Upgrading Ocean Literacy in Europe: what, why and how to do it

Jan Seys, Chair, European Marine Board Communications Panel (EMBCP)

Jelly-Watch: citizen science in action

Stefano Piraino, University of Salento/National Interuniversity Consortium for Marine Science (CoNISMa), Italy

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- Moderator: **Quentin Cooper**, BBC
Key messages from the parallel sessions
- Speakers: Innovation in the blue economy
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- What the blue growth agenda means for the deep-sea research
Alex Rogers, University of Oxford, UK
- Reinforcing the ocean's resilience to climate change
Katja Philippart, Royal Netherlands Institute for Sea Research (NIOZ), the Netherlands
- Capturing oceanographic events that impact the deep seafloor
Fabio Trincardi, Institute of Marine Science, National Research Council of Italy (CNR), Italy
- Valuing marine ecosystem services and benefits
Melanie Austen, Plymouth Marine Laboratory (PML), UK
- Transparency in ocean governance: avoiding the resource curse
Jeff Ardron, Institute for Advanced Sustainability Studies (IASS), Germany

PANEL DISCUSSION 59 **Addressing complex seas and oceans challenges: How can we cross the disciplines more effectively?**

- Moderator: **Quentin Cooper**, BBC
- Panel: **Ferdinando Boero**, University of Salento/National Interuniversity Consortium for Marine Science (CoNISMa)/ National Research Council (CNR), Italy
Melanie Austen, Plymouth Marine Laboratory (PML), UK
Kathrine Angell-Hansen, Joint Programming Initiatives for Healthy and Productive Seas and Oceans (JPI Oceans)

Michael Depledge, University of Exeter, UK

Tarmo Soomere, Estonian Academy of Sciences,
Estonia

Paulo A.L.D. Nunes, Wealth Accounting and the
Valuation of Ecosystem Services (WAVES),
The World Bank

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PANEL DISCUSSION 62 A Blue Growth Research and Innovation Initiative for the Mediterranean

Moderator: **Quentin Cooper**, BBC

Panel: **Vangelis Papathanassiou**, Hellenic Centre for Marine
Research (HCMR), Greece

Fabio Trincardi, The National Research Council (CNR),
Italy

Tatjana Hema, Mediterranean Pollution Assessment
and Control Programme (MED POL), United Nations
Environment Programme (UNEP)

Joaquin Tintoré, Balearic Islands Coastal Observing
and Forecasting System (SOCIB), Spain

Sigi Gruber, Directorate-General for Research and
Innovation (DG RTD), European Commission

François-Régis Martin-Lauzer, Pôle Mer
Méditerranée, France

Paolo Lotti, National Association of Italian Shipbuilders
and Ship repairers (ASSONAVE), Italy

PLENARY SESSION	65	Finalization and approval of the Rome Declaration Edward Hill , Chair of the Rome Declaration Drafting Group
CLOSING PLENARY SESSION	66	Presentation of the Rome Declaration Edward Hill , Chair of the Rome Declaration Drafting Group Closing statements from Mauro Bertelletti , Italian Ministry of Agriculture, Food and Forestry Policy Rudolf Strohmeier , Deputy Director-General, Directorate-General for Research and Innovation (DG RTD), European Commission Ricardo Santos , Member of the European Parliament (MEP), Portugal Fabio Trincardi , National Research Council of Italy (CNR) Jan Mees , Chair, European Marine Board (EMB)

INTRODUCTION

EuroOCEAN Conferences are major European marine science policy events. They provide a forum for the marine and maritime research community and wider stakeholders to interact with European and Member State policymakers and strategic planners to consider, discuss and respond to new marine science and technology developments, challenges and opportunities. The EuroOCEAN Conference series started in the 1990's with previous Conferences being held in Brussels (1993), Sorrento (1995), Lisbon (1998), Hamburg (2000), Galway (2004), Aberdeen (2007) and Ostend (2010). Since 2000, EuroOCEAN

Conferences are organized by the European Marine Board and the European Commission in partnership with a local host.

From Galway to Rome: Since EuroOCEAN 2004 in Galway, EuroOCEAN Conferences have delivered a Declaration, an agreed position representing the combined voice of the marine science and technology community which plays a central role in advancing marine science and science policy agendas in Europe. This tradition was continued at EuroOCEAN 2007 (22 June 2007, Aberdeen, UK) through the Aberdeen Declaration. EuroOCEAN 2010 (12-13 October 2010, Ostend, Belgium) delivered the Ostend Declaration which highlighted the crucial role that marine and maritime science and technology can play in meeting societal and economic needs and identified the research infrastructures, support mechanisms and governance structures necessary to ensure that critical research challenges in the next decade are properly addressed at national and European level.



The presentations, Declarations and reports of all EuroOCEAN Conferences are available on the website: <http://www.eurooceanconferences.eu>.

EurOCEAN 2014: Setting a vision for seas and oceans science

EurOCEAN 2014 took place on 7-9 October 2014 in Rome, Italy. It was co-organized by the European Marine Board (EMB), the European Commission (EC), the Italian National Research Council (CNR), National Inter-university Consortium for Ocean Science (CoNISMa) and the National Institute of Oceanography and Experimental Geophysics (OGS) as an official event of the Italian Presidency of the Council of the European Union. The Conference was hosted at the headquarters of the National Research Council (CNR) and brought together over 340 European scientists, policy-makers and other experts representing 143 organizations from 31 countries. EurOCEAN 2014 ran over 2.5 days with a combination of plenary sessions and parallel workshops, organized around societal, policy and regional challenges. This Conference report presents the main



highlights and key messages delivered by the speakers and chairs at the EurOCEAN 2014 Conference. EurOCEAN 2014 delivered the Rome Declaration⁷ which presents a vision for seas and ocean science that will deliver impact, global leadership and sustainable blue growth for Europe. The section below describes how the Declaration was developed (the Declaration is reproduced in full at the start of this report.

The Rome Declaration

EurOCEAN 2014 delivered the Rome Declaration - a consensus view of the European marine science and technology community. This called for the augmented, coherent and targeted support of Member States and Associated Countries, the European Commission and European Parliament, the European Investment Bank and the private sector, to shape together the future agenda for seas

and oceans research. The Rome Declaration was developed over a number of months through extensive stakeholder consultation before the Conference and through interactive feedback sessions with participants during the EurOCEAN 2014 Conference. To oversee this process, a Rome Declaration Drafting Group was convened in February 2014, chaired by Edward Hill (National

⁷ <http://www.marineboard.eu/images/publications/Rome%20Declaration-249.pdf>

Oceanography Centre, NOC, UK) and consisting of 12 representatives drawn from the main EurOCEAN 2014 organizers: the European Commission, the European Marine Board and three Italian institutions: the Italian National Research Council (CNR), National Inter-university Consortium for Ocean Science (CoNISMa) and the National Institute of Oceanography and Experimental Geophysics (OGS). The Rome Declaration Drafting Group met in May and September 2014 and throughout the Conference

week to ensure an iterative drafting process, taking into account the latest stakeholder feedback. A consultation group of 50 key stakeholder organizations spanning science, policy, industry from national, regional and European levels was also consulted in addition to a fully open public consultation preceding the Conference and interactive feedback from the EurOCEAN 2014 participants in Rome. The process is summarized below.

The Road to Rome: The Rome Declaration drafting and stakeholder consultation process

Drafting Group

Rome Declaration Drafting Group is convened, chaired by Edward Hill, NOC (February 2014)

Drafting Group meets in May 2014 and produces EurOCEAN 2014 Issues Paper outlining high level ideas and priorities (July 2014)

Drafting Group takes on board first stakeholder consultation and produces first draft Rome Declaration (August 2014)

Drafting Group takes onboard public consultation feedback and prepares an advanced draft Rome Declaration for EurOCEAN 2014 participants (September 2014)

The draft Rome Declaration was presented in two plenary sessions to EurOCEAN 2014 Conference participants and updated by the Drafting Group based on stakeholder feedback. The final Rome Declaration was adopted by Conference participants on 8 October 2014.

Stakeholder Consultation

Stakeholder identification: 2050 stakeholders were identified to receive targeted information on EurOCEAN 2014. In addition, a stakeholder consultation group of 50 key organizations and networks spanning science, policy, industry (National, Regional, European, international levels) was set up for feedback throughout the process.

First Stakeholder Consultation: July-August 2014

Targeted Consultation on Issues Paper of:

- EMB network (35 Member Organizations)
- Stakeholder Consultation group (50 wider stakeholders)

Online public Stakeholder Consultation: 19-29 September 2014

- Open consultation for marine stakeholders and wider society
- Targeted invitations sent to over 2050 stakeholders (including the EurOCEAN 2014 stakeholder consultation Group, 35 EMB Member Organizations, EurOCEAN 2014 registered participants and wider marine stakeholders identified for their role in marine science and policy).

Dissemination of draft Rome Declaration ready for EurOCEAN 2014

Electronic and hard copies of the latest draft Rome Declaration were disseminated on the first day of EurOCEAN 2014 to Conference participants.

Interactive stakeholder input at EurOCEAN 2014: 7-9 October 2014

340 Conference participants spanning 143 organizations from 31 countries participated in interactive discussions on the Rome Declaration through dedicated plenary discussions and parallel sessions.



Presentation of the Rome Declaration at EurOCEAN 2014

The Rome Declaration was presented on 9 October 2014 in the closing plenary session by EMB Chair, Jan Mees, to representatives of the Italian government and marine research community, European Commission and European Parliament.

From Left to Right: Edward Hill, Chair of Drafting Group, Rudolf Strohmeier, Deputy Director General of DG Research and Innovation, European Commission, Mauro Bertelletti, Italian Ministry of Agriculture, Food and Forestry Policy, Ricardo Santos, Member of the European Parliament, and Jan Mees, Chair of the European Marine Board.

The Declaration was translated into 22 official EU languages and is available to download at <http://eurocean2014.eu>. Immediately following the EurOCEAN 2014 Conference, the event co-organizers actively communicated the Rome Declaration including electronic dissemination to over 2000 stakeholders together with a targeted hard copy dissemination to stakeholders and key Conferences.

OPENING SESSION

EuroOCEAN 2014 –

Setting an Agenda for Seas and Oceans Science

On behalf of the Italian Presidency and the EuroOCEAN 2014 organizing institutions, **Luigi Nicolais** (President of

the National Research Council of Italy) formally opened the EuroOCEAN 2014 Conference welcoming all participants. In his opening speech he stressed the importance of research as a basis for growth and employment, two key policy priorities for Europe. He then invited opening remarks from a delegation of the Italian Presidency of the European Union and EuroOCEAN 2014 co-organizers.



Maria Cristina Pedicchio (President of National Institute of Oceanography and Experimental Geophysics, OGS, Italy) emphasized the importance of blue growth and stressed that, to deliver on blue growth, transparency and integration across science, policy-making and society are essential. She concluded that OGS is fully committed to these values.



"Transparency and integration across science, policy making and society, are essential to deliver on blue growth." Maria Cristina Pedicchio



Opening remarks from

Luigi Nicolais,
President of the National Research Council of Italy (CNR), Italy

Maria-Cristina Pedicchio,
President of the National Institute of Oceanography and Experimental Geophysics (OGS), Italy

Angelo Tursi,
President of the National Interuniversity Consortium for Marine Science (CoNISMa), Italy

Stefania Giannini,
Italian Minister for Education, Universities and Research, Italy

Silvia Velo,
Italian Deputy Minister for the Environment, Italy

Lowri Evans,
Director-General for Maritime Affairs and Fisheries (DG MARE), European Commission

Jan Mees,
Chair, European Marine Board (EMB); Director, Flanders Marine Institute (VLIZ), Belgium

Edward Hill,
Chair, Rome Declaration Drafting Group; Director, National Oceanography Centre (NOC), UK

Angelo Tursi (President of the National Interuniversity Consortium for Marine Science, CoNISMa, Italy) explained that CoNISMa's main focus is on fundamental research in marine science. He also noted the importance of the interdisciplinary approach in marine science, as fostered by the vision and mission of the CoNISMa, a consortium of 33 universities that represent the core of the capacity building system in marine sciences in Italy.

"Fundamental research in marine science remains crucial - an interdisciplinary approach is key." Angelo Tursi



"The younger generation should remain at the core of our engagement - a key priority is training." Stefania Giannini

Stefania Giannini (Italian Minister for Education, Universities and Research) noted the strong support by the Italian Presidency for the objectives and themes of the EurOCEAN 2014 Conference and the relevance of hosting the event in Italy which has 8,000km of coastline and is particularly concerned with sustainable exploitation and preservation of marine resources. For Italy, the Mediterranean sea is not only a unique hot-spot for biodiversity, but a means of economic growth and well-being. Therefore, in a global perspective, the Italian Government is working to develop a European policy for Mediterranean blue growth. Minister Giannini also stressed the continuing need for marine scientific training, noting that training must should be a key priority to foster a skilled and mobile young generation of researchers that will be crucial to supporting blue growth and maritime development agendas.

Silvia Velo (Italian Deputy Minister for the Environment) stated that Mediterranean countries face similar challenges and recognized the overall importance of the Marine Strategy Framework Directive (MSFD) for assessing the health of marine ecosystems. She stressed the importance of supporting scientific research in the Mediterranean to protect the biodiversity of marine habitats and to ensure that resources originating from the sea are used appropriately.



"Supporting scientific research is essential to preserve the biodiversity of marine habitats in the Mediterranean." Silvia Velo



Speakers at the opening session (from left to right): Stefania Giannini, Luigi Nicolais and Lowri Evans.



"The EU has been spending about €350 million a year on marine research, around 17% of the total EU and Member States' spend. But we can leverage more from this by making results more transparent and publicly accessible." Lowri Evans

Lowri Evans (Director-General for Maritime Affairs and Fisheries, DG MARE, European Commission) recognized that long-term investment in research was required to incentivize innovation and to create growth and sustainable jobs for Europe's young people into the future. She also noted that *"sound growth is impossible without integrating sustainability,"* highlighting that the European Commission President-elect, Jean-Claude Juncker, had made sustainable growth a number one priority for the European Commission. She further added, *"Our blue and green growth agendas will make environment and maritime conservation key drivers for economic recovery. Protecting the environment and maintaining our competitiveness are complementary - both are about a sustainable future."*

Lowri Evans referred to ocean energy and aquaculture as key emerging blue sectors with huge growth potential in Europe and noted that the European Commission's Maritime Spatial Planning Directive, launched in September 2014, offered a legal framework to organize the growing competition for marine space. She noted the key role of marine science in making blue growth a reality *"... by taking the best ideas from marine research and applying them in practice."*

She stated that the European Union has been spending approximately €350 million a year on marine research but noted that more could be done to make results more transparent and publicly accessible. To help make this happen the European Commission would create an online information platform by the end of 2015 to share results from completed Horizon 2020 projects as well as nationally funded marine research.

Lowri Evans also noted the continuing need to invest in innovation and research through Horizon 2020 and invited the marine scientific community to help determine priorities for future investment. To stimulate innovation, the European Commission would also launch in 2015 a Blue Economy Business and Science Forum to further involve the private sector and to encourage research, business and education actors to come together to turn ideas into reality.

Referring to the European Commission's flagship project to produce a multi-resolution map of all European seas by 2020, Lowri Evans stated *"the European Maritime and Fisheries Fund (EMFF) will help finance over a hundred scientific institutes, hydrographical agencies and geological surveys."*

Jan Mees (Director of the Flanders Marine Institute, VLIZ, and Chair of the European Marine Board, EMB) acknowledged the long and prestigious history of EuroOCEAN Conferences. He noted the importance of strategic declarations representing the voice of the whole community in setting ocean research priorities. He highlighted that the European Marine Board Position Paper, Navigating the Future IV (NFIV), published in 2013, provided a blueprint for seas and oceans research which had informed the Rome Declaration. Jan Mees expressed conviction that the Rome Declaration would provide additional insights to inform European Horizon 2020 funding and strongly encouraged national funding agencies and bodies to consider its key messages.



"EuroOCEAN 2014 represents an opportunity for the research community and broader stakeholders to reassess and reinvigorate their efforts to support marine science policy at both European and national levels."
Jan Mees



"It is clear the pressing agenda is blue growth and jobs. The science community needs to demonstrate that it understands the issues and can do its part to move forward with this agenda."

Edward Hill

Closing the session, **Edward Hill** (Director of the National Oceanography Centre, NOC, and Chair of the Rome Declaration Drafting Group), presented the draft Rome Declaration explaining how it had been developed over a period of months by a Drafting Group in consultation with the marine and maritime research community. He highlighted the opportunity for EuroOCEAN 2014 participants to further discuss and improve the Rome Declaration during the Conference, noting that the Declaration would be finalized and adopted on 8 October and officially presented during the Closing session of the Conference on 9 October. Edward Hill outlined the content of the Rome Declaration, describing the key focus in setting a vision for seas and ocean science that would deliver impact, global leadership and sustainable blue growth for Europe. He introduced the four high-level goals of the Declaration as: Valuing the ocean; Capitalizing on European Leadership; Advancing ocean knowledge and Breaking barriers. He concluded with a call for augmented and targeted support to shape the future agenda for seas and ocean research and opened the floor for comments. A discussion followed on the Rome Declaration with comments and feedback from Conference participants.



PANEL DISCUSSION

European and global marine ecosystems in transition

The long-term societal and policy objectives of a thriving but sustainable maritime economy in Europe will require a much greater understanding of marine ecosystems, their structure and functioning, the benefits they provide, their current state, their resilience to pressures, vectors of change, and mechanisms to assess and improve ecosystem health (EMB, 2013)⁸.

The session Chair **Peter Heffernan** introduced the panel discussion as a platform for interactive discussion, with a view to developing a vision for 2020 of the research needs and priorities for maintaining a European focus but set firmly in the context of global ecosystems and the international research agenda.



This session focused on the transition of marine ecosystems as a result of natural and anthropogenic pressures. Panellists recognized that changes are not distributed homogeneously and that there is a need to assess change across multiple levels spanning global to local levels. The panel also stressed the need to further understand connectivity of marine ecosystems, including the interaction of physical, chemical, geological and biological processes, and to assess the entire ocean from the deep-sea to shallow seas and coastal environments.



Chair:

Peter Heffernan,
Marine Institute, Ireland

Panel:

Frederic Briand,
Mediterranean Science
Commission (CIESM), Monaco

Roberto Danovaro,
Stazione Zoologica Anton Dohrn,
Naples, Italy

Ricardo Santos,
Member of the European
Parliament (MEP), University of
the Azores, Portugal

Luis Valdes,
Intergovernmental
Oceanographic Commission
(IOC) of the United Nations
Educational, Scientific and
Cultural Organization (UNESCO)

Karen Helen Wiltshire,
Alfred Wegener Institute (AWI),
Germany

⁸ European Marine Board (2013). Navigating the Future IV. Position Paper 20 of the European Marine Board, Ostend, Belgium. ISBN: 9789082093100

It is commonly accepted that marine ecosystems are changing fast and the panel discussed the need to move from mitigation to adaptation responses which would require new governance models and new approaches based on the understanding that scientific knowledge is crucial for good environmental governance.

Frederic Briand (Mediterranean Science Commission, CIESM, France) noted that we need to become wiser about ocean governance and that more relevant observations are required to decipher tipping points in marine ecosystems.



"To allow wiser ocean governance, we need more relevant observations. For example, you can't decipher marine tipping points from satellite images." Frederic Briand (above right)

"To communicate biodiversity and ecosystem services with policy makers, an integrated approach is needed." Luis Valdes (above left)

Luis Valdes (Intergovernmental Oceanographic Commission, IOC, UNESCO) highlighted that for biodiversity and ecosystem services, an integrated approach is needed to communicate with policy makers. There was a call for capacity building and for Europe and North America to take responsibility for transferring knowledge and technology to develop these areas.



Roberto Danovaro (Stazione Zoologica Anton Dohrn, Naples, Italy) noted that understanding change in marine ecosystems was a crucial issue that would require enhanced capability for observing biodiversity and ecosystem functioning. He also stressed that highlighting the socio-economic implications of biodiversity loss was vital to communicate the importance and value of marine biodiversity to policy makers and the wider public. Conference participants highlighted that this would require both technology development but also skilled people.

"To communicate the value of biodiversity to policy makers we need to highlight the socio-economic implications of its loss. This key message will enable politicians to better communicate this to the wider public." Roberto Danovaro

The panel agreed that we are at a turning point for biological observations and that the European Marine Strategy Framework Directive (MSFD) was a major step forwards for holistic monitoring and understanding of the marine environment. It was noted that the World Ocean Assessment would, at the global scale, allow us to track the status of the marine environment complimenting the European MSFD and that Europe needs to take a leadership role in contributing to this. Geographical gaps in biological observing systems in e.g. Indian Ocean were identified as obstacles to preventing a full assessment of the state of the world ocean.

Karen Wiltshire (Alfred Wegener Institute, AWI, Germany) noted that we are entering a new age for biological observations and we should take care to optimize data management to avoid drowning in an avalanche of data. The panel recommended the quality of data must be maintained and a better engagement with the Information Communication Technology (ICT) community is needed for developing innovative ways of data management and handling.



"We are entering a new data age for biological observations and we are on the brink of drowning in an avalanche of data." Karen Wiltshire (above middle)

"All policy decisions should be based on solid science if we want to secure healthy seas for our grandchildren." Ricardo Santos (above right)

Ricardo Santos (Member of European Parliament, University of the Azores, Portugal) expressed concern for our capacity to achieve and maintain healthy seas and noted that all policy decisions related to marine governance should be based on solid science to aid evidence-based decision making.

The open floor discussion addressed the danger of invasive (alien) species in marine ecosystems with one participant noting that the Mediterranean already has 146 exotic species, 90% of which have entered through the Suez Canal. The potential consequences of the proposed Suez Canal expansion on Mediterranean ecosystems and their functioning were also discussed together with a renewed call to apply the precautionary approach in the context of European and International legislation e.g., the United Nations Ballast Water Convention.

The plenary session then continued with presentations from representatives of the European Commission and the Intergovernmental Oceanographic Commission of UNESCO.



The panel (from left to right): Peter Heffernan (Chair), Luis Valdes, Frederic Briand, Roberto Danovaro, Ricardo Santos and Karen Wiltshire.

Marianne Wenning (Director, Directorate-General for the Environment, Directorate C: Quality of Life, Water and Air, European Commission) highlighted that, globally, 110 million jobs rely on the oceans out of which 70 million depend on healthy oceans. The challenge is achieving blue growth within sustainable limits. She highlighted the importance of marine science and knowledge in achieving this balance. By 2021, she said, the European Commission expects an integration of environmental concerns into the policy decision-making process building on existing initiatives. The economic development of the oceans, she further commented, could not be ignored. But environmental protection should be considered simultaneously with blue growth as it is vital to work towards good environmental status of our seas and oceans.



"By 2021, the European Commission expects an integration of environmental concerns into the policy decision-making process, building on existing initiatives."
Marianne Wenning



"I am pleased to launch at EurOCEAN 2014 the Marine Strategy Framework Directive Competence Centre (MCC), a single-entry science-policy platform established to facilitate dialogue between knowledge and service providers and to provide the MSFD Common Implementation Strategy with up-to-date scientific knowledge." Maria Betti

Maria Betti (Director for Environment and Sustainability, Joint Research Centre, European Commission) officially launched the Marine Strategy Framework Directive Competence Centre⁹ (MCC), a science-policy platform established to facilitate dialogue between knowledge and service providers and to provide the Marine Strategy Framework Directive (MSFD) Common Implementation Strategy with up-to-date scientific knowledge. The MCC, she said, represents a single-entry point for reference data and MSFD-relevant information and also offers a repository with guidance documents including Commission endorsed documents. She further commented that MCC is unique in the way it combines all scientific community expertise and acts as an information platform including data from a wide range of H2020 projects across Directorates. She highlighted the MCC's metadata repository which includes a validation of the data's relevance for policy making. Maria Betti concluded that the MCC will contribute to a sustainable exploitation of the sea and invited the community to be active in updating and contributing to its development.

Luis Valdes (Intergovernmental Oceanographic Commission, UNESCO) announced the 2nd International Ocean Research Conference 'One Planet, One Ocean', organized in Barcelona which would take place between 17 and 21 November 2014. The Conference, he said, would provide an overview on the latest trends and achievements in ocean sciences and technologies and would explore future needs, as well as most recent developments in management and ocean governance.



⁹ <http://mcc.jrc.ec.europa.eu/>

PARALLEL SESSION 1

Blue Growth I: Creating a marine innovation culture

A key message from this session was there is a need to promote entrepreneurship in the marine science culture and also to create an educated 'customer base' with ocean literate decision makers, company CEOs, accountants and investors. Marine stakeholders should move away from 'silo mentalities' and to foster much more cross-disciplinary working cultures. Well-designed, evidence-based regulatory instruments were recognized as very important for ensuring best practice.

Session Chair **Gilles Lericolais** (French Research Institute for Exploitation of the Sea, Ifremer, France) introduced the session noting the opportunity for marine research to embrace future change and drive innovation, to understand the marine environment, and foster growth in the maritime economy.



Chair:

Gilles Lericolais,
French Research Institute
for Exploitation of the Sea
(Ifremer), France

Edward Hill (National Oceanography Centre, NOC, UK) discussed research as a driver of blue growth in Europe and the opportunity for marine research to underpin blue growth sectors such as aquaculture, offshore energy, cruise tourism, blue biotechnology and extraction of mineral resources. He further highlighted Europe's strong research base both in the public and private sectors, and the importance of technology to open new opportunities. For example, it is becoming economically viable for the oil and gas industry to move into deeper water and access more extreme environments, thanks to new methods and capabilities including autonomous underwater vehicles (AUVs) and robotic technologies. He also noted the increasing awareness by the European research community to match skills and training to economic and policy needs.



Speakers:

Edward Hill,
National Oceanography Centre
(NOC), UK

Helena Vieira,
University of Lisbon, Portugal

Valerie Cummins,
Irish Maritime and Energy
Cluster, (iMERC), Ireland

Damien Périssé,
Conference of Peripheral
Maritime Regions (CPMR),
France

"Europe has a strong research base and this represents an opportunity for marine investigation to underpin blue growth". Edward Hill



"Ideas are worth nothing unless you have a client and the right market conditions."
Helena Vieira

Helena Vieira (University of Lisbon, Portugal) advocated the need to promote entrepreneurship within marine science. Entrepreneurship, she noted, is about taking risks but having a client is crucial to bringing ideas to market. She stressed that entrepreneurship is a skill that can be learned and should be included in the educational and cultural landscape of marine graduates through cross-disciplinary research and international collaboration.



Valerie Cummins (Irish Maritime and Energy Cluster, iMERC, Ireland) discussed maritime geostrategic thinking, noting that innovation can be thought of as a process that starts with a novel idea and grows into new products and services. She noted that marine science should identify commodities, such as big data sets, that can underpin innovation. To drive innovation, she stressed, we need to overcome a 'silo' mentality in marine science and to have effective governance, working with a variety of partners to create economic opportunities and jobs. She expressed a need for the public sector to change its attitude and embrace innovation and that this should start at the local levels. She also stressed it is crucial to know from the start your desired goal or 'end state' to provide direction and a goal for each your company or organization.



"We need innovation to overcome scientists' 'silo' mentality. Maritime geostrategic thinking matters. However there's no silver bullet: you must understand your local factors."
Valerie Cummings



Damien Périssé (Conference of Peripheral Maritime Regions, CPMR, France) stated that marine and maritime research is an important cross-cutting priority in the peripheral coastal areas of Europe and that the EU remains a major source of funding. But despite employment and the connection between sea and land being at the heart of regional development strategies, he questioned whether regions were making sufficient use of this funding to stimulate blue growth. He noted that facilitating better links between scientists and policy makers would help to optimize the use of regional development funds in marine and maritime sectors. He also noted that sustainability is key, and welcomed the Horizon 2020 calls for sustainable aquaculture as a very positive development for peripheral regions.

"We must look at ways to make optimum use of regional development funds in the marine and maritime sector, for example, to support maritime employment."
Damien Périssé

The discussion following the presentations focused on education. All speakers agreed that training is a critical challenge to ensure a well-informed society spanning the general public, scientific community and the private sector. Participants noted that ocean literacy should go beyond fundamental ocean knowledge and also include practical knowledge of how to access funding, EU programmes, etc. Finally, it was suggested that the science community could focus on meeting customer requirements with a key question being, 'are we discovering the findings people need and want to know about?'



PARALLEL SESSION 1

Towards Good Environmental Status in European seas



Chair:

Jacky Wood,

Natural Environment Research Council (NERC), UK

Speakers:

Ana-Teresa Caetano,

Directorate-General for Research and Innovation, European Commission

Anna Cheilari,

Directorate-General for the Environment (DG Environment), European Commission

Marisa Fernandez,

Centre for Marine Technology (CETMAR), Spain

Darius Campbell,

Convention for the Protection of the Marine Environment of the North-East Atlantic, OSPAR

Mark Dowell,

Joint Research Centre (JRC), European Commission

The session focused on discussing the key components of assessing and achieving Good Environmental Status (GES) in European seas. The key high-level messages were that in the future, fulfilling knowledge gaps should be a priority while ensuring that identified gaps are fed through into science agendas. The science-policy dialogue should be maximized and the access to knowledge should be facilitated through existing and new tools for knowledge brokerage. A key priority should also be to promote greater coherence across regions and the exchange of best practice and agreement on targets was proposed as one way forward. It was also recognized that the opportunity exists for Europe to foster international leadership by promoting the Marine Strategy Framework Directive's (MSFD) values at international fora, e.g. the Intergovernmental Platform on Biodiversity and Ecosystem services (IPBES).

Session Chair, **Jacky Wood** (Natural Environment Research Council, NERC, UK), introduced the session noting that 2014 marked the mid-point of the Marine Strategy Framework Directive and it was timely to assess the current state of progress and the steps needed to achieve the ambitious target of Good Environmental Status (GES) of European marine waters by 2020.



Ana-Teresa Caetano (Directorate-General for Research and Innovation, European Commission) stated that the Marine Strategy Framework Directive (MSFD) initial assessment conducted in 2013 was the first comprehensive marine environment review at European level. She stressed the need for a strategic approach to obtaining more data and for monitoring knowledge gaps. She noted the European Commission recognizes the importance of strengthening the scientific knowledge base to support implementation of the MSFD and this had been shown through the funding of FP7 projects such as STAGES¹⁰. She added that the launch of the MSFD Competence Centre (MCC) would provide a permanent scientific platform to support the implementation of MSFD.



"There are important knowledge and research gaps and I hereby invite the community to be active in moving forward with the marine research agenda at national and EU levels."
Ana-Teresa Caetano



Anna Cheilari (Directorate-General for the Environment, European Commission) explained that the Marine Competence Centre (MCC) would act as a science-policy interface (SPI), working in close collaboration with Member States and Regional Sea Conventions as a focal point for information about the Marine Strategy Framework Directive and resource sharing.

"The priority of the Marine Strategy Framework Directive (MSFD) Competence Centre is to harmonize MSFD implementation by responding to the needs and requests of Member States of the European Union. Close collaboration across geographical scales is vital to achieve this." Anna Cheilari

Marisa Fernandez (Centre for Marine Technology, CETMAR, Spain) described the outputs of the EU FP7 STAGES project. A key aim of the project was to improve the methodologies for harnessing knowledge to support implementation of the Marine Strategy Framework Directive (MSFD) and to propose ways forward for an effective, long-term science-policy interface (SPI) platform to maximise the exchange and uptake of scientific knowledge into environmental decision making. She stated that STAGES had produced a number of key decision support resources for MSFD implementers and had identified scientific knowledge brokers as a key component that at present lacked visibility and resources.



"The STAGES project produced a number of key Marine Strategy Framework Directive (MSFD) decision support resources to increase the harnessing and uptake of relevant scientific knowledge into environmental decision making." Marisa Fernandez

¹⁰ Science and Technology Advancing Governance on Good Environmental Status. <http://www.stagesproject.eu/>



Darius Campbell (Convention for the Protection of the Marine Environment of the North-East Atlantic, OSPAR) noted the importance of regional sea coordination and coherence, stressing that to assess the marine environment at regional sea levels, joint monitoring utilizing the latest technologies and coordination of data management are needed. He called for much greater appreciation and understanding of cumulative impacts to enhance integration and understanding of the ecosystem approach. He also noted that a balance must be found between striving for scientific perfection and providing policy and decision makers with timely scientific advice so that scientific data and knowledge can be used even if it is a work in progress.

"New technologies such as future ocean gliders offer opportunities to support the Marine Strategy Framework Directive (MSFD) and better understand pressures, natural changes and impacts on ecosystems."

Darius Campbell

Mark Dowell (Joint Research Centre, JRC, European Commission) highlighted the need to establish a European marine knowledge base for Good Environmental Status. He emphasized the Marine Strategy Framework Directive Competence Centre (MCC), launched during the opening session of EuroOCEAN 2014, was a joint effort of the Joint Research Centre, with the International Council for the Exploration of the Sea (ICES) and the European Environment Agency. He noted the Competence Centre provided a bridge between science and policy and invited the marine community to contribute to it as a living process. It would provide users with easy access to scientific knowledge related to the monitoring and assessment of the environmental status of the European Seas, information about relevant policy structures, scientific information regarding environmental data acquisition, modelling and evaluation, and a common platform for shared guidance on the Marine Strategy Framework Directive's implementation.



"The Marine Strategy Framework Directive Competence Centre is a focal point and a platform for Marine Strategy Framework Directive information exchange, offering knowledge at different scales."

Mark Dowell



PARALLEL SESSION 2

Blue Growth II: Managing Seas and Ocean Resources

The key messages in this session were that marine resources offer opportunities to meet the demand of growing populations and address societal challenges such as the increasing need for food, energy, raw materials and new technologies. Exploitation of marine resources was expected to increase and science should take a leading role, informing policy and industry of ways to minimize impacts on the marine environment. It was agreed that the continued funding for basic research would be essential to achieve this, together with cross-sectorial dialogue and integration to improve stakeholder interfaces, e.g. public-private, research-industry and science-policy.

Marcel Jaspars (University of Aberdeen, UK) stated that marine biodiscovery brings innovation and application opportunities that can contribute to blue growth in Europe. However, we still know very little about marine genomics, and are having to deal with a declining expertise in taxonomy needed to identify organisms and micro-organisms. He also acknowledged the physical and legal challenges of accessing marine genetic resources from extraction right through to production and commercialization of possible end-products. Furthermore, he stressed that further legal certainty was needed, particularly for the access, extraction and benefit sharing of biomaterials from areas beyond national jurisdiction (ABNJ).



"Marine resources have an advantage over terrestrial resources, notably in terms of novel chemical structures, unique properties and a rich potential for unprecedented applications." Marcel Jaspars



The panel (left to right): Ronán Long, Joachim Harms (Chair), Alessandro Lovatelli, Fernando Barriga and Marcel Jaspars.

Chair:

Joachim Harms,
Forschungszentrum Jülich,
Germany

Speakers:

Marcel Jaspars,
University of Aberdeen, UK

Alessandro Lovatelli,
Food and Agriculture
Organization of the United
Nations (FAO), Fisheries and
Aquaculture Department

Fernando Barriga,
Centre for Mineral Resources,
Mineralogy and Crystallography,
University of Lisbon, Portugal

Ronán Long,
National University of Ireland
(NUI), Galway, Ireland

A notable problem is that many scientists are not aware of the legal regulations which govern the taking and utilisation of biological samples and data collection in different areas of jurisdiction. In this respect, Marcel Jaspars stressed that efficient science-policy interfaces are critical as well as open access to information and the creation of biobanks to securely store samples and associated metadata. He noted that transfer of expertise was also crucial and should be addressed via long-term projects with cooperation between the scientific community, SMEs and marine biotechnology centres throughout the full marine biodiscovery process.

Alessandro Lovatelli (Food and Agriculture Organization of the United Nations, FAO, Fisheries and Aquaculture Department) stated the seas and oceans are a major source of food for a growing world population and healthy oceans are, therefore, vital to human welfare. He acknowledged that ocean biomass is dramatically declining and the consequent reduction in fisheries, estimated at 1.3 million tonnes per year, needs to be urgently addressed. He stated that Europe was well placed to be a leader in overcoming these issues. Alessandro Lovatelli also suggested that stronger public-private partnership is needed to promote industry growth, supported by appropriate access, governance and regulatory frameworks and better support to entrepreneurs. He also stressed the need for further development of mariculture, noting that according to current projections, it is unlikely that we will be able to supply enough fish to meet the global demand by 2030."



"Europe is a leader in seas and ocean technologies, but more innovation is needed to ensure sustainable and viable commercial activities." Alessandro Lovatelli



"We need raw materials as much as we need food. Furthermore, minerals are critical for food production itself." Fernando Barriga

Fernando Barriga (University of Lisbon, Portugal) noted that deep-sea exploration has allowed a quantum leap in our knowledge of the Earth system and deep-ocean biosphere which, in turn, has led to the discovery of deep-sea raw materials ranging from minerals found in hydrothermal vents and seabed nodules, to rare earth elements, such as cobalt which is a critical element of electric car batteries. He referred to the opportunity and growing demand to exploit these resources noting that, for some resources such as methane hydrates, estimates for the amount of reserves in the oceans were comparable to the total known fossil fuel reserves. But he also noted in Europe the European mineral consumption remains very high and while modern deep-sea exploitation research and technology are conducted with strong environmental awareness and caution, more basic research is needed to understand the deep-sea environment, particularly highlighting the importance of 3D seabed and sub seafloor observations and monitoring.

Ronán Long (National University of Ireland, Galway) addressed European regulatory measures, stressing that while existing EU regulations and policies provide sound rules and procedures, ocean governance for research and exploitation activities still needs attention, as each of the 23 coastal Member States have different regulations. He noted that the harmonization of consent procedures in the Member States for global oceanic vessels to undertake research in a coastal state jurisdiction, as addressed in Part XIII of the United Nations Convention on the Law of the Sea (UNCLOS), will greatly improve the administrative and cost burden of undertaking ship-based research.



"Regulatory and administrative requirements are numerous. What's needed is a 'one stop shop' approach to seeking and gaining consent for ship-based research." Ronán Long

The subsequent questions and answers session tackled the issue of recycling versus exploiting the environment for more resources. It was noted that the world demand for resources such as rare earth elements has exceeded production and further exploitation is an inevitable need. It was also noted that even renewable resources have an environmental cost. The session acknowledged that the private sector tends to move more quickly than the process of developing appropriate regulation. Nevertheless, the role of political drivers should be recognized, e.g. the Member State targets for marine renewable energy that are fast-tracking the development of the offshore wind industry.

Session Chair, **Joaquin Harms** (Jülich Research Centre, Germany), noted the session's clear agreement on the critical need to achieve a sustainable balance between environmental requirements and societal needs. He stressed the common call to make industry an integrated partner, notably through harmonization and simplification of procedures. Moreover, EU project findings should be made easily accessible to the private sector to ensure that entrepreneurs can pick up on ideas that can lead to the development of commercial opportunities. The EU should further support long-term data acquisition, storage and management and support sustained research projects (among others, through a better integration of industry). He noted the common agreement on the need for joint infrastructures and physical and legal access to technologies through improved international cooperation.



PARALLEL SESSION 2

Unravelling the Links between the Oceans and Human Health



Chair:

Michael Depledge,

European Centre for
Environment and Human
Health, UK

Speakers:

Angelo Camerlenghi,

National Institute of
Oceanography and Experimental
Geophysics (OGS), Italy

Philipp Hess,

French Research Institute for
Exploitation of the Sea (Ifremer),
France

Sam Dupont,

University of Gothenburg,
Sweden

Mathew White,

University of Exeter, UK

Niall McDonough,

European Marine Board (EMB)

This session addressed the complex linkages between the marine environment and human health and wellbeing. A key message of the session was that we must increase the awareness amongst the public, policy makers and politicians of the intimate interconnections between human health and wellbeing and the marine environment. Particular threats covered in this session related to submarine geohazards, harmful algal blooms (HABs) and ocean acidification.

In his introduction, the session Chair, **Michael Depledge**

(European Centre for Environment and Human Health, UK), described how Oceans and Human Health is a growing integrative metadiscipline which spans a very wide range of issues from chemical pollution to marine pathogens, to the health effects of eating seafood and interacting with coastal environments. Interdisciplinary research, bringing together diverse fields across natural and social sciences, is necessary to address the complexity of ocean and health interactions. Through a better understanding of these interactions, we can develop and apply more effective policy and management actions to protect and enhance both marine environmental health and public health.



To consider the potential impact of submarine geohazards,

Angelo Camerlenghi

(National Institute of Oceanography and Experimental Geophysics, OGS, Italy), stated that submarine geohazards, including earthquakes, submarine landslides and sediment mass movements, tsunamis and gas emissions, often occur at continental margins, where population density is high. Therefore, blue growth must cope with hazard assessment, risk analysis and preparedness and resilience of coastal society, especially in the areas of the European coast that are most vulnerable.



"Blue growth must consider the impact of submarine geohazards." Angelo Camerlenghi



"Further research is needed on the factors that underpin HAB development." Philipp Hess

Philipp Hess (French Research Institute for Exploitation of the Sea, Ifremer, France) spoke about the underestimation of public health and socio-economic impacts of HABs and noted that it is both an environmental and human health issue that is closely linked to climate change. He identified the need for further research on the factors that underpin HAB development, tracking the transmission pathways of HAB toxins into the human food chain, determining the actual disease burden and public health impact of HABs, and improved monitoring, surveillance and diagnostic technologies to protect human health and support blue growth industries such as shellfish aquaculture.

Sam Dupont (University of Gothenburg, Sweden) presented on the topic of ocean acidification, a consequence of rising atmospheric carbon dioxide levels. He stated that while some species will respond positively to increased acidification of the oceans, others such as marine calcifiers will respond negatively. The indirect impacts of ocean acidification, he said, include seafood quality and quantity, climate feedback and losses for blue innovation, tourism and culture.



"Ocean acidification is a tool with which to communicate the problems of carbon dioxide emissions." Sam Dupont

As well as discussing threats, this session also dealt with the many benefits and opportunities that the topic of Oceans and Human Health presents.



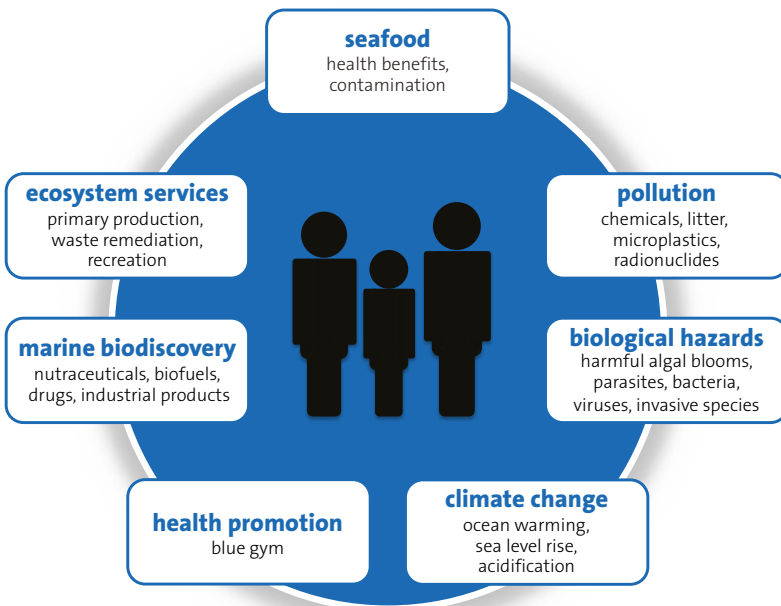
"Environmental psychology provides compelling evidence for the health benefits of coastal environments." Matthew White

Mathew White (University of Exeter, UK) presented an overview of research on the positive health effects associated with living by the sea and spending time in coastal areas such as increased exercise, lower levels of stress and facilitating the building of positive social bonds. He described the results of his research in the field of environmental psychology, which provides compelling evidence for the health benefits of spending time and taking exercise in coastal environments, providing measurably greater health benefits when compared to rural or urban environments.

Niall McDonough (European Marine Board, EMB) provided a summary of the progress that has been made by the European Marine Board and several research partners to promote the need for greater support and research focus in the area of Oceans and Human Health in Europe. EMB published a position paper in 2013¹¹ outlining the key research challenges in this growing field. He outlined some of these high-level research challenges, emphasizing that there are many highly policy relevant questions concerning public health issues and that a remaining challenge is to engage the health community.



"Oceans and Human Health is about management to reduce risk and an opportunity to improve human health." Niall McDonough



In the discussion there was support for Oceans and Human Health being linked with the work of Health 2020, the European policy for health and well-being, and agreement that the health community needs to be more engaged. It was also suggested that the topic of Oceans and Human Health is very relevant in the context of the World Health Organisation's (WHO) estimation that by 2030, mental health will be the biggest human health problems globally. It was suggested that the strength of Oceans and Human Health as a topic is that it is being presented from a human perspective. Considering that coasts are publicly owned spaces, approaching it from the view of the public good should be effective.

¹¹ <http://www.marineboard.eu/publications-full-list>

PARALLEL SESSION 3

Regional Seas: to the south and east



The key message of the session was that the Mediterranean and Black Seas, shared by both European and non-European countries with (semi-) enclosed geographical characters, need a vision and strategy to tackle inherent marine environmental problems in a timely manner.

The session Chair **Tatjana Hema** noted that the challenges of southern European seas call for a synthesized knowledge base, aligned funding in-

struments, and an inclusive approach for the whole community. She also highlighted that effective communication will convey innovative solutions to policy makers for governance within and beyond national boundaries.

Laura Giuliano (Mediterranean Science Commission, CIESM, Monaco) stated that dealing with environmental problems and creating commercial opportunities in the Mediterranean could be achieved more effectively through an improved alliance between the marine academic community and industry sectors. She cited past reports from CIESM that have addressed challenges faced by the Mediterranean region, such as oil pollution, governance of marine fisheries, acoustic noise and marine spatial planning.



"The Mediterranean has the potential for an improved alliance between the marine academic community and industry sectors." Laura Giuliano



Chair:

Tatjana Hema,

Mediterranean Pollution Assessment and Control Programme (MED POL), United Nations Environment Programme (UNEP)

Speakers:

Laura Giuliano,

Mediterranean Science Commission (CIESM), Monaco

Temel Oguz, Institute of Marine Science, Turkey

Vangelis Papathanassiou, Hellenic Centre for Marine Research (HCMR), Greece

Temel Oguz (Institute of Marine Science, Turkey) explained that environmental problems in the Black Sea are amplified because of its enclosed geographic character. Studies on overfishing, eutrophication, alien species invasions and abrupt decadal climatic change, have shown that ecosystems change fast and yet the speed of the ecosystem recovery is very slow when the system is continually perturbed by human activities. Temel Oguz further highlighted that such a fast-changing ecosystem needs the implementation of advanced monitoring strategies, e.g. useful proxies for nutrient enrichment.



"There is a need for advanced monitoring strategies to measure fast-changing ecosystems." Temel Oguz



"Science can provide the power to facilitate the alignment of policy, industry and research at basin level." Vangelis Papathanassiou

Vangelis Papathanassiou (Hellenic Centre for Marine Research, HCMR, Greece) focused on the southern European seas highlighting that governance is an important aspect as environmental stresses impact more quickly in enclosed seas compared to open oceans. He stressed that transferring data and converting information to knowledge and wisdom was crucial before applying it to innovative technology. He noted that blue growth, by definition, should be sustainable, although it was necessary to align the investment timeframe of various stakeholders. He concluded that trust is key to tackling the challenges at basin level, stating that science diplomacy could be a tool and that science can provide the power to facilitate the alignment of policy, industry and research amongst partners around the southern European seas.

When asked of ways to enhance cooperation at regional level, the speakers proposed to set up permanent platforms for scientists, local communities and wider stakeholders. It was also suggested to develop on an open access approach citing examples from the project 'Policy-oriented marine Environmental Research for the Southern European Seas' (PERSEUS). In addition, there was a general consensus that working in a trust-based environment remains essential.

Addressing the environmental challenges of the Black Sea, it was noted that measures and observations regarding the problem of anoxia and acidification should be more systematic and that long-term funding for this type of regional monitoring is essential.

PARALLEL SESSION 3

Regional Seas: to the north and west



Chair:

Kaisa Kononen,
Baltic Organisations' Network
for Funding Science (BONUS
EEIG), Finland

Speakers:

Jacob Carstensen,
Aarhus University, Denmark

Mike St. John,
National Institute of Aquatic
Resources (DTU Aqua), Denmark

Paul Wassmann,
University of Tromsø, Norway

This session addressed the main pressures affecting the seas of northern and western Europe and identified the critical shortage of sustained observations. The lack of long-term data leads to uncertainty in understanding natural and anthropogenic variability and an overreliance on modelled predictions for policy decisions. In addition, understanding the mechanisms driving tipping points within ecosystems and regions was noted as a crucial issue. It was stressed that regional changes might have global effects and, therefore, should be taken into account in policy and management at multiple scales. Regional seas also provide an opportunity for the coordination of research between scientific groups and with policy makers.

Kaisa Kononen (Baltic Organisations' Network for Funding Science, BONUS EEIG, Finland) observed that while regional organizations are already in place such as HELCOM for the Baltic and OSPAR for the North-east Atlantic, further effort towards enhanced cooperation should be considered.



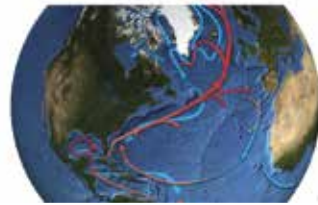
Jacob Carstensen (Aarhus University, Denmark) explained how the Baltic Action Plan (BAP) could serve as a best practice example of successful engagement of science with policy. He explained it involved nine countries from the Baltic region and focused on the recovery of the Baltic Sea from anoxia and eutrophication. Using a modelling approach based on nutrient and chlorophyll *a* time-series, 'maximum allowable nutrient inputs' (MAI) had been calculated to set limits and 'Country Allocated Reduction Targets (CARTs)' were set in collaboration with policy makers. The effort had resulted in a decline in nutrients in the Baltic Sea, but Jacob Carstensen stressed that it might take up to a century to reach the ultimate targets.

"Over the last decade the nutrient inputs have declined in the Baltic Sea; but remember that there is a time lag of about 30 years until a stabilization occurs." Jacob Carstensen

Mike St John (National Institute of Aquatic Resources, DTU Aqua, Denmark) called for increased multidisciplinary as well as more transatlantic cooperation as climate change is rapidly affecting the North Atlantic. He explained that the North Atlantic Ocean and the North Sea are a coupled system and important for heat transport and distribution around the planet. He stressed it was crucial to understand possible impacts on the multiple services provided by the region. New knowledge, he proposed, was needed for advice and prediction, particularly in the area of sustainable fisheries and marine ecosystem health. To illustrate this he presented an example of how observed climate change could impact in the region, causing biotic shifts in copepod species distribution with implications to the rest of the food chain from zooplankton to fish.



"The North Atlantic acts as the lungs of the ocean and approximately 25% of global carbon is sequestered in the Atlantic." Mike St John



Paul Wassmann (University of Tromsø, Norway) noted the increasing interest in the Arctic for oil and gas exploitation, mining and cargo transport to and from Asia, as well as the opportunities the Arctic region offers for bioprospecting (the discovery and commercialization of new products based on biological resources). He explained the European-Arctic corridor controls much of the Arctic climate and stressed that care should be taken for its preservation as change might be rapid and small alterations can lead to big impacts. Tipping points and the effects of climate change are already observed, he said, but predicting when and where regime shifts might occur remains uncertain.

"Finding footprints of climate change in the Arctic is challenging as few data are available for comparison with the past; long time-series are lacking." Paul Wassmann

The discussion following the presentations focused on the difficulties in predicting tipping points and the fact that marine managers and scientists should be aware that policy and science act at different time and spatial scales. The participants of the session shared their personal opinions related to bridging science and policy through appropriate interfaces and agreed that solid science should be the basis of all discussions. It was proposed that Europe should invest research in early warning signals capable of anticipating regime shifts.

PARALLEL SESSION 4

Building a European Ocean Observing System (EOOS)



Chair:

Alessandro Crise,
National Institute of
Oceanography and Experimental
Geophysics (OGS), Italy

Speakers:

Erik Buch,
Chair, European Global Ocean
Observing System (EuroGOOS)

Jan Mees,
Director of Flanders Marine
Institute for the Sea (VLIZ),
Belgium; Chair of the European
Marine Board (EMB)

Christoph Waldmann,
Centre for Marine Environmental
Sciences (MARUM), Germany

Nadia Pinardi,
University of Bologna/National
Institute for Geophysics and
Volcanology (INGV), Italy

Mike Thorndyke,
University of Gothenburg,
Sweden

A tribute to Kostas Nittis: a scientist, a diplomat, an initiator and a friend

This session was dedicated to Kostas Nittis, former Chair of the European Marine Board and Secretary General of EuroGOOS, a strong advocate for marine science, in particular ocean observation, and a visionary and talented diplomat. (see Annex I).

Session Chair, **Alessandro Crise** (National Institute of Oceanography and Experimental Geophysics, OGS, Italy) introduced the session, noting its focus on discussing the key components needed to build a sustained and integrated European Ocean Observing System (EOOS). A key outcome was that to implement EOOS in the long-term, sustainable funding and coordination mechanisms would be required at national, regional and European scales. Public-private partnerships spanning marine scientific and operational oceanographic communities were noted as an important way to drive user investment and close collaboration between scientists and technologists. An *ad hoc* ocean technology platform, for example, would further drive European innovation and capability in ocean observation. Further investment in defining and estimating uncertainty in ocean observation was noted as crucial to further develop European leadership in ocean simulation, forecasting and prediction. The need to reinforce the biological component of EOOS was highlighted, taking into account the rapid development in automated systems for biological measurements. However, it was recognized that skilled personnel are crucial for the success of EOOS particularly for biological observations, including observations collected by marine stations and through citizen science.



In their joint presentation on 'Making EOOS a reality', **Jan Mees** (Chair of EMB) and **Erik Buch** (Chair of EuroGOOS), made a call for action on behalf of the marine scientific and operational oceanography communities to develop a roadmap, time-line and governance structure for EOOS and to implement a flagship initiative building on existing resources and commitments.

"To implement an effective, integrated European Ocean Observing System (EOOS), sustained funding and coordination mechanisms are required at national, regional and European scales." Jan Mees



The need for a strong science base to underpin EOOS was also noted and Essential Ocean Variables (EOVs) were proposed as crucial to achieving optimum design, evaluating gaps and allowing harmonization between different international ocean observation initiatives. Establishing a European governance for EOOS was also proposed that would allow coordination of existing initiatives, maximize investments (largely at national level) and enable holistic assessments and gap analysis of Europe's ocean observation capability.

"Are we measuring the right things at the right place and time? Or can we spend our resources in a more optimal way? We need simulation experiments to inform re-design of observing systems." Erik Buch

Discussing the future for ocean observation technology, **Christoph Waldmann** (Center for Marine Environmental Sciences, MARUM, Germany) highlighted the need for EOOS to respond to societal needs and stated that it is crucial to involve the private sector in the process of building an end-end EOOS. Christoph Waldmann also proposed to enhance the cross-disciplinary approach by closer interaction between scientists and technologists, advocating for Europe to establish an *ad hoc* ocean technology platform to further drive European innovation and capability in ocean observation. In discussing the need for an integrated marine monitoring strategy at European level, it was noted that data are still focused on the coast and that further analysis is required to assess the right variables and the most efficient spatial and temporal coverage to optimize resource allocation.



"Europe has the technical base to address complex observation scenarios, but we need a systematic approach and concerted strategy." Christoph Waldman



In a presentation on ocean forecasting, **Nadia Pinardi** (University of Bologna/National Institute for Geophysics and Volcanology, INGV, Italy) noted that there is a large stakeholder community for ocean predictions and forecasting tools, yet defining uncertainty in ocean forecasts remains a major obstacle. She recommended that to become a leader in ocean simulation, forecasting and prediction, Europe should fund basic projects on uncertainty estimation, utilizing ocean observational data to validate and constrain models, develop diagnostic and prognostic components and informing the re-design of observing systems.

"To become a leader in ocean simulation, forecasting and prediction, Europe should fund basic projects on uncertainty estimation". Nadia Pinardi

Finally **Mike Thorndyke** (University of Gothenburg, Sweden) presented on the biological component of EOOS stating that a new era had begun with automated systems now available for genomics and many other biological components. He also recognized the importance of skilled human resources required for biological observations and the vital role played by marine biological stations. He also noted that wider society can play an active role in environmental monitoring through citizen observatory initiatives.



"We have entered a new era for biological observations and wider oceanographic information in the new data age."
Mike Thorndyke.



PARALLEL SESSION 4

'Bridging the Gap' – Linking marine science and society



Session Chair **Isabel Sousa Pinto** (Interdisciplinary Centre of Marine and Environmental Research, CIIMAR, Portugal) introduced this session which focused on how to maximise the societal value of marine research. A key message was that advancements in scientific knowledge do not often reach society in an efficient way, creating a gap between science, society and policy makers. Ocean literacy was noted as crucial to bridge this gap and the session noted that to realize the blue economy, Europe needs informed citizens and policymakers to achieve sustainable ocean governance, supported by competent scientists and professionals. Therefore, the marine community needs to work as a team, with a coordinated and long-term perspective, recognizing the importance of training, entrepreneurship and communication.



Chair:

Isabel Sousa Pinto,
Interdisciplinary Centre of
Marine and Environmental
Research (CIIMAR), Portugal

Speakers:

Tim Deprez,
University of Ghent, Belgium

David Murphy,
AquaTT, Ireland

Jan Seys,
Flanders Marine Institute (VLIZ),
Belgium; Chair, European Marine
Board Communications Panel

Stefano Piraino,
University of Salento, Italy



Tim Deprez (University of Ghent, Belgium) highlighted the lack of coordination across European marine graduate training. He noted a number of pan-European activities currently addressing this issue. These included the European Marine Board Working Group on marine graduate training which was preparing a foresight analysis of training needs, and the European Marine Biological Resource Centre (EMBRC), which was developing a portal for marine training programmes in Europe. In reviewing the state of European marine education, Tim Deprez noticed many differences across countries in all aspects of the training, from duration and cost of marine courses to terminology and applications.

"If we believe training is of key importance, we should ensure that training initiatives are recognized at the same level as research outputs." Tim Deprez

Tim Deprez placed special attention on the lack of a coherent funding policy and drew attention to the imbalance in the prioritization of research outputs before the training of young people, despite the next generation being a crucial resource for achieving future sustainability. He also recommended that marine training should be recognized as an integral part of the knowledge cycle, with appropriate programmes and cross-disciplinary approaches addressing societal needs. Furthermore, an effective stakeholder dialogue was crucial, he noted, for the harmonization of the learning programmes throughout Europe, as well as for improving links with the job market and career development.



"Managing knowledge effectively requires a clear understanding of the knowledge outputs, the target users and the potential applications." David Murphy

David Murphy (AquaTT, Ireland) focused his talk on the knowledge value chain, from creation to impact. In his view, a clear understanding of the knowledge outputs, the target users and the potential applications was essential in managing knowledge effectively. The quality of knowledge, he noted, was crucial. However, knowledge could create value only through appropriate knowledge transfer which enables the end-users of the knowledge to take it up. Therefore, the whole system of the knowledge impact should be considered and not just its various parts separately (i.e. science, governance, end-users and society at large), because the citizens ultimately support the system. He noted that efforts to build a one-stop repository for knowledge outputs had been made by various pan-European initiatives, e.g. the EurOcean portal and the Marine Knowledge Gate inventory and he proposed several ways to improve and optimize the use of knowledge to create impact, including more adaptable funding mechanisms, improved stakeholder dialogue, and training of scientists to communicate and translate knowledge results to non-specialist audiences.

Jan Seys (Flanders Marine Institute (VLIZ), Belgium; Chair, European Marine Board Communications Panel) explained that ocean literacy was a unifying theme and crucial in understanding the ocean. He noted that the ocean shapes the earth's future, but remains largely unexplored. He then stressed that increasing knowledge and educating people about the oceans might create new job opportunities, explaining that shared ocean knowledge (SHOCK) therapy was a way to enhance ocean literacy and improve ocean knowledge transfer through formal education, informal learning and outreach.

Jan Seys then highlighted the progress of ocean literacy in Europe, not initiatives such as the European Marine Science Educator's Association (EMSEA) and the European Marine Board's Communications Panel. He also welcomed the inclusion of a call on ocean literacy in the Horizon 2020 programme and the increasing recognition of ocean literacy at political levels, e.g. in the Galway Statement, an initiative of the Transatlantic Ocean Research Alliance.



"Blue growth needs informed citizens in order to achieve sustainable development and to ensure a well-trained workforce for future ocean jobs." Jan Seys



"We are living in the communication era which is a powerful tool for research," Stefano Piraino

As an example of citizen science, **Stefano Piraino** (University of Salento, Italy) presented the Jelly-Watch programme, which had shown the power of engaging with the public, recording the changing biodiversity in near real-time through innovative mechanisms including smartphone applications, allowing citizens to record jellyfish sightings on a map and provide information about jellyfish, stings, and their treatment.

Stefano Piraino highlight the importance of using standardized methods and the validation of the taxonomy. An overarching theme for discussion was the need to close the gap between science and policy. More specifically a lack of knowledge brokerage was highlighted as a key hurdle and that linking science with policy and society on a broader level was essential and required funding. It was noted a "citizen push" could be effective and citizen science should be made more visible, e.g. through articles in the media. The content and process of training was also discussed with a balance required between technical skills and more generic transferable skills and the need for greater involvement of entrepreneurs and industry in training initiatives.



PLENARY SESSION

Blue skies and blue growth: scanning the horizon for the big challenges in marine science



Moderator:
Quentin Cooper,
BBC

Speakers:
Richard Bates,
Directorate-General for
Maritime Affairs and Fisheries
(DG MARE), European
Commission

Alex Rogers,
University of Oxford, UK

Katja Philippart,
Royal Netherlands Institute for
Sea Research (NIOZ)

Fabio Trincardi,
Institute of Marine Science/
National Research Council of Italy
(CNR)

Melanie Austen,
Plymouth Marine Laboratory
(PML), UK

Jeff Ardron,
Institute for Advanced
Sustainability Studies, Potsdam,
Germany

At the start of the session, **Quentin Cooper** (BBC) presented a summary of key messages from the parallel sessions. The plenary session then continued with horizon scanning presentations focused on some of the big challenges in marine science to be addressed over the next decade.

The key message of the session was that capacity building was essential to address societal challenges such as climate change, food resources, energy security and human health set in the context of the blue growth agenda within the sustainable boundaries of ecosystems. Therefore, over the next decade, ocean literacy would be vital as the blue economy needed an informed, politicians, industry and wider public. All speakers agreed that the lack of knowledge remained a major hurdle.





Richard Bates (Directorate-General for Maritime Affairs and Fisheries, DG MARE, European Commission) called for a more coordinated approach to fostering innovation in the blue economy, focussing on renewable energy, biotechnology, coastal and maritime tourism, raw material extraction and aquaculture. He identified cross-cutting issues such as marine spatial planning and the importance of sea basin strategies, and, looking 50 years ahead, expressed the need for making natural resources work for mankind in a sustainable way. He announced that a Blue Economy Business and Science Forum would be set up in 2015 to help spur innovation.

"We need blue sky research, better observations and innovative research to bring the blue economy to life."

Richard Bates

Alex Rogers (University of Oxford, UK) reviewed the connections between deep-sea research and the goals of the EU Blue Growth strategy. He explained that a dedicated expert Working Group had been convened under the auspices of the European Marine Board to examine the state of the art across a range of deep-sea research fields, identify knowledge gaps and make recommendations for future research. In view of the limited history of deep-sea exploitation and knowledge of its vulnerability, EMB had identified an overwhelming need for evidence, knowledge, and seabed and habitat mapping. Industry sectors had expressed concern over the lack of an effective regulatory framework governing the exploitation of deep sea resources, especially in areas beyond national jurisdiction.



"The deep-sea may make a substantial contribution to sustainable blue growth. However an assessment of the opportunities requires analysis of benefits versus (environmental) costs."

Alex Rogers





"Reinforcing the ocean's resilience to climate change requires an increased understanding of thresholds and tipping points as early warning signals of limits of resilience." Katja Philippart

Katja Philippart (Royal Netherlands Institute for Sea Research, NIOZ, the Netherlands) stated that reducing CO₂ emissions was by far the most important factor in achieving ocean resilience to climate change. She also highlighted the need to further understand ecosystem functioning as local habitat changes could have a wider impact on the system as a whole. Research priorities should include understanding cumulative effects and understanding underlying mechanisms of ecosystem and species reactions to change. Finally, Katja Philippart advocated for a multi-stakeholder approach, sharing information across the scientific, policy and society domains to help understand thresholds and tipping points.



Fabio Trincardi (Institute of Marine Science/National Research Council of Italy, CNR, Italy), highlighted the importance of marine habitat mapping to underpin Marine Spatial Planning. Oceanographic events, impacting the sea floor could thus be tracked, and knowledge of the seafloor could, therefore, guide the observation of oceanographic events. He explained that combining geomorphological information of the seafloor with oceanographic data could provide a predictive capacity for sea floor impact, but this depended upon improved sharing of modelling approaches and outputs.

"To capture oceanographic events impacting the deep sea floor, we need to optimize data retrieval and stimulate data exchange amongst scientists." Fabio Trincardi



Melanie Austen (Plymouth Marine Laboratory, UK) stated that methodologies for the valuation of ecosystem benefits were needed to support policy, industry, management/regulation and environmental protection. She noted that this had been done for terrestrial ecosystem service frameworks but that we should continue to ‘marinize’ these, applying methods to the marine environment. She described a case study on the valuation of ecosystem benefits from the Dogger Bank in the North Sea.

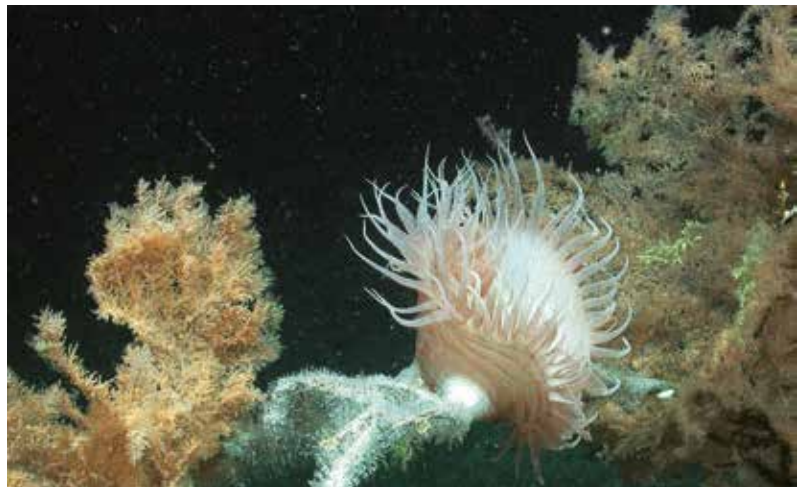
“We should continue to ‘marinize’ terrestrial ecosystem service frameworks and valuation methods.” Melanie Austen

Jeff Ardron (Institute for Advanced Sustainability Studies, Germany) presented some of the most challenging societal questions concerning the emerging commercial interest in deep-sea mining, particularly for small island developing states. He described the “resource curse” scenario for these countries, whereby an initial boom generated by exploiting a natural resource ultimately led to economic difficulty in the longer term. He stated that the legislative and regulatory frameworks governing these activities required urgent progress to reduce environmental impact and ensure transparency and fairness. He added that whilst licenses for deep-sea mining are currently being granted with a Voluntary Codes of Conduct exists, centralized reporting was still lacking.



“When looking to the sea, let us learn from resource governance mistakes made on land.” Jeff Ardron

In the discussion following the presentations it was noted that one of the biggest problems was setting the standard for transparency in deep-sea mining and that governance frameworks underpinning this new commercial sector is currently not fit-for-purpose. A comparison with fishing licenses was made and Jeff Ardron stated that the European agreements in that field are one of the best in the world and could set an example of best practice.



PANEL DISCUSSION

Addressing complex seas and oceans challenges: how can we cross the disciplines more effectively?



Panel (left to right): Ferdinando Boero, Kathrine Angell-Hansen, Michael Depledge, Tarmo Soomere and Paulo Nunes.

Moderator:

Quentin Cooper,
BBC

Panel:

Ferdinando Boero,
University of Salento/National
Interuniversity Consortium for
Marine Science (CoNISMa), Italy

Melanie Austen,
Plymouth Marine Laboratory, UK

Kathrine Angell-Hansen,
Joint Programming Initiative for
Healthy and Productive Seas and
Oceans (JPI Oceans)

Michael Depledge,
University of Exeter, UK

Tarmo Soomere,
Estonian Academy of Sciences,
Estonia

Paulo A.L.D. Nunes,
Wealth Accounting and the
Valuation of Ecosystem
Services (WAVES), The World
Bank

The panel focused on marine research and technology “grand challenges” and the need to address these in a holistic and coherent way. It was noted there is an ever growing need to demonstrate the societal value of research and it was no longer viable or possible to address such complex societal challenges within the confines of traditional scientific disciplines. Cross-disciplinary approaches were identified as essential and there was considerable scope to improve how this was currently performed in Europe. The panel discussion examined training requirements to foster cross-disciplinary approaches. It was agreed more that people should retain expertise in a particular area, whilst being supported through effective training and support from communication experts to promote cross-disciplinary working. Bridging the gap between natural science, social science and economy was also noted as becoming increasingly essential for tackling society’s big challenges.

Melanie Austen (Plymouth Marine Laboratory, PML, UK) stressed the need for scientists to have the wisdom and foresight to ask questions to help to understand different disciplines. She stressed that excellent facilitation, scientific translation and communication were essential to promote cross-disciplinary research, suggesting that communication experts could be involved from the outset of multidisciplinary initiatives to foster this approach and experts could be engaged to bridge the disciplines.



“Excellent facilitation, scientific translation and communication are essential to promote cross-disciplinary research.”
Mel Austen



Kathrine Angell-Hansen (Joint Programming Initiative for Healty and Productive Seas and Oceans, JPI Oceans) noted the need to retain our curiosity in nature and to build expertise in a single discipline together with an ability to apply multidisciplinary approaches. She acknowledged that the university educational system was not yet organized in a way that can assemble an appropriate pool of experts to tackle concrete problems. She also noted that the level of detail and complexity of knowledge outputs from scientific investigation should be targeted to the user. She added that should take account of this in planning their work to ensure maximum impact.

"There is a readiness in the scientific community to apply multidisciplinary approaches, but the university educational system is not yet organized to pro-actively support this through both training and research."
Kathrine Angell-Hansen

Michael Depledge (University of Exeter, UK) described how the European Centre for Environment and Human Health at the University of Exeter, was itself an example of cross-disciplinary research in action. The Centre, he explained, hosted experts from a broad range of disciplines across natural and social sciences who work together to address complex environment-health interactions. He stressed that effective multi-disciplinary endeavours required expertise in one field and awareness of related areas and that applying cross-disciplinary approaches to scientific questions requires scientists to have better communications training.



"Effective multi-disciplinary endeavours require expertise in one field and awareness of related areas."
Michael Depledge



"Incentives are needed for scientists to engage in cross-disciplinary research."
Tarmo Soomere

Tarmo Soomere (Estonian Academy of Sciences, Estonia) addressed the question of incentives for scientists to engage in inter-, multi- or trans-disciplinary research. He explained that often there was a risk for individual scientists to cross disciplines because it involved a much greater investment of effort to publish on a topic that was outside the scientist's area of expertise. In addition, because of the conventional way they are structured around disciplines, many research funding agencies were less inclined to fund this kind of research.

Paulo Nunes (Wealth Accounting and the Valuation of Ecosystem Services, WAVES, The World Bank) noted that scientists were all reductionistic, addressing problems by dividing them into different components. He supported an interdisciplinary approach, noting that to tackle a problem, we should identify the appropriate knowledge needed, assess the expertise needed to contribute from across natural and social sciences and economics, and where appropriate work with industry and technology developers. Referring to the need for marine science to work more with economists, he stated that the UN have committed to bringing natural capital into accounting frameworks, adding that cooperation represents a major added value and a hands-on approach that is already pursued in the activities of the World Bank. However, he cautioned that the marine scientific PhD system should be retained as a fundamental core of scientific training.



"The marine scientific PhD system should be retained as a fundamental core of scientific training."
Paulo Nunes



Ferdinando Boero (University of Salento, National Interuniversity Consortium for Marine Science, CoNISMa, Italy) advocated for cross-disciplinary research but stressed that capacity building was necessary. As an example, he referred to the MSFD indicator for biodiversity and the lack of experts in taxonomy to identify species contributing to assessments of Good Environmental Status (GES).

"To achieve the expertise required to apply a multidisciplinary approach we need to change the way we educate young scientists." Ferdinando Boero

PANEL DISCUSSION

A Blue Growth Research and Innovation Initiative for the Mediterranean



Moderator:

Quentin Cooper,
BBC

Panel:

Vangelis Papathanassiou,
Hellenic Centre for Marine
Research (HCMR), Greece

Fabio Trincardi,
The National Research Council
(CNR), Italy

Tatjana Hema,
Mediterranean Pollution
Assessment and Control
Programme (MED POL),
United Nations Environment
Programme (UNEP)

Joaquin Tintoré,
Director, Balearic Islands
Coastal Observing and
Forecasting System (SOCIB),
Spain

Sigi Gruber,
Directorate-General Research
and Innovation, European
Commission

**François-Régis Martin-
Lauzer,**
Pôle Mer Méditerranée, France

Paolo Lotti,
Association of Italian
Shipbuilders, Ship repairers and
Ship Equipment Manufacturers
(ASSONAVE), Italy

The focus of the Mediterranean roundtable discussion was how to maximize the potential of the Mediterranean Sea in the context of blue growth while also safeguarding its environmental status. A key message put forward by panellists was that science is crucial to underpin sustainable blue growth in sectors including tourism and that education was key to the success of initiatives in the region.



François-Régis Martin-Lauzer

(Pôle Mer Méditerranée, France) stated that blue growth was a straightforward concept which was related to economy and growth. However, the question was how to develop the

blue economy in the Mediterranean without putting too much stress on the environment. **Tatjana Hema** (Mediterranean Pollution Assessment and Control Programme, MED POL, United Nations Environment Programme, UNEP) agreed that as well as the economy, blue growth must also consider available resources. She pointed out that at national level, financial constraints could compromise the balance between blue growth and sustainability of commercial maritime activities.



"We must find a balance to develop the blue economy of the Mediterranean whilst minimizing stress on the environment." François-Régis Martin-Lauzer (above, left)

"The Mediterranean has the potential to be an excellent pilot for blue growth by developing the right governance mechanisms to ensure sustainability." Tatjana Hema (above, right)

Vangelis Papathanassiou (Hellenic Centre for Marine Research, HCMR, Greece) emphasized that the Mediterranean region is one of the most highly populated tourism destinations in the world. Tourism, he noted, was an area that could benefit greatly from scientific input to feed into long-term investment in the area as opposed to the short-term view taken at present.



"Sustainable tourism needs scientific input to develop long-term strategies." Vangelis Papathanassiou



"To integrate the marine and maritime areas we need to bring in small and medium-sized enterprises (SMEs) at local levels and maximise funding streams and investment at national and European levels, including structural funds." Sigi Gruber

Sigi Gruber (Directorate-General for Research and Innovation, European Commission) agreed that the region was a growth hub, containing many ports and terminals, which in turn placed enormous stresses and challenges on the Mediterranean. She also stressed the need to examine the type of tourism experiences on offer around the Mediterranean, considering that the area contained more than 400 UNESCO cultural heritage sites that attract visitors. She also noted that integration of the marine and maritime industries and that multiple funding streams were needed, including structural funds needed and that emphasized that science was needed continue to supporting the implementation of European Directives and more professional development was needed to create a highly skilled workforce.

Fabio Trincardi (The National Research Council, CNR, Italy) focused on the importance of open data for promoting blue growth noting that sharing data from environmental agencies, the scientific community and industry could lead to new models being developed and could be instrumental in improving the economy of the region. Integration, he noted, was still needed to reach this objective and to acquire long-term time series.



"Open data sharing amongst all stakeholders is crucial to improve the Mediterranean blue economy." Fabio Trincardi



Panel (left to right): Tatjana Hema, Joaquin Tintoré, François-Régis Martin-Lauzer, Sigi Gruber and Paolo Lotti with moderator, Quentin Cooper.

Joaquin Tintoré (Director, Balearic Islands Coastal Observing and Forecasting System, SOCIB, Spain) agreed that in order to characterize the state of the ocean and ocean variability, long- time- series and synoptic data were needed. He referred to the Balearic Islands Coastal Observing and Forecasting System, a multi-platform observing system with mobile applications producing data. can download data. However, he also noted the complexity of ocean and coastal interactions and highlighted that careful monitoring and management were required to make observations useful for society.



"Observation systems with real-time open data are key elements for innovation initiatives and are required for turning data into jobs."
Joaquin Tintoré

Paolo Lotti (Association of Italian Shipbuilders, Ship repairers and Ship Equipment Manufacturers, ASSONAVE, Italy) emphasised that maritime industries such as renewable energies, fisheries, shipbuilding, the oil and gas industry were continually innovating and developing new technologies that support and enable blue growth. He noted there was also a need to better integrate the European scientific knowledge base and industry should be included in this effort. He concluded by saying that the ancient Greeks considered the Mediterranean a bridge between countries and that today this should remain an important concept to foster innovation.



"Industry is central to the European scientific knowledge base and we cannot have blue growth without supporting synergies." Paolo Lotti



PLENARY SESSION

Finalization and approval of the Rome Declaration

Edward Hill (Chair, Rome Declaration Drafting Group) thanked all the EurOCEAN 2014 participants for their valuable comments and suggestions throughout the Conference, noting that the interactive nature of discussions had led to important refinements to the text of the Rome Declaration. He noted the Rome Declaration was a statement of intent by the European marine community for how to work together and advance marine science over the next five years. He stressed that science could not act alone and that the Declaration called for Member States and Associated Countries, the European Commission, the European Parliament, the European Investment Bank and the private sector to support the four high level goals and associated actions to deliver the vision for achieving impact, global leadership and sustainable blue growth for Europe. Edward Hill announced that on the basis of the support from the floor, the EurOCEAN 2014 Conference had approved the Rome Declaration. This was greeted by sustained applause from participants.



CLOSING PLENARY SESSION

Presentation of the Rome Declaration

Closing statements from:

Mauro Bertelletti,
Italian Ministry of Agriculture,
Food and Forestry Policy

Rudolf Strohmeier,
Deputy Director-General,
Directorate-General Research
and Innovation (DG RTD),
European Commission

Ricardo Santos,
Member of the European
Parliament (MEP), Portugal

Fabio Trincardi,
National Research Council of Italy
(CNR), Italy

Jan Mees,
Chair, European Marine Board
(EMB)

Jan Mees (Chair of the European Marine Board) welcomed distinguished guests Rudolf Strohmeier (Deputy Director-General, Directorate-General for Research and Innovation, European Commission), Mauro Bertelletti (Italian Ministry of Agriculture, Food and Forestry Policy), Ricardo Santos (Member of the European Parliament). Each of these guests were presented with an approved version of the Rome Declaration that had been adopted during the previous session. Jan Mees asked that the Declaration be seen as a common call for action by the European marine scientific community. Hard copies of the final Rome Declaration were disseminated to all the Conference participants.



Official presentation of the Rome Declaration, from left to right: Edward Hill, Rudolf Strohmeier, Mauro Bertelletti, Ricardo Santos and Jan Mees.

Closing statements:

In his message, **Mauro Bertelletti** (Italian Minister of Agriculture, Food and Forestry Policy), commended the Conference participants on delivering the Rome Declaration and expressed his hope that different actors with responsibility for the marine environment would work together to promote its implementation. He stated that decision making affecting maritime activities such as fisheries and aquaculture, should be underpinned by solid science. Equally important, in his view, was the coordination and regionalization of Mediterranean Member States and neighbouring countries, as outlined by the Declaration. He noted the Mediterranean region was complex both environmentally and politically and managing it requires an integrated approach involving all stakeholders. He anticipated that the Declaration would receive the full support of the Italian government and would place the Mediterranean at the centre of Europe to boost new ideas and growth.



"The Rome Declaration is a crucial policy document that shall be endorsed by the Italian government."
Mauro Bertelletti



"Public engagement in marine matters relies on improved communication between scientists and society, and policy makers."

Rudolf Strohmeier

Rudolf Strohmeier (Deputy Director-General, Directorate-General Research and Innovation, European Commission) explained the new approach of the European Union in light of the obligation to keep the ocean and seas in good condition for the next generation, considering current economic, energy and climate challenges. With a view to generating growth and wealth, he explained the new agenda of the European Commission was designed around ten policy priorities most of which have direct or indirect relevance to marine scientific challenges. He also stated that the blue economy needed knowledge and would require new technologies for multiple sectors e.g. aquaculture and deep-sea mining.

Rudolf Strohmeier noted that in the period 2007-2013, the EU contributed a substantial amount of funding to marine research through FP7. He predicted that this support would continue in Horizon 2020 with a focus on blue growth, spearheaded by the Marine Resources Unit within the Directorate-General for Research and Innovation.

He drew attention to the new Action Plan for Innovation in the Blue Economy which, he noted, included a number of ambitious targets including the creation of an online marine research information platform for dissemination of research results and the development of a Skills Alliance by 2016. He invited the stakeholders to assist this process of mapping the needs and skills for tomorrow's work force.

Referencing the Rome Declaration, Rudolf Strohmeier encouraged broad commitments to a wider understanding of the benefits of the ocean to the daily lives of European citizens. He stressed the importance of increasing the ocean literacy of European citizens and also emphasised the importance of delivering an integrated Ocean Observing system across all sea basins through ensuring that the European Ocean Observing System (EOOS) was compatible with global infrastructures and makes better use of data generated by Group on Earth Observations (GEO) and Copernicus services.

Rudolf Strohmeier called on the audience to note the recently published guidelines for synergy between Horizon 2020, structural and investment funds. He concluded by expressing his vision that steps be taken to further align research agendas to support blue growth in Europe. For this vision to be translated into action, Rudolf Strohmeier urged everyone to take responsibility for its implementation.



"While blue growth should be a strategic priority, our first obligation is to ensure that the oceans are kept healthy and productive to safeguard the future of our grandchildren in a time of change."
Ricardo Santos

Ricardo Santos (Member of the European Parliament) stated that throughout his long involvement in European research, he had observed the European Marine Board (EMB) contribution to a sustainable and innovative vision aimed at advancing marine science in Europe but with a global perspective. He stated that the Rome Declaration represented a major step forward and he would make sure that it delivered impact on the strategic agenda for marine science in the framework of blue growth. He also commended the EMB for its achievements over the past fifteen years and for its frequent interaction with important stakeholders such as the European Commission. He highlighted that knowledge at a global scale is required to advance the blue economy and expressed his commitment to communicate to policy makers that the future relies on knowledge of the seas and oceans. He concluded that, despite regional strategies, there is only one ocean and one planet. He made a call for greater cooperation and integration in Europe, as emphasized in the Rome Declaration, to achieve the goal of healthy and productive seas and oceans both in our own lifetimes and for future generations.



"It will be necessary to capture the benefits of emerging science and innovation opportunities on a global perspective as both offer a vehicle for peace and dialogue."
Fabio Trincardi

Fabio Trincardi (National Research Council of Italy, CNR, Italy) acknowledged that this was the first time in recent years that a EurOCEAN Conference had taken place in the Mediterranean, a site of cultural heritage and the convergence of continents. On behalf of President Luigi Nicolais, he thanked all participants for their outstanding contributions across many different sessions. He emphasized the importance of the Integrated Maritime Policy as a fundamental asset underpinning blue growth in Europe and paving the way for integrated approaches to protect Europe's food and energy security. Furthermore, he noted the necessity of a regional approach to managing Europe's seas. He noted this was particularly important for the Mediterranean, with its unique characteristics and economic potential in areas such as tourism.



"The Rome Declaration is not only a call but also a promise that we, the marine community, are ready to deliver." Jan Mees

In his closing speech, **Jan Mees** (Chair of the European Marine Board) stated that the EurOCEAN 2014 Conference had been a great success. He thanked all of the participants for their active contribution in creating a positive energy and friendly atmosphere and for recognizing the importance of the Rome Declaration and its clear intent to move marine science to the next level. He also gave thanks to the speakers and chairs for contributing so effectively to the discussions and expressed his special thanks to Quentin Cooper of the BBC for raising the energy of the Conference through his excellent moderating of key plenary sessions. Jan Mees also acknowledged the important contributions of the EurOCEAN 2014 organizing committee, the organizing team, Conference rapporteurs and the members of the Rome Declaration Drafting Group. He paid tribute to Edward Hill, Chair of the Rome Declaration Drafting Group, for effectively managing discussions during the drafting process and throughout the Conference itself.

Jan Mees ended with a final thank you to the local host, the National Research Council of Italy (CNR) for their warm hospitality in Rome and for providing excellent facilities. He then formally closed the Conference.



Annex I: A tribute to Kostas Nittis

In memoriam Kostas Nittis



At EuroOCEAN 2014, tributes were paid to Kostas Nittis of the Hellenic Centre for Marine Research (HCMR) who sadly passed away on 30 July 2014. During the Opening Session of the Conference on Tuesday 7 October 2014, Vangelis Papathanassiou of HCMR commended his colleague's commitment towards promoting and advancing marine research in Europe, both through his own research, but also in the leadership he provided across many European initiatives, networks, projects and programmes. At the time of his death, Kostas Nittis was Secretary General of EuroGOOS AISBL and had only recently completed a term as Chair of the European Marine Board.

The EuroOCEAN 2014 session '*Building a European Ocean Observing System (EOOS)*' on Wednesday 08 October 2014, was specifically dedicated to Kostas Nittis. A further tribute was paid by Erik Buch who said that he would always remember Kostas as a strong advocate for ocean observation and as a visionary and talented diplomat.

Among his many achievements, Kostas Nittis led the complex process of drafting the Ostend Declaration (2010) and delivery of the EMB flagship publication *Navigating the Future IV* (2013). A distinguished oceanographer, his sphere of influence extended well beyond his own research field. Through participation in multiple projects and networks, he was a leading figure in Europe for the promotion of marine science and setting the marine research agenda. Those fortunate to have known and worked with Kostas Nittis will remember his wisdom, integrity, diplomacy and a steady calmness which concealed a determination to effect positive change.

Annex II: EuroOCEAN 2014 reception: Celebrating 15 years of the European Marine Board



On 7 October 2014 the European Marine Board (EMB) celebrated its 15 year anniversary celebration at EuroOCEAN 2014. Sigi Gruber, Head of the Marine Unit (Directorate-General Research and Innovation, DG RTD, European Commission) and Jan Mees, European Marine Board Chair, both highlighted the achievements of the Marine Board, describing its history and evolution over the years. The stressed the uniqueness of its rigorous processes and the importance of EMB publications in influencing the science and maritime policy agendas at European and national level. Ricardo Santos, EMB vice-Chair and Member of the European Parliament, noted that the EMB remains truly at the heart of European marine science strategy, referring to its important impact of the flagship publication, *Navigating the Future IV*.

Speakers also highlighted that since its establishment in the early 1990s and the move to a stand-alone organization in 1998, EMB had gained recognition and respect from national and international

decision makers, funding agencies and the marine community itself. Sigi Gruber noted that *“EMB outputs not only promote scientific priorities on the policy agenda, but also channel policy priorities to the scientific community, thus creating an efficient science-policy interface for the European seas and oceans”*. Speakers particularly congratulated EMB on its *Navigating the Future* series which provides a periodic review of the European research and a blueprint for policymakers to develop future research and funding programmes.

Geoffrey O’Sullivan was honoured for his long-term commitment to the European Marine Board. As a tireless advocate for marine science at national and European level, Geoffrey was also an active EMB Delegate since its inception, serving as a two terms vice-Chair. He has also played a crucial role in previous EuroOCEAN Conferences, and has been a key actor in the development of the Galway (2004), Aberdeen (2007) and Ostend (2010) Declarations.

The session concluded with the official launch of EMB Position Paper 21, *Land Beneath the Waves: Research strategies in submerged landscapes and sea level change*¹¹. The paper was produced by an working group convened by the EMB including experts from the geosciences and humanities. The report provides a comprehensive overview of recent progress in the study of submerged cultural heritage and provides recommendations for the new scientific field termed

“Continental Shelf Prehistoric Research”. In his presentation, Nicholas Flemming (National Oceanography Centre, UK) Chair of the Working Group, highlighted that more than 2,500 submerged prehistoric artefact assemblages - ranging in age from 5,000 to 300,000 years - have been found in the coastal waters and open sea basins around Europe, yet few have been properly mapped or assessed for preservation or excavation.



EMB Secretariat with speakers at the 15 years anniversary celebration, EuroOCEAN 2014.

¹¹ <http://www.marineboard.eu/publications-full-list>

Annex III: EurOCEAN networking, exhibition and outreach



EurOCEAN 2014 provided the opportunity for marine and maritime stakeholders to exhibit their work and network with Conference participants. These ranged from national institutes, regional and European projects and networks to international initiatives.

A Press Release¹² was produced for the EuroCEAN 2014 Conference to inform the media and wider society about the key messages of the Conference and Rome Declaration.

The EurOCEAN 2014 Conference movie (© European Union, 2014) 'Our marine environment, striving for the right balance'¹³ was developed and produced by the European Commission in cooperation with the European Marine Board. The four-minute film was played in the opening session of the Conference and emphasised the importance of the ocean with statements such as, 'Oceans cover 70% of the planet, yet very little is known about this precious blue world'. Throughout the movie the importance of sustainable growth around the key pillars of the Blue Growth Strategy (aquaculture, coastal tourism, marine biotechnology, ocean energy and seabed mining) is highlighted.

A twitter hashtag for the EurOCEAN 2014 Conference (#EurOCEAN2014) was assigned for use throughout the Conference. Images and tweets from the Conference were compiled and can be viewed¹⁴ online.



¹² <http://www.marineboard.eu/sites/marineboard.eu/files/public/images/publications/EurOCEAN2014-PressRelease.pdf>

¹³ https://www.youtube.com/watch?v=nCbDjyXe_Tg

¹⁴ <http://tweetedtimes.com/#!/search/EurOCEAN2014/en>
<https://storify.com/CNRDTA/eurocean2014>



EuroCEAN 2014 participants networking at the Conference and exhibition.

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Niall McDonough, Dina Eparkhina (European Marine Board), Sigi Gruber, Ana-Teresa Caetano (Directorate-General for Research and Innovation, European Commission), Enrico Brugnoli, Margherita Cappelletto, Paolo Braico (National Research Council of Italy, CNR), Ferdinando Boero, Annibale Cutrona (National Interuniversity Consortium for Marine Science, CoNISMa, Italy), Alessandro Crise, Caterina Fanara (National Institute of Oceanography and Experimental Geophysics, OGS, Italy).

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Facilitator: Niall McDonough (European Marine Board, EMB)

Members: Jan Mees (Flanders Marine Institute, VLIZ; Chair European Marine Board, EMB), Alessandro Crise (National Institute of Oceanography and Experimental Geophysics, OGS; vice-Chair European Marine Board, EMB), Erlend Moksness (Institute of Marine Research, IMR; vice-Chair European Marine Board, EMB), Gilles Lericolais (French Research Institute for Exploitation of the Sea, Ifremer; vice-Chair European Marine Board, EMB), Ricardo Santos (Fundação Ciência e Tecnologia, FCT; vice-Chair European Marine Board, EMB), Tarmo Soomere (Estonian Academy of Sciences, vice-Chair European Marine Board, EMB), Jacky Wood (Natural Environment Research Council, NERC; vice-Chair European Marine Board, EMB), Kostas Nittis (Hellenic Centre for Marine Research, HCMR; former European Marine Board Chair, EMB), Peter Haugan (University of Bergen; former European Marine Board vice-Chair), Ana-Teresa Caetano (Directorate-General for Research and Innovation, DG RTD, European Commission).

Conference Report

The Conference report was prepared by the European Marine Board and the European Commission (Directorate-General for Research and Innovation)

Editorial team: Kate Larkin, Noémie Wouters, Niall McDonough (European Marine Board, EMB) and Ana-Teresa Caetano (Directorate-General for Research and Innovation, DG RTD, European Commission)

Conference rapporteurs: Nan-Chin Chu, Dina Eparkhina, Veronica French, Kate Larkin, Noémie Wouters (European Marine Board); Stephen Hall and Jennifer Riley (National Oceanography Centre, NOC, UK)

Conference photography: Roberto Bellucci (National Research Council of Italy, CNR), Veronica French, Nan-Chin Chu and Dina Eparkhina (European Marine Board, EMB)

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This publication presents the Conference Report from EurOCEAN 2014 – a major European marine science policy conference which took place on 7-9 October 2014 in Rome, Italy. The report provides the key messages from the Conference including the Rome Declaration, a consensus view of some 340 participants spanning science, policy and industry. The Declaration sets a vision for seas and ocean science to achieve an ecosystem approach to the management of Europe's marine resources as a fundamental requirement for sustainable Blue Growth whilst driving European leadership in marine science and technology. EuroCEAN 2014 was an official event of the Italian Presidency of the Council of the European Union, co-organized by the European Marine Board (EMB), the European Commission (Directorate-General for Research and Innovation), the Italian National Research Council (CNR), National Inter-university Consortium for Ocean Science (CoNISMa), and the National Institute of Oceanography and Experimental Geophysics (OGS).

B.5 Studies and reports



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