JPI OCEANS

Annual Activities 2017

Contributions:

Kathrine Angell-Hansen, Anders Brudevoll, Willem De Moor, John Hanus, Pier Francesco Moretti, Gunnhild Nedberg Grønlid, Tom Redd, George Westmeijer, Jacky Wood

Publication editing:

Willem De Moor

Suggested reference:

De Moor, W., (Eds). JPI Oceans Annual Activities 2017. JPI Oceans, Brussels, Belgium. 2018.

Photo credit frontpage:

Biel Morro on Unsplash

Table of Contents

Annual Activities

Preface

Caron Montgomery, Chair JPI Oceans Management Board '14-'17

2017 was a crucial year for the ocean. Two highly publicized events brought the marine environment to the top of the political agenda globally. At the UN Ocean conference in New York, 193 Member States of the United Nations committed to a set of ambitious measures that will hopefully begin the reversal of the decline of the ocean's health. As a side event to the conference, JPI Oceans together with international partners organised the briefing "Multilateral Science-Policy Partnerships: Generating the Evidence to Underpin SDG Implementation".

At the 'Our Ocean' conference, hosted by the EU in Malta, public and private actors committed more than six billion euro to better manage the marine environment. We are proud that JPI Oceans participated and made commitments on four different research and innovation actions.

I am also very pleased to report on the many ongoing JPI Oceans actions which were implemented throughout the year. Our four microplastics research projects continued their work full steam. It was a great pleasure to see the scientists involved in the projects working together with the Race for Water Foundation. Using the ocean, the sun and the wind as its sole sources of energy, the catamaran of the Swiss Foundation left the port of Lorient in April 2017 for a five-year expedition around the world. Scientists from five JPI Oceans member countries joined the mission at Bermuda, Cuba and Guadeloupe from June to October.

2017 also saw the end of the first JPI Oceans project on the ecological aspects of deep-sea mining, MiningImpact. The project reported on the final results at the Natural History Museum in London and called on the International Seabed Authority to establish protected areas with the same environmental conditions and community composition as in the identified mining areas. Following up on the successful project, several JPI Oceans member countries launched a new joint call for preproposals in August to study the environmental impacts and risks associated with seabed mining.

In short, the year has been packed with activities, new projects and events. It is my pleasure to thank my fellow board members for the three years as a chair of the Management Board, as well as the Secretariat for their dedicated support. I am honoured to hand over the chairmanship to Arvid Hallén, former Director-General of the Research Council of Norway. I wish Arvid all the best and am convinced he will navigate JPI Oceans with a steady hand in open water.

Arvid Hallén, Chair JPI Oceans Management Board

Starting off as the incoming chair, elected in October 2017, I would like to extend my gratitude to Caron Montgomery. I thank Caron in particular for her years at the helm of the JPI Oceans Management Board, during which JPI Oceans launched its Strategic Research and Innovation Agenda, implemented the first actions and projects and prepared JPI Oceans for the future by taking the steps to set up a legal entity.

Looking back at what was achieved in 2017 after taking over the chairmanship, I am proud to say that we could already announce that 19 research and innovation projects were selected for funding resulting from the first call for proposals of the ERA-NET Cofund MarTERA. Together with the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI) and JPI Healthy Diet for a Healthy Life, JPI Oceans identified different aspects of the food and nutrition security challenge and released a new paper describing the scope of a proposed joint research programme. Following a review of national offers, in October several JPI Oceans member countries met in Rome to define an implementation plan for late 2017-2018 on the action on munition in the sea.

Finally, at the second JPI Oceans conference, held in Lisbon, we had the chance to present the progress on these different JPI projects and actions to an audience of policy makers, scientists and industry representatives. The event was a success with more than 250 participants from 28 different countries. We in particular would like to thank our Portuguese partners for their role in the organization of this event and the European Commission for their support through the CSA Oceans 2 project.

As the incoming Chair of the JPI Oceans Management Board I am looking forward to continuing the work of JPI Oceans and further implementing the strategic research and innovation agenda with my Management Board colleagues. With the establishment of a legal entity and new actions and events planned, there will be no shortage of work in the years to come.

List of Acronyms

CSA Oceans 2- CSA Oceans 2 is an Horizon 2020 funded project which supports the implementation of JPI Oceans' Strategic Research and Innovation Agenda.

ExCom- Executive committee of JPI Oceans

JPI- Joint Programming Initiative

JPI Oceans- Joint Programming Initiative for Healthy and Productive Seas and Oceans

MarTERA- ERA-NET Cofund on marine and maritime technologies

MB- Management Board of JPI Oceans

SRIA- Strategic Research and Innovation Agenda

StAB- Strategic Advisory Board

CHAPTER 1

Our Activities

PICTURE CREDIT: JPI OCEANS

Microplastics research projects report first year of activities

The executive summaries of the reports list the main achievements of the four projects which started their work in January 2016.

An overview of the executive summaries can be found below:

- BASEMAN - Defining the baselines and standards for microplastics analyses in European waters – summary 2016
- EPHEMARE - Ecotoxicological effects of microplastics in marine ecosystems – summary 2016
- PLASTOX - Direct and indirect ecotoxicological impacts of microplastics on marine organisms – summary 2016
- WEATHER-MIC - How microplastic weathering changes its transport, fate and toxicity in the marine environment – summary 2016

The projects are the result of a joint call focusing on microplastics in the marine environment launched by ten member countries of JPI Oceans under the Pilot Action "Ecological Aspects of Microplastics" (BE, DE, ES, FR, IE, IT, NL, NO, PT, NO). The member countries selected the four projects for funding from January 2016 for a three year period.

EPHEMARE and WEATHER MIC join Race for Water Odysey

Using the ocean, the sun and the wind as its sole sources of energy, the catamaran of the Swiss Race for Water foundation left the port of Lorient in April 2017 for a five-year expedition. Scientists from five JPI Oceans member countries joined the mission at Bermuda, Cuba and Guadeloupe from June to October.

The solar powered vessel hosted research partners from Vigo University, Bordeaux University, University of Antwerp and Marche Polytechnic University of Ancona and the Norwegian Geotechnical Institute involved in the EPHEMARE and WEATHER-MIC projects. On these two missions, the researchers sampled microplastics in the water column, sediment and beaches and collecting endemic marine organisms such as fish, crustaceans, molluscs and bivalves.

The Scientific team with Sky Sails kite on the background (L to R: Kim van Arkel (R4W), Raimundo Blanco (EPHEMARE), Frederic Sciacca (R4W), Hans Peter Arp (NGI, WEATHER-MIC) Ricardo Beiras (University of Vigo, EPHEMARE)

Samples collected by the WEATHER-MIC project were initially processed on board, after which it these were sent to laboratories in Norway (NGI), Sweden (Stockholm University) and Germany (UFZ and IKTS Dresden) for analyses. The scientists then quantified the microplastics and investigate it for signs of weathering. Of particular interest is a comparison of the signs of weathering in microplastic found in the new areas and other samples collected in the cooler waters of Scandinavia. As part of the initiative, WEATHER-MIC was also forming research collaborations with local environmental researchers in Cuba, providing an opportunity to increase European-Caribbean collaborations on the topic. In general the campaign helped to address the central goal of WEATHER-MIC to better understand and identify how the weathering of microplastics changes their distribution in the ocean, and how this affects their environmental risk.

The EPHEMARE project focused on the effects of microplastics on planktonic and benthic organisms. Apart

from beach sand, sediment and water column, EPHEMARE sampled key species representative of local habitats in an extension of the work currently conducted in Oslo Fjord, Scheldt estuary, Bay of Biscay, Algarve (Portugal) and Adriatic Sea. Back at Bordeaux and Vigo the toxicity of the plastics collected will be tested in laboratory using invertebrate and fish larvae. Although polymers are non-toxic, many plastic additives cause concern because of their deleterious effects on those highly sensitive early life stages, and EPHEMARE scientists have adapted international standard procedures to be applied to marine organisms.

Both research projects also used the Race for Water Odyssey to create local awareness of the risks and possible solutions related to microplastics, and promote research and action on this topic.

Munition in the sea

On October 6, 2017, several JPI Oceans member countries met in Rome to define an implementation plan for late 2017-2018

The meeting on the joint action on munition in the sea, led by Italy, followed on a review of national offers which identified activities to be implemented with and without additional external efforts. At the meeting participants discussed the planning and expected outputs of the joint activities in 2018. The action aims to further structure the EU scientific cooperation on the issue and provide a platform for collaboration with operators to tackle the challenge of Munitions in the Sea.

The future activities will address:

- a scenario-based workshop to exchange practices on solutions/procedures and address the main gaps,
- a workshop to identify the scientific and technological state-of-the-art and paths to fill the gaps,
- a design for cost-efficient joint activities between the military and civil communities,
- a proposal for the rationalization and re-utilization of data from seabed mapping.

For 2018, a workshop is planned in Oslo by the Research Council of Norway (RCN) and Norwegian Defence Research Establishment (FFI) to exchange information and establish best practice recommendations on responsibility, technology, risk assessment, and procedures regarding munitions in the sea.

MarTERA ERA-NET Cofund on marine technologies: outcomes second step

In response to the joint call launched in December 2016, 19 proposals requesting 23 million Euro were selected for funding.

Following the ranking of the International Evaluation Panel (IEP), the MarTERA Steering Committee recommended 19 full proposals for funding. The joint call was initiated by 18 funding organisations of the former ERA-NET MARTEC consortium and JPI Oceans members from 16 countries/ regions in December 2016. After the first phase of the joint call MarTERA received 96 pre-proposals requesting 104 million Euro. From the 96 pre-proposals MarTERA partners selected 44 pre-proposals which were invited to submit a full proposal for the second step in the procedure.

MarTERA partners and priorities

EU Member States countries/regions: Belgium-Flanders, France, Germany, Ireland, Italy, Malta, Netherlands, Poland, Portugal, Romania and Spain;

EU associated countries: Norway and Turkey

Third countries: Argentina, Belarus and South Africa.

The 16 countries supported following maritime and marine technology areas:

- Priority Area 1: Environmentally friendly maritime technologies
- Priority Area 2: Development of novel materials and structures
- Priority Area 3: Sensors, automation, monitoring and observations
- Priority Area 4: Advanced manufacturing and production
- Priority Area 5: Safety and security

Food & Nutrition security: Collaboration FACCE-JPI, JPI Oceans AND JPI HDHL

The three JPI's released a new paper describing the scope of a proposed joint research programme.

Food and Nutrition Security is a complex issue, requiring an integrated food systems perspective. Food and Nutrition Security bridges a number of Societal Challenges; it encompasses the entire food system (land and sea) from farm to fork. The Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI), JPI Healthy Diet for a Healthy Life and JPI Oceans have identified different aspects of this challenge and have published a paper which outlines the scope of a newly proposed joint research programme.

It is well known that the health, environmental, economic, and societal costs will be substantial if no action is taken when it comes to the food system and the underlying challenge of Food and Nutrition Security. Coordination is needed to bring together different research domains and national and international research investments and to ensure involvement of key actors (consumers, primary producers, industry etc.) to stimulate innovation and implementation. Strong stakeholder involvement in JPIs will facilitate knowledge flow from research towards practice. The coordination between FACCE-JPI, JPI Oceans and JPI HDHL aims to define a research programme to address the challenge of Food and Nutrition Security.

The research is expected to contribute to the implementation of the European Commission's FOOD 2030 initiative, but also to the UN Sustainable Development Goals, by connecting research communities along the entire food value chain to propose adapted, acceptable and sustainable solutions to achieving food and nutrition security. It will promote the building of lasting transdisciplinary coordination across a range of fields. The research to be undertaken will help to provide solutions for providing sustainable and resilient food systems for nutritious food from land and sea to feed an ever-changing world.

Final meeting MiningImpact project

For three years researchers from eleven countries have been working intensively on the "MiningImpact" coordinated by the GEOMAR Helmholtz Center for Ocean Research Kiel. Project partners discussed their findings at the project`s final meeting at the Natural History Museum London.

Until recently it was widely believed that the large deep-sea plains in the central Pacific were very uniform and only sparsely populated. As researchers of the "MiningImpact" project have found out this is not the case though: the ecological diversity in the deep sea is enormous.

The findings have implications for assessing environmental risks of proposed mining of metal ores from the deep sea. That is exactly what the 25 partner institutions of the project have been working on during the past three years. "We wanted to find out what would happen in the central Pacific if manganese nodules were to be mined at industrial scale," said project coordinator Dr Matthias Haeckel from the GEOMAR Helmholtz Center for Ocean Research Kiel. Participants met at the Natural History Museum London (NHM), one of the project partners, for the final symposium. They not only discussed the results of the individual working groups with stakeholders, such as regulators, NGOs, and companies, but also put forward actual recommendations on how the deep-sea ecosystem could be protected.

A key finding is that the habitat formed by manganese nodules is home to specific sessile and mobile fauna. Species abundance and diversity is related to the nodule density. On the numerous seamounts in the most important area for manganese nodules, the Clarion-Clipperton-Zone (CCZ), different species occur compared to the nodule habitats in the plains. "The nodules are essential to preserve the biodiversity in the deep sea," said Dr Haeckel. Furthermore, "MiningImpact" scientists emphasize that disturbance impacts on nodule ecosystems last for many decades and affect numerous ecosystem compartments and functions.

Researchers' recommendations include the establishment of protected areas with the same environmental conditions and community composition as in mining areas. "There are already protection zones in the CCZ. They are useful but additional protected areas inside license areas seem to be necessary," said Dr Haeckel. On the other hand, the project has shown that technology to monitor deep-sea mining is already available. However, an exchange of knowledge between industry and science, as well as a standardization of the investigation protocols is necessary.

These recommendations are directed especially at the International Seabed Authority (ISA). On the basis of the International Convention on the Law of the Sea (UNCLOS), ISA manages the entire seabed outside the exclusive economic zones (200-nautical mile zone) of individual states. The agreement also obliges ISA to ensure the effective protection of the marine environment from possible adverse effects of deep-sea mining. "Therefore the ISA is currently developing legal frameworks for the exploitation if the first states are to apply for mining licenses in the near future," explained Dr. Haeckel. "We are optimistic that our results will be reflected in this mining code."

As early as in the 1970s, there were initial plans for the mining of manganese nodules from the deep sea, but they never proceeded past pilot trials. Manganese nodules are ball- or cauliflower-shaped pieces of ore, which occur mostly at depths below 4000 meters on the deep seabeds. They consist not only of manganese, but also contain iron as well as coveted metals, such as copper, cobalt and nickel. "The technical effort to get them out of the deep sea is still extremely high. But the demand for metals is increasing and will continue to do so with a growing world population," Dr. Haeckel, "we should be prepared if a country wants to start mining deep-sea ores."

The JPI Oceans MiningImpact project was initiated by German Federal Ministry of Education and Research (BMBF) which provided 118 days of ship time for onsite research in the Pacific on the RV SONNE. Over the course of three cruises, researchers from 11 countries mapped habitats, studied deep sea ecosystems and investigated their functioning in addition to predicting and identifying the environmental implications of nodule and sediment removal, sediment plume dispersion and re-deposition caused by mining activities. The project started in January 2015 and runs for 36 months with an overall budget of approximately €9.5m.

Joint call: Ecological aspects of deep sea mining

On August 1, 2017, several JPI Oceans member countries launched a new joint call for preproposals to study the environmental impacts and risks associated with seabed mining.

The call was launched to follow-up on the MiningImpact project which was conducted under the framework of JPI Oceans. It calls for cruise proposals for the RV SONNE in early 2019 in the Clarion-Clipperton Fracture Zone (CCZ), subequatorial eastern Pacific.

In order to support the formation of consortia, a virtual brokerage space was set up. Projects are expected to start from July 1, 2018. Each application for a joint project was requested to involve researchers from at least three funding partner countries.

Funding Partners

- Belgian Federal Science Policy Office (BELSPO) and Flanders EWI Department, Belgium
- The Federal Ministry for Education and Research (BMBF), Germany
- Research Council of Norway (RCN), Norway
- The Netherlands Organization for Scientific Research (NWO), The Netherlands
- Fundação para a Ciência e a Tecnologia (FCT) and Direção-Geral de Política do Mar (DGPM), Portugal

Associated partners with in-kind contributions included:

- France
- Italy
- Sweden
- International Seabed Authority (Jamaica Headquarters)

Focus of the Call

Project proposals were expected to address the topics outlined in the call text:

- the fate and impact of the particle plume generated during mining operations,
- the definition of appropriate indicators of ecosystem health and threshold values for "harmful effects" on the environment as well as
- measures to mitigate significant adverse effects,
- an assessment of associated environmental risks, and
- implementation of scientific knowledge and respective uncertainties into improved legislation, including analyses that address the science-policy interface.

European marine sensors calibration network

The action launched and led by Greece aims to establish a permanent working group for calibration activities and will propose a future strategic plan towards a permanent, pan-European calibration grid to support the activities of marine observatories.

The action involves the research community, the National Metrology Institutes (NMIs) and industry from the participating countries. The group had its first major meeting in Brest, France, on 13 October 2016 and developed factsheets (on pH, salinity, and fluorescence) and one white paper summarizing the challenges and outlining the rationale for this action.

From the remaining three variables after careful examination pH was selected as the first test case. Today, pH is the only one quantity internationally recognized as a parameter to measure the acidity of seawater. In light of the mentioned difficulties of measuring seawater acidity due to multiple possible definitions and different measurement methods a link between different pH measurements procedures used in the field may overcome the current limitations in terms of comparability of measurements results.

Therefore, the aim of this proposal is to provide a sound methodology to ensure the continuity when comparing seawater acidity measurements between current and historical measurements. As a next step the group will investigate funding possibilities for the planned work.

Background

Calibration, unlike validation, which can be performed with various ways and methods, requires standardised techniques and specialised equipment. As it was revealed through the JERICO project activities and in particular Deliverable 4.1 "Report on existing calibration facilities", very few observatory operators actually maintain dedicated calibration facilities with trained personnel. Thus very often sensors are shipped to manufacturers on a regular basis which is neither convenient nor cost efficient. Moreover maintenance intervals have to be planned according to the requirements of each sensor (need for double sets of sensors). Thus transport and calibration costs often have a major contribution on total running costs. Partners operating calibration facilities often face difficulties in maintaining dedicated personnel positions as funding is variable and rather insecure. Although there is significant experience among European research institutes on calibration methods, at present each lab works independently with no or very little connection with other labs.

Therefore, the development of a pan-European calibration grid is proposed. The grid will be open to the whole marine community and in close connection with the national metrological institutes while in order to maximise benefits and minimise costs it can have a 2 level approach separating calibration procedures into primary and secondary. In the first level, labs capable of handling reference calibration procedures will be identified and appointed as Primary Reference Nodes (PRN) where secondary calibration instruments can be calibrated. Level 2 or Secondary Reference Nodes (SRN) will use the secondary reference instruments calibrated at PRN and will be responsible for the calibration of the day-to-day operational sensors around European Waters.

CSA Oceans 2

CSA Oceans 2 is a Horizon 2020 project which supports the implementation of JPI Oceans' Strategic Research and Innovation Agenda.

At the meeting of 16 June 2016 the JPI Oceans Management Board, in its capacity as the steering board of the CSA Oceans 2 project, agreed to support workshops to initiate new JPI Oceans joint actions namely: the Joint Action on Cumulative Effects of Human Activities, the Joint Action Integrated Assessment of Effects of New Pollutants.

Joint action Cumulative effects of human activities

The JPI Oceans Strategic Research and Innovation Agenda recognized the need to improve the current knowledge to identify environmental sensitivities to cumulative effects of human pressures over longer timeframes, at all levels of ecosystem organisation and geographic scales, and to improve tools for assessment. A first workshop was conducted in Utrecht (Netherlands) on 24 and 25 April 2017 with the objective to draw up a roadmap. The workshop was chaired by the representatives of the lead countries the Netherlands and Estonia. A roadmap, including activities and type of tools (calls, hubs...) was drafted and presented at the Management Board meeting in Lisbon in October.

Joint action Integrated Assessment of effects of new pollutants

In the meeting of the Management Board in June 2016 it was agreed to partly support an expert workshop in autumn 2016 addressing the issue of Integrated Assessment of effects of new pollutants and the lack of data for effect-based assessment systems in general and target matrices (e.g. sediment and biota). Under the lead of Norway and Spain the participating countries held a workshop in June in Brussels.

At the workshop the participants discussed the potential activities and objectives of this joint action. It was decided that the action should aim to reinforce the scientific basis for cost-effective integrated monitoring and assessment of – especially novel – contaminants and the pollution risk they pose, by extension of the marine ecotoxicological databases. In addition the action should develop, test and apply thresholds/targets/assessment levels usable for assessment of biological effects (and impacts) and ultimately Good Environmental Status.

The proposed action should further develop a core set of methodologies and techniques for monitoring and assessment of biological effects including contaminant mixture actions, effects on genetic composition of populations and effects at different trophic levels (taking into account bioaccumulation/biomagnification) to be used in a cost-efficient integrated monitoring and assessment protocol.

The roadmap presenting the outcomes of the workshop was presented to the JPI Oceans Management Board held in October in Lisbon.

Other activities

A methodology (incl. the questionnaire 'Perspective of JPI Oceans Joint Actions on enhancing the public-private connection' and interviews) has been designed to develop specific suggestions on to enhance the link between JPI Oceans and private stakeholders. A workshop addressing the involvement of industry and private stakeholders was organised at the EU maritime days in May 2017.

An international statement for JPI Oceans was developed which sets out in detail the rationale and principles of why JPI Oceans should engage internationally. Direct engagements took place with international partners in bilateral context with for example US, Canada, India and in multilateral context with organisations such as G7, IOC (UNESCO) and Belmont Forum.

A high level working group, with agreed terms of reference and joint chairmanship has been established between the JPI Oceans Management Board and the Steering Board of the BONUS 185 programme. Jülich and RCN participated in the preparation and joint meeting of representatives of the JPI Oceans Management Board and the Art. 185 BONUS project on 7 February 2017, the second such high level meeting, and in the BONUS 10th Anniversary event in May 2017 in Helsinki.

Further, the JPI Oceans Strategic Research and Innovation agenda has played a part in informing the development of the PRIMA Article 185, together with the BlueMED initiative. JPI Oceans has a seat at the Advisory Board of the BlueMED CSA.

With the support of CSA Oceans 2, the 2nd JPI Oceans conference was organized in Lisbon on 26 October 2017. The conference presented the first results of the actions and projects initiated under the framework of JPI Oceans (see more below).

In addition, CSA Oceans 2 and JPI Oceans together with international partners organised the briefing "Multilateral Science-Policy Partnerships: Generating the Evidence to Underpin SDG Implementation" as a side event to the UN Ocean conference in New York (see more on p. 19).

Finally, the procedures for the evaluation of policy and structuring actions of JPI Oceans have been developed.

2nd JPI Oceans conference

The 2nd JPI Oceans conference took place in Lisbon on 26 October 2017 and presented the first results of the actions and projects initiated under the framework of JPI Oceans. The event provided an excellent opportunity for stakeholders from research and industry to network and discuss with policy makers from across Europe.

The conference was opened by João Aguiar Machado, Director-general at the European Commission, Directorate-General for Maritime Affairs and Fisheries and MEP Ricardo Serrão Santos. The opening session was followed by a presentation of the diffrent joint actions and projects which JPI Oceans undertakes in collaboration with its member countries.

To highlight the benefits that can be made through the alignment of research agendas and through public-public partnerships all marine and maritime ERA-NETs, BONUS, the joint Baltic Sea research and development programme, and BLUEMED gave an overview of their activities.

Different breaktout sesions ensured more detailed disucssions on different topics. A panel of maritime industry representatives discussed how cross-cutting technologies can enable innovation in the different maritime sectors.

The session on marine science communication gave an overview of the current activities and planned actions with regards to ocean literacy and highlighted how to overcome the barriers that researchers face when trying to communicate their work to non-specialists. In the session on open science representatives from EMODnet, the European Commission and the Foster Plus project, exemplified how scientists can optimally make their data available online and publish in open access. In the auditorium in the meantime panellists discussed an agenda and vision for international cooperation in marine science. Together they reflected on ways to bring together and build on the various ongoing international initiatives and levels in ocean science (SDG 14, UN Decade for Ocean Science, G7, Belmont Forum, OECD, etc.) and make best use of the increasing momentum for ocean issues on the global stage.

In the subsequent session a high level panel discussed the basic science and technology needed to understand the ocean from micro to macro scales and address the key challenges and opportunities in the oceans for 2030 and to meet policy obligations. The conference was finally closed by Telmo Carvalho, representing the Portuguese Minister of the Sea Ana Vitorino, Sigi Gruber, the Head of Marine Resource Bioeconomy Directorate, at DG R&I at the European Commission and Jacky Wood, Acting Executive Director of the JPI Oceans secretariat.

CHAPTER 2

Strategic role

PICTURE CREDIT: JPI OCEANS

Commitments 'Our Ocean' conference

On the occasion of the high-level 'Our Ocean' conference hosted by the EU, JPI Oceans announces four commitments for 2018-2019.

Since 2014, the Our Ocean Conference series has brought about 250 concrete actions across the world, committing over 8.2 billion Euro (US$ 9.7 billion) and designating 9.9 million square kilometres as new Marine Protected Areas (MPAs). In the spirit of the successful 2014, 2015 and 2016 editions, the conference aims to inspire and empower entrepreneurs, scientists and civil society to identify solutions and commit to actions. These actions are aimed to reduce marine pollution, manage aquatic resources sustainably, mitigate climate change, and set up marine sanctuaries in line with the UN Sustainable Development Goals.

On the occasion of the conference hosted in by the EU, JPI Oceans committed to four actions:

1. Understanding Deep-Sea Ecosystems

Under the framework of JPI Oceans; Germany, Norway, Portugal, Belgium and the Netherlands, announced to commit to a second phase of research funds of approximately 7 million Euro in 2018 and to provide ship time to study the impacts of marine mineral mining. This research will advance the scientific knowledge on deep-sea ecosystems, providing a scientific basis for assessing the environmental impacts and risks of future seabed mineral extraction and continue to inform the establishment of a framework of best environmental practices for the management of potential seabed mining operations under the auspices of the International Seabed Authority.

2. MarTERA: Developing sustainable maritime technologies

Under the framework of JPI Oceans; Germany, Argentina, Belarus, Belgium, France, Ireland, Italy, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, South Africa in partnership with the European Commission (via its Research and Innovation Programme H2020), announced to commit research funding of up to 30 million EUR to marine and maritime technology development in a first call. In 2018 the partnership, "MarTERA", will fund the development of environmentally friendly maritime technologies, novel materials and structures, sensors, automation, monitoring and observations, advanced manufacturing and production, safety and security.

3. Microplastics

Under the framework of JPI Oceans; Belgium, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain and Sweden, have an ongoing commitment of over 7.5 million Euro on transnational research projects, investigating microplastics in the marine environment. The research will, by 2018, promote the validation and harmonisation of methodologies and protocols for microplastics research, a key concern raised in the respective G7 and G20 Action Plans to Combat Marine Litter.

4. Blue Bioeconomy

Under the framework of JPI Oceans; 17 European countries announced, to have the ambition to commit at least 30 million Euro in partnership with the European Commission's Horizon 2020 programme by 2019 to fund research and innovation that will support the development of a sustainable and climate-friendly blue bioeconomy, targeting zero waste, production, harvest and exploitation of aquatic biomass for use in food and other bio-based value chains.

Cross-cutting maritime technologies workshop

On May 18th, JPI Oceans hosted a workshop at the European Maritime Day on Enabling and Cross-Cutting Maritime Technologies. Experts from different industries were brought together to break the "silo mentality" and identify cross-cutting technology-related challenges that act as bottlenecks for multiple sectors.

An active participation from the audience also provided vital insights into the current state of play. During the event it was stressed that well established maritime sectors can benefit from technological innovations as well as the new 'Blue Growth' sectors. Specific cross-cutting technologies which may offer major advantages have already been identified (e.g. in Lloyds Register Global Marine Trends 2030).

From an industry perspective, there is a need for new technologies now. If European developments cannot offer solutions, industry will look into international sources. Pierre Perrocheau, representing SEA Europe, clearly addressed this point. The European maritime industry is proactive but needs continuous investment to maintain its leadership.

Iain Shepherd, from the business-led consortium Marine Southeast, pointed out how multipurpose offshore platforms under development offer tremendous opportunities, creating new value chains by serving multiple end-user markets. Challenging initiatives such as the development of autonomous vessels and platforms (e.g. cargo carriers) are ongoing.

As well as identifying the state of play, participants also discussed what needs to be done. It was thought that multiple stakeholders' action is needed to define common goals and keep a competitive advantage. Innovation funding/projects should aim to identify clear targets, to define the common ground for a worldwide fair competition, including themes and good processes, as well as responsibilities for each step; skilled and fit for purpose people are key.

In terms of ocean literacy, it was agreed that society needs a wider, more holistic understanding of the oceans role in sustainability. Environmental restoration actions should only be implemented if they are not an excuse for delaying the ban of a misbehave (e.g. littering) and following a well-informed debate.

Marine and maritime industry sectors need to learn from each other, but also from non-marine sectors. Co-design of research and innovation programmes with industry is key to ensure that it generates the results needed towards commercialization. Gilles Lericolais, member of the JPI Oceans Management Board and Executive Committee, brought the example of underwater technologies as driver for innovation on future exploration of the sea. A prominent sector where public-private collaboration is key.

FROM LEFT TO RIGHT: PIERRE PERROCHEAU, IAIN SHEPHERD AND ULRICH WOLF

Industry will participate in these discussions if the topics are interesting. But implementing innovation and scaling up also needs to be supported by infrastructures, test-beds, and the right regulatory environment. It is also important to access and make best use of existing knowledge.

Considering a massive development and deployment of autonomous platforms and vehicles, together with an estimated drop of technology costs in the next years, the definition of new rules and regulation for the use of autonomous multi-use systems is needed. Alongside industry developments there is also a need for scientific baseline assessments of the marine environment and a need to develop ways to identify and measure impacts.

JPI Oceans side event - UN Ocean conference

On 7 June 2017, JPI Oceans together with international partners organised the briefing "Multilateral Science-Policy Partnerships: Generating the Evidence to Underpin SDG Implementation" as a side event to the UN Ocean conference in New York.

The side-event, supported by CSA Oceans 2, highlighted the importance of scientific evidence and knowledge for the sustainable development of the oceans and the realisation of the implementation of Sustainable Development Goal 14. In particular, the briefing stressed the key role of international partnerships for generating and providing the scientific evidence for a knowledge-based governance of the ocean and the need to use and build on existing partnerships such as JPI Oceans, the Atlantic Ocean Research Alliance, the G7 efforts on the Future of the Ocean, IOC-UNESCO and its proposal for an International Decade of Ocean Science as well as the International Council for the Exploration of the Sea (ICES). Moreover, the briefing showcased a number of cutting-edge research endeavours which are working on delivering the necessary knowledge for an effective governance of the Oceans.

TIM EDER, FEDERAL MINISTRY OF EDUCATION AND RESEARCH - GERMANY (BMBF), GERMAN MEMBER OF THE JPI OCEANS MANAGEMENT BOARD

The side-event took place in the context of the high-level United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources hosted by the Governments of Fiji and Sweden at the United Nations Headquarters in New York. At the conference, Governments, the United Nations system, other international organisations, NGOs and civil society organisations, academic and research institutions, the private sector, philanthropic organisations and other actors announced 1402 voluntary commitments geared at driving implementation of Sustainable Development Goal 14 and its associated targets. Furthermore, the Conference adopted by consensus an intergovernmentally agreed Call for Action Our Ocean, Our Future to support the implementation of Goal 14.

Tim Eder (BMBF), German member of the JPI Oceans Management Board, presented how the member countries of JPI Oceans were cooperating to provide scientific evidence for effective governance of the oceans. Tim highlighted how through the alignment and integration of national research efforts, member countries were creating evidence as a foundation for informed decision-making, for instance in the field of microplastics and deep-sea mining.

Craig McLean (NOAA) outlined how the Atlantic Ocean Research Alliance is seeking to increase knowledge of the Atlantic Ocean and its dynamic systems by aligning ocean observation efforts to improve ocean health and stewardship and promote the sustainable management of its resources. In particular, he highlighted the need for joint mapping to better understand the ocean and its resources. With only 15% of ocean depths directly measured and 50% of the world's coastal waters not even surveyed, Craig therefore called for an international campaign to map the Atlantic and the global ocean.

On behalf of Italian G7 Presidency, Marco Borra gave an update of the cooperation of the G7 states on the Future of the Ocean. The G7 are working together to (i) support an initiative for enhanced global sea and ocean observation (ii) support an enhanced system of ocean assessment through the UN Regular Process to develop a consensus view on the state of the oceans; (iii) promote open science and improvement of the global data sharing infrastructure; (iv)strengthen collaborative approaches to encourage the development of regional observing capabilities and knowledge networks; and (v) promote G7 political cooperation by identifying actions needed to enhance routine ocean observations.

Chair of UNESCO's Intergovernmental Oceanographic Commission, Peter Haugan, presented the proposal for an International Decade of Ocean Science for Sustainable Development 2021-2030. The aim of the decade would be to build an inventory of marine resources and identify opportunities to manage these resources in a sustainable manner, gain a better quantitative knowledge of the ocean floor and water column ecosystems, understand the impacts of cumulative stressors on the ocean and recommend specific actions to obtain more benefit from the ocean, and share knowledge and enhance capacities through the transfer of marine technology, leading to economic benefits for SIDS and Least Developed Countries.

Researcher from Stockholm University, Matt McLeod, showcased the results of the JPI Oceans Weather-MIC project to understand the environmental impacts of microplastic in the marine environment and how weathering of plastic in the ocean changes its transport, fate and toxicity. He informed that science could say with certainty that the global ocean is polluted with plastic, trends are not clearly established, but the pollution cannot readily be reversed, and that adverse effects on wildlife have been observed even in remote areas. Moreover, Matt asserted that pollution that is globally distributed and poorly reversible (like plastic) fits the profile of a planetary boundary threat.

Libby Jewett, Director of the NOAA Ocean Acidification Program, showed what science was doing to study and address the impacts of ocean acidification. Libby stressed the importance of the development of new sensors that would enable a better and more precise measurement of ocean acidification and the impact it has on the marine environment. Expanding and improving global efforts to train scientists would also be necessary to assess the full scale of ocean acidification.

Ann Vanreusel (Ghent University) outlined which input and knowledge is the scientific community currently generating for the governance of deep-sea ecosystems. Drawing on the latest knowledge from the JPI Oceans MiningImpact project as well as the EU-funded MIDAS project, Ann presented concrete policy recommendation that the scientific community had developed to inform the ongoing deliberations at the International Seabed Authority for the regulation of seabed mining. Amongst others, she highlighted that (i) conservation areas need to match habitat characteristics of mined areas, (ii) the need to define indicators of ecosystem health and threshold values for "harmful effects" on the environment as well as rules for avoiding or mitigating them, (iii) the need for standardization of monitoring technology, and (iv) the need to develop a concept for spatial management and restoration to minimize large-scale impacts.

Finally, Anne Christine Brusendorff, ICES General Secretary, showed how the ICES scientific community was working to provide advice on fishing opportunities, including special advice on climate change and projections for moving stocks/species distribution, on sensitivity and vulnerability of stocks to climate change, on changes in fish distribution and on the impact of fisheries on the seafloor. As such, ICES science provides important scientific advice that helps to ensure the implementation of SDG14 and for the sustainable management of the ocean and its resources.

In the discussion that followed panellists highlighted the need to generate and provide scientific advice. In order to enable informed and effective decision-making and governance of the ocean, international collaboration between ministries and research funding agencies to jointly fund new knowledge generation as well as efficient and effective science-policy partnerships and processes are of fundamental importance. Panellists stressed that we should build on existing international partnerships, that we need to learn, exchange practice and partner globally as well as improve these mechanisms in order to meet the 2030 targets.

CHAPTER 3

Our Governance

PICTURE CREDIT: JPI OCEANS

New Chair and Vice Chair elected

At its 15th meeting, the JPI Oceans Management Board members elected Arvid Hallén as Chair and Joachim Harms as Vice Chair.

The election took place at the meeting on 24-25 October in Lisbon hosted by the Portuguese Foundation for Science and Technology and held back to back with the 2nd JPI Oceans conference. The new Chair and Vice-Chair are following in the footsteps of Caron Montgomery, DEFRA, UK (Chair 2014-2017) and Lourdes Armesto, MINECO, Spain (Vice-Chair 2014-2016).

Arvid Hallén, elected as Chair under the mandate of the Norwegian Ministry of Trade, Industry and Fisheries, served as Director-General of The Research Council of Norway from 2004 until 2017. After an early career as a researcher he served as Executive Director at Norwegian Institute for Urban and Regional Research from 1987 till 1995. Recently he was member both of the Mid-term Evaluation Panel of the 7th Framework Programme (FP7) of the European Commission and the Ex-post Review panel of FP7. He has been involved as a panel member in evaluations of several research councils and has been member of the Governing Council of Eurohorcs and the European Science Foundation and served as member of the Governing Board of Science Europe. He currently also serves in the boards of Western Norway University of Applied Sciences, The Bjerknes Centre for Climate Research, Copenhagen Business School, Board member and Oxford Research, Norway.

Dr. Joachim Harms, elected as Vice Chair, studied Biology in Darmstadt, where he received his PhD in 1986. He worked as marine zoologist at the Marine Station Helgoland in various interdisciplinary projects. From 1991 to 1992 he worked at the "National Institute of Fisheries Science" in Tokyo. He joined the Research Center Jülich in 1994 and was responsible for international research projects in co-operation with Brasil, Israel and Indonesia. In 2001 he took over responsibility for the regional research programme of Mecklenburg-Vorpommern. In 2008 he became head of the department PtJ-MGS with the responsibility for the national research programmes MARE:N and GEO:N in the field "System Earth" of the Federal Ministry of Education and Research as well for the programme "Maritime Technologies for the next Generation" of the Federal Ministry of Economic Affairs and Energy. Joachim Harms is member of the BONUS Steering Committee since 2007 and has been a member of the ExCom of JPI Oceans since 2012.

ANNEXES

Annex I: Website - Social Media Statistics

Website analytics

Year	Visits	Unique visitors	Pageviews	Avg. Visit Duration
2013	16,882	9,615	55,914	03:07
2014*	36,139	18,076	155,318	03:01
2015	79,829	48,669	350,926	04:25
2016	88,718	60,009	374,294	05:11
2017	233,145	180,833	611,917	05.05

Website Content & Newslettter

Year	News articles published	Newsletters sent	Newsletter subscribers
2013	32	5	545
2014	37	7	641
2015	25	6	955
2016	26	4	1204
2017	24	9	1430

Social Media & Newsletter analytics

Year	LinkedIn group members	Twitter followers	Facebook likes	Slideshare views (cumulated)	Klout Score
2013	356	457	54	2,589	41
2014	478	707	74	3,357	41
2015	624	1,102	200	6,283	44
2016	787	1,733	408	9,742	49
2017	908	2,392	634	11,220	48

* 2014 figures are partly based on Google Analytics in combination with an in-house analytics programme from September 2014 onwards.

Annex II: JPI Oceans presentations at external events

Event & place	Date	Representative
H2020 Blue Arctic project kick off, Berlin	19/01/2017	Jacky Wood
BONUS A 185 10th Anniverary event, Helsinki	4/05/2017	Jacky Wood
Euroean Maritime Day, Poole, JPI Oceans side event	18/05/2017	Various MB members
High Level Group on Joint Prorgramming (GPC) meeting, Brussels	6/06/2017	Jacky Wood
IOC secretariat bilateral, Paris	29/09/2017	Kathrine Angell-Hansen and Jacky Wood
OurOceans conference Malta - Launch JPI Oceans commitments	5/10/2017	Kathrine Angell-Hansen and Jacky Wood
European Marine Board plenary meeting, Galway	18/10/2017	Jacky Wood
Committee of the Regions, marine research event, Brussels	21/11/2017	Jacky Wood
Stavanger Region Board study visit to Brussels	24/04/2017	Anders Brudevoll
NTNU Student Group study visit to Brussels	16/10/2017	Anders Brudevoll
Norwegian EU Minister JPI Oceans office	18/01/2017	Kathrine Angell-Hansen and Jacky Wood
SCAR food kickoff	1/2 02/2017	Kathrine Angell-Hansen
Eurofleets meeting	31/01/2017	Kathrine Angell-Hansen
Ocean governance round table European Parliament	29/01/2017	Kathrine Angell-Hansen and Jacky Wood
Bioeconomy ERRIN network/portal	6/02/2017	Kathrine Angell-Hansen and Jacky Wood
Meeting NOFIMA institute management	7/02/2017	Kathrine Angell-Hansen, Anders Brudevoll and Jacky Wood
Euromarine meeting	8/02/2017	Kathrine Angell-Hansen
MarTERA brokerage event	15/02/2017	Kathrine Angell-Hansen
Visit Spain - Informing ministeries and funding agencies on JPI Oceans	23/02/2017	Kristin Thorud and Kathrine Angell-Hansen
VLIZ Marine Science Day, Ostend	3/03/2017	Willem De Moor
Visit Portugal - Informing MInisteries funding agencies of JPI Oceans and opening Ocean Azul foundation	15/03/2017	Kristin Thorud, Jartrud Steinsli and Kathrine Angell-Hansen
SCAR meeting	30/03/2017	Kathrine Angell-Hansen
Waterborne meeting	4/04/2017	Pier Francesco Moretti/secretariat
PC SCAR meeting	16/05/2017	Tom Redd
Belmont Forum	29/05/2017	Kathrine Angell-Hansen
European Parliament event - SDG14	30/05/2017	Gilles Lericolais and Kathrine Angell-Hansen
UN Ocean conference and JPI Oceans side event, New York	7/06/2017	Anna Jöborn, Tim Eder and Kathrine Angell-Hansen
UN Ocean conference and Belmont side event, New York	7/06/2017	Kathrine Angell-Hansen

G7 preparatory meeting, Naples	13/06/2017	Christina Abildgaard, Pier Francesco Moretti, Kathrine Angell-Hansen and Jacky Wood
Carlos Moedas visit at NTNU/SINTEF Trondheim - STARMUS	17/06/2017	Kathrine Angell-Hansen
Science Business forum FP9 and round table discussions	27/06/2017	Kathrine Angell-Hansen
SINTEF Roundtable	17/09/2017	Kathrine Angell-Hansen
JRC meeting	20/09/2017	Kathrine Angell-Hansen
IOC partnering meeting, Paris	29/09/2017	Jacky Wood and Kathrine Angell-Hansen
Estonian Presidency - DG MARE conference on blue growth	11/10/2017	Kathrine Angell-Hansen
"Beyond 2020: Supporting Europe's Coastal Communities, A European conference on the European Maritime and Fisheries Fund (EMFF), Tallinn"	12/10/2017	Kathrine Angell-Hansen
NTNU Alumni event	8/11/2017	Pier Francesco Moretti and Kathrine Angell-Hansen
Final Marinebiotech ERA-NET conference, Oslo	21/11/2017	Kathrine Angell-Hansen
International dimension of partnering with clusters, Norway	28/11/2017	Kathrine Angell-Hansen

Annex III: Management Board

Country	Organisation	Representatives
Belgium	Belgian Federal Science Policy Office (BELSPO) Flemish Government, Department Economy Science and Innovation (EWI) Fonds National de la Recherche Scientifique (FNRS)	*Frank Monteny* *David Cox* *Johan Hanssens* *Gert Verreet*
Croatia	Institute of Oceanography and Fisheries Ruđer Bošković Institute	*Ivica Vilibić* *Sandi Orlić*
Denmark	Innovation Fund Denmark Technical University of Denmark	*Anitha Sharma* *Michael St. John*
Estonia	Ministry of the Environment of the Estonian Republic Ministry of Agriculture	*Rene Reisner* *Katarina Oganjan* *Eve Külmallik*
Finland	Academy of Finland, Research Council for Biosciences and Environment	*Jaana Lehtimäki*
France	French Research Institute for Exploitation of the Sea (IFREMER) French National Research Agency (ANR)	*François Jacq* *Gilles Lericolais* *Maurice Heral*
Germany	German Federal Ministry of Education and Research (BMBF) German Federal Ministry of Food, Agriculture and Consumer Protection Research Centre Jülich (JÜLICH)	*Tim Eder* *Ursula Posselt* *Hartmut Stalb* *Joachim Harms*
Greece	Hellenic Centre for Marine Research (HCMR) Ministry of Education, Research and Relgious Affairs- General Secretariat for Research and Technology	*George Petihakis* *Maria Koutrokoi*
Iceland	The Icelandic Marine and Freshwater Research Institute	*Sigurður Guðjónsson* *Sóley Morthens*
Ireland	Marine Institute Ireland (MI)	*Niall McDonough* *Peter Heffernan* *Ciaran Kelly* *Caroline Bocquel*
Italy	National Institute of Oceanography and Experimental Geophysics (OGS) Italian Ministry of Infrastructure and Transport, Directorate of Maritime Transport and Inland Waterways Italian Consortium for Managing research Activities Venice Lagoon (CORILA) National Research Council of Italy, Marine Technology Research Institute (INSEAN-CNR)	*Angelo Camerlenghi* *Maurizio Coletta* *Pierpaolo Campostrini* *Emilio Fortunato Campana*

Country	Organisation	Representatives
Lithuania	Ministry of the Environment of the Republic of Lithuania (AM)	Dalius Krinickas Viktorija Vaškeviciene
	Research Council of Lithuania	Albertas Bitinas Kornelija Janaviciute
Malta	University of Malta, Physical Oceanography Unit (UM)	Corinne Muscat
Netherlands	Ministry of Economic Affairs, Agriculture and Innovation (EL&I)	Nancy Meijers
	Netherlands Organisation for Scientific Research (NWO) on behalf of the Ministry of Education, Culture and Science	Josef F. Stuefer Bernard Westerop
Norway	Research Council of Norway (RCN)	Arvid Hallén Kristin Elisabeth Thorud
	Norwegian Ministry of Fisheries and Coastal Affairs	Arne Benjaminsen Jartrud Steinsli
Poland	Polish Academy of Sciences; Institute of Hydroengineering (IBW PAN)	Grzegorz Różyński
Portugal	Portuguese National Funding Agency for Science, Research and Technology (FCT)	Sofia Cordeiro
	Portuguese Institute of Ocean and Atmosphere (IPMA)	Nuno Lourenço
Romania	National Authority for Scientific Research, Directorate for European Integration and International Cooperation	Viorel Vulturescu
	University of Bucharest, Faculty of Geology and Geophysics	Viorel Gh. Ungureanu
Spain	Spanish Ministry of Economy and Competiveness (MINECO)	Estrella Fernandez Garcia Esther Chacón
Sweden	Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)	Lisa Almesjö
	Swedish Agency for Marine and Water Management (HaV)	Anna Jöborn
Turkey	Tübitak Marmara Research Center	Cinar Oner
United Kingdom	Department for Environment, Food and Rural Affairs (DEFRA)	Caron Montgomery
	National Oceanography Centre (SOTON-NOCS)	Ed Hill
	Natural Environment Research Council (NERC)	Mike Webb
	Department for Environment, Food and Rural Affairs (DEFRA)	Tarquin Dorrington

The European Commission (DG Research and Innovation) has a status of non-voting member.
The two appointed members are Jacques Fuchs and Sieglinde Gruber.

Meeting	Date	Place
14th Management Board meeting	29 March 2017	Brussels, Belgium
15th Management Board meeting	24-25 October 2017	Lisbon, Portugal

Annex IV: Strategic Advisory Board

Name	Organisation
Catherine Boyen	Centre National de la Recherche Scientifique; Station Biologique de Roscoff (CNRS-SBR)
René P.A. Dekeling	Ministry of Infrastructure and the Environment - Directorate-general for Spatial Development and Water Affairs
Laura Giuliano	Italian National Research Council - Institute for Coastal Marine Environment
Karin Lochte	Alfred Wegener Institute for Polar- and Marine Research (AWI)
Sigve Nordrum	Aker BioMarine Antarctic
Frank Roland	Centre of Maritime Technologies e.V. (CMT)
Nils Christian Stenseth	University of Oslo, Centre for Ecological and Evolutionary Synthesis (UiO-CEES)

* Strategic Advisory Board members were invited to attend all Management Board meetings.

Annex V: Secretariat

Name	Position
Kathrine Angell-Hansen	Strategic Director, Full-time at the JPI Oceans secretariat
Anders Brudevoll	Adviser, Full-time at the JPI Oceans secretariat
Willem De Moor	Adviser, Full-time at the JPI Oceans secretariat
John Hanus	Adviser, Part-time at the JPI Oceans secretariat
Pier Francesco Moretti - PhD	Science Officer, Part-time at the JPI Oceans secretariat
Gunnhild Nedberg Grønlid	Office Assistant, Part-time at the JPI Oceans secretariat
Tom Redd	Scientific Adviser, Full-time at the JPI Oceans secretariat
Jacky Wood	Acting Executive Director, Full-time at the JPI Oceans secretariat

JPI Oceans

JPI Oceans AISBL | Company number: 0691.970.779 | Rue du Trône 4
1000 Brussels | Belgium
Tel. +32 (0)2 626 16 60 | jpioceans@rcn.no

www.jpi-oceans.eu

This publication has been created with input of CSA Oceans 2. The CSA Oceans 2 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 696324