



Towards integrated European marine
research strategy and programmes

Seas-era
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Proposals and developments for regional common programs for long term monitoring of the climate change in Atlantic and in the Mediterranean

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**Proposals and developments for regional common programs for long term monitoring
of the climate change in Atlantic and in the Mediterranean**

CONTENTS

Summary	P.5-6
Introduction	P.7-8
1. Some of the main points to be highlighted for both regions	P.9-15
1.1. Scientific issues and stakes	P.9-14
<i>1.1.1. Atlantic</i>	P.9-10
<i>a) State of play</i>	P.9-10
<i>b) Conclusions</i>	P.10
<i>1.1.2. Mediterranean</i>	P.11-14
<i>a) State of play</i>	P.11-14
<i>b) Conclusions</i>	P.14
1.2. A share use of infrastructures	P.15
2. A scientific program for the Mediterranean Sea	P.16-17
2.1. Introduction	P.16
2.2. Scope	P.16-17
2.3. Expected Impact	P.17
3. Other key outputs for Common Programs in both basins	P.18-20
3.1. Transatlantic cooperation	P.18
3.2. Common actions in H2020 (2014-2015) and for the next programming (2016-2017)	P.18-20
<i>3.2.1 Galway outputs / H2020 (2014-2015)</i>	P.18
<i>3.2.2 Common actions for H2020 next programming (2016-2017) focusing on the Med</i>	P.19-20
3.3. Future perspectives for the common programs	P.20
Conclusions	P.21
Annex1 Seas-Era Workshop on Common Programmes, Paris, 10 February 2014 Agenda	P.22-23
Annex2 List of participants	P.24-25
Annex3 ERA-Net Seasera WP2 – Proposed scientific program for the Mediterranean	P.26-27
Annex4 Flyer Seasera WP2 “Common Program” for the Galway Conference	P.28-29
Annex5 Proposed H2020 TOPIC by ERA-Net Seasera – Med cooperation Research Alliance	P.30-31

Summary

Build alignment of national programs ensuring alignment with national strategies to develop common programs is a long process that ERA-Net Seasera in association with JPI Oceans are trying to achieve

In the two deliverables D 2.1.1 "[General concept of the Common Program](#)" and D 2.1.1 (Part) & M 2.1.1 "[General concept of the Common Programs and guidelines for implementing Common Program](#)", the difficulties to reach these objectives have been identified. The reports provide good practice guidance which aim at developing common programs on common priorities.

Based on the experiences of the previous ERA-Net MariFish, it has been decided to develop, into the Seasera network, the concept of common programs at the regional levels in connection with the regional Strategic Research Agendas (SRAs).

Due to the closer interest of the actors involved, It has been feasible to define common priorities and propose the alignment of national programs between countries bordering the same sea that have expressed an interest to share their programs to benefit from building critical masses and sharing infrastructures.

For the first time, the same priority through the topic "long term monitoring of the impact of the climate change" has been identified for the Atlantic ocean as well as for the Mediterranean Sea.

Three regional workshops were organized with the support of WP2 to initiate and monitor the process of developing joint programs.

Two topics have been identified by the Members States after a process of inventory and prioritization for Atlantic and Mediterranean basins. **These topics address the long term evolution of physical circulations and their bio-chemical consequences in relationship with climate change.**

This is a long-term process to build an optimized scientific approach and common programme on climate change impacts in both regions, to support initiatives which could trigger its implementation (Galway declaration, H2020, ...), to propose and obtain multi-annual agreements between national fleets for such long term monitoring programme of common interest, to add the international cooperation dimension at basin scale (Atlantic ocean, Med Sea) which should facilitate the shared use/full deployment of infrastructures like vessels and observing systems.

In parallel, WP2 on behalf of the Seas-Era partners put forward to the Management Board of the JPI Ocean the pilot action “Sharing vessels facilities for the achievement of long term common programmes on impact of climate change on physical circulation, geochemical and biological consequences in the Atlantic and Mediterranean” so that this common programme could take advantage of this high level authority to build commitments between Members States in a long-term perspective, in parallel with EU international initiatives for Atlantic and Med basins.

This report is the last one related to WP2 works and it focuses on the workshop on Common Programs held in Paris on February 10th, 2014 with the participation of scientific experts on physical oceanography and related annual transects, on science and observing systems in both basins, representatives of the fleet manager, representatives from JPI Ocean, Ministries and Funding agencies, to address mainly the issues of the sharing of vessels and observing facilities for the achievement of multi-annual programs in relation with climate change impact on physical circulation, geochemical and biological consequences.

For Atlantic ocean, this long term programme will go on through the Trans-Atlantic Alliance and collaborative actions proposed by H2020 (Topics BG14 and BG8 mostly) to develop this cooperation between North America and EU members.

For Mediterranean Sea, an ALLIANCE to address these issues is requested for the new H2020 programming (2016, 2017) to increase dialogue between EU and non EU countries.

Introduction

WP2 focused on the success of regional common approaches and the development of the two common programs in Atlantic and Mediterranean. These topics have been identified by the representative of Members States, members of SEASERA, after a process of inventory and prioritization for Atlantic and Mediterranean seas. **They address the long term evolution of physical circulations and their bio-chemical consequences in relationship with climate change.**

This can be caused by several reasons such as:

i) The scientific relevance and importance of the research topics in relation with:

- Consequences of circulation change on geochemical cycles and biological productivity of the systems,
- Impact of the ocean circulation on future climatic evolution conditions for North European countries,
- Role of ocean in carbon assimilation,
- Impact on biological productivity,

ii) The international context:

- IPCC recommendations to increase knowledge on the role of ocean interactions and to include all these interactions in the models to give more realistic scenarios of evolution of global warming at the regional level,
- The international approach is a necessity as a large number of EU members are concerned as well as North American countries,
- The long duration of the programs: long term monitoring for several decades,
- The absence of International Agreement at the state level despite some coordination under IOCCP, CLIVAR and the GO-SHIP program, and also at regional level: ICES and CIESM,
- No EU strategy and EU support for these long term research activities,
- Each country performs in isolation their own research,
- These studies cross the Atlantic or cross the Mediterranean seas are very expensive: possibility of mutual benefits of the vessels costs.

Before the Galway declaration, the analysis of national, European and International projects/programmes and the approach by alignment of the different national projects/programs, the identification and analysis of convergences, gaps have been carried out [through three workshops involving national experts, fleet managers, funding agencies and ministries representatives] and have demonstrated specificities of the two regions.

For the both regions, WP2 pointed out:

- i) At this time of financial crisis, many projects are in danger (OVIDES, BASIN ...) and could be withdrawn for Atlantic or not established for the Mediterranean.
- ii) The concern about optimization and harmonization of:
 - the large infrastructure (vessels),
 - the existing regional observing systems, and through a close collaboration with the existing European infrastructures established for observing platforms as well as the existing networks of marine observatories, merging the long-term observing strategies developed within current EU or international projects.
- iii) The need to increase international cooperation (e.g USA, Canada for Atlantic and the Mediterranean countries from the South for the Med). Seasera WP2 "Common Program" has contributed to the definition of the priority topics for the cooperation with a position paper presented at the Galway Conference (Ireland) May 2004].

The Seasera WP2 approach enabled the mapping of the current situation and attempted to clarify how the different actors would better interact to improve or establish a large common program.

This is the reason why Seasera WP2 in strong connection with Seasera WP4 "Infrastructures" organized a specific workshop [10 February, 2014 - ANR Office (Paris)] with the participation of (i) expert on physical oceanography for Med and related annual transects, (ii) expert on science and observingsystems in Med, (iii) scientist expert on annual transects in Atlantic, (iv) Research Vessel Operations Managers, ... (v) representatives from JPI, (vi) Ministries and funding agencies representatives of 10 countries (Ireland, UK, DE, Greece, Italy, Portugal, Spain, France, Belgium, Iceland) - 26 attendees

This workshop was organized to address the regional common programmes issues and focused on the way to implement a step by step approach for sharing vessels in the context of H2020 initiatives and in coordination with the JPI Ocean (**Annex 1 & Annex 2**).

It was proposed to debate on:

- The "sharing vessels and observing facilities for the achievement of multi-annual programmes in relation with climate change impact on physical circulation, geochemical and biological consequences",
- The links with the ongoing projects MedSHIP, EUROFLEET2, PERSEUS for the Med Sea and how to prepare the next programming of H2020,
- The development of recommendations and next building steps to complete the common programmes in both regions.

1- Some of the main points to be highlighted for both regions

1.1. Scientific issues and stakes

What are the scientific issues which can be addressed thanks to annual ocean transects repeated regularly

1.1.1 Atlantic

The alignment of the national programs converges to address the long term evolution monitoring on: INTERNATIONAL LONG TERM MONITORING OF THE NORTH EAST ATLANTIC to follow impacts of climate change with the main objectives:

- Maintain the long term time series (and the other observing system)
 - Cooperate for the optimization of the observation system in the next 5 - 10 years
-

a. State of play:

The need for increased coordination on existing ocean observing systems has been identified by the scientific community.

- Several nations conduct transects in parallel, while other regions may be less visited,
- There is a large amount of data that is being, or has already been collected and resides in repositories with varying degrees of accessibility,
- Further cooperation on both sides of the Atlantic is needed essentially with USA and Canada.

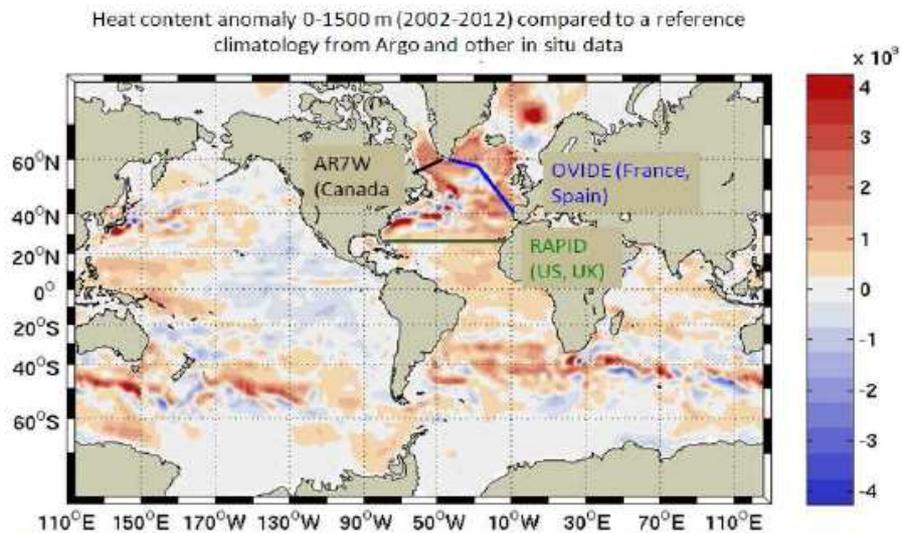
Thus, there appears to be scope for more efficient allocation of research funding and optimization of the cooperation on a long term basis.

The global community that performs repeated hydrography and geochemistry radial is structured under the international program GO-Ship <http://www.go-ship.org/About.html>.

The implementation plan of the program defines the radial to occupy (and their frequency) parameters to be measured, etc... There is a database managed under the Clivar and IOCCP programs.

Within this program, some countries coordinate bilateral cooperation to implement some radials. This is for example the case of France and Spain, which now share the task to achieve the radial Ovide once every two years. The radial Ovide was conducted by France in 2010, Spain in 2012, and France again in 2014 and should be made by Spain in 2016 and so on...

North-Atlantic repeated transects



Monitor and understand heat content changes and anthropogenic carbon storage in the North-Atlantic in combining :
repeated transects + Argo + altimetry + air-sea heat fluxes + other observing system

b. Conclusions:

- There is a need to support GO -Ship and develop other compliance activities basins in the North Atlantic.
- There is a need to improve the observing networks and data systems.
- Climate relevant indexes of the North-Atlantic Ocean variability are monitored thanks to hydrographic transects: MOC, water mass properties, CO₂ storage.
- Data from sustained observing systems (altimetry, Argo) have been used to compute proxies of those indexes.
- High-frequency oceanographic data are required to capture interannual variability and long-term trends in the highly variable North-Atlantic Ocean.
- It has been identified to go toward an integrated monitoring of the North-Atlantic Ocean variability.
- The repeated transects are funded at national level.
- Seasera worked with the commission to support the topic H2020 BG-8-2014, emphasizing the need for an optimization of in situ observing and not only a juxtaposition of the existing national initiatives.

1.1.2 Mediterranean

The alignment of the national programs converges to address the long term evolution monitoring. It is requested the urgent need for international long term monitoring to follow impacts of climate change with cross-Mediterranean surveys, including the sharing of vessels between the countries that are interested in participating to the cross Mediterranean surveys.

a.State of play:

Presently, the existing observing systems in the Mediterranean are not more than a group of regionally or nationally supported systems, based on several (often different) measuring platforms, with the limited aim of survey a given region. The coordination between these systems is presently rather weak.

There are also some international thematic networks which are relevant in the present context, such as the proposed MedSHIP initiative for a periodic large scale hydrological monitoring of the basin coordinated by CIESM.

As main consequence of the lack of pan-Mediterranean coordination, important areas (for scientific, geo-politically and strategically reasons) are uncovered, especially in the East and South of the basin. Few actions are, however, changing the situation. An ongoing initiative, involving academics from Algeria, France and Spain, is a punctual (and relevant) initiative to fill the gap in the Algerian Basin. The spatial extension of CYCOFOS toward Lebanon is also under consideration. Moreover, some essential parameters are not collected, which might dramatically prevent fulfillment of the needs related to the MSFD or the Copernicus Marine monitoring Service.

It is also worth mentioning here the Data Collection Framework surveys supporting the Common Fisheries Policy (CFP) and co-funded by EC / DG Mare. This data collection effort could be valuably exploited for the hydrological monitoring, the reverse being also conceivable.

It also clear that the R/V component of the observing systems (see table on ongoing surveys) is not as well defined as other components such as profiling floats, fixed point observatories or gliders, because of the lack of an agreed international coordination on the scientific objectives and its operational implementation. In this context, any multi annual planning and financial commitments for a joint programming of the R/V monitoring effort at the Member States level is not done presently.

These gaps and mismatches definitively prevents from having a global view of the Mediterranean Sea in both space and parameters. And as a consequence, there are big gaps in the services that these observing systems and monitoring networks can deliver, in particular for the important fishery sector which needs a global view of the stocks and of the environmental conditions.

Table - lists the ongoing surveys in the different areas of the Mediterranean Sea and Black Sea

The needs in frequency is as follow :
 < season : more than 2 survey per year;
 2/y : 2 surveys per year;
 year : once a year;
 >year : not every year, with a 2 to 5 years spacing;
 >5 years : with a spacing higher than 5 years.

The spatial scale designates the distribution of the stations: H/M/LR (small/medium/large distance between stations, typically <10/~15/>20 nm between stations); Section(s) stands for a series of transects, possibly drawing closed boxes; 2D stands for a mapping covering a large surface.

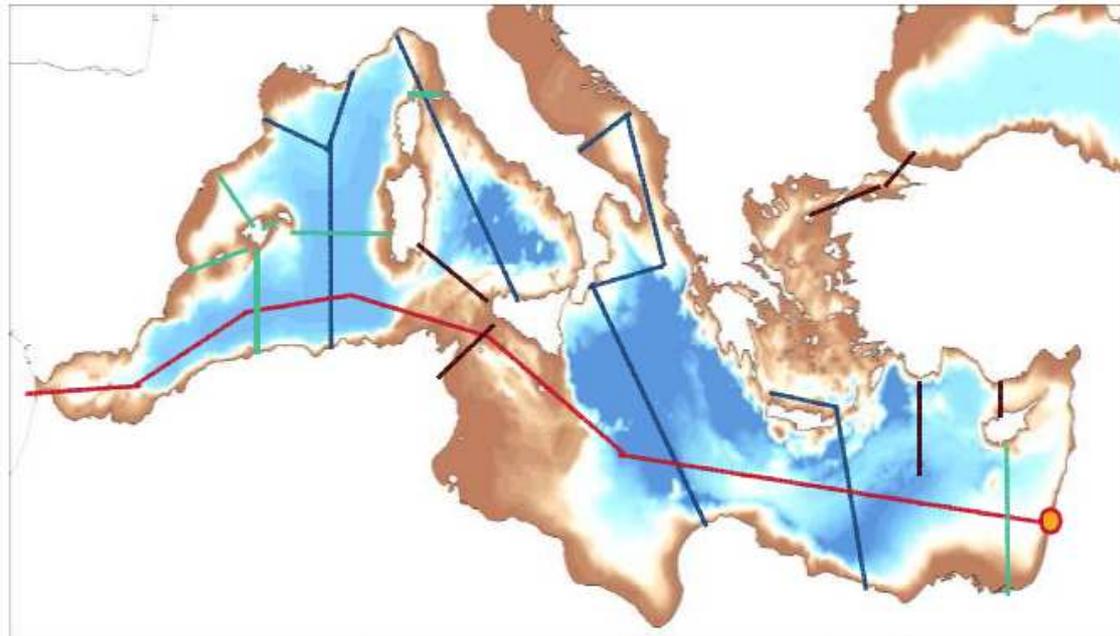
Type is as follow: P for only physical parameters, including possibly currents with LADCP; C for basic biogeochemical parameters; C+ includes C and other tracers; B for "biological parameters" and B+ includes B and others advanced biological parameters.

The sustained characters can be: Service (a regional/national service with long term commitment); Starting (no defined but intention for a sustained survey); Research (long term under research funding through projects, opportunities, ...).

	Cruise	Frequency	Spatial scale	Type	Sustained	Country
Alboran Sea	RADMED	<season	HR / sections	P, C, B+	Yes / Service	Spain
Balearic Sea	RADMED	<season	HR / sections	P, C, B+	Yes / Service	Spain
Ligurian-Provencal Area	MOOSE-GE	year	MR / 2D	P, C, B	yes / Service	France
Algerian Area	SOMBA	year	MR / 2D	P, C, B	Starting	Alg./Fr.
Tyrrhenian Sea						
Sicily Channel	TSELOS	> 1 year	HR / sections	P	yes	Tunisia
Malta Area						
Adriatic Sea	ADREX	2/y	HR / sections	P, C	Starting	Italy/Slov./Croat.
North Ionian Area	ADREX	2/y	HR / sections	P, C	Starting	Italy/Slov./Croat.
South Ionian Area						
Aegean Sea						
Cretan Sea	E1-M3A	<season	MR / 1 section	P, C, B	Yes	Greece
West-Levantine						
East-Levantine	CYBO	Year	HR / 2D	P	yes	Cyprus
Marmara Sea						
Black Sea						
West Mediterranean	MEDOCC	>year	HR / sections	P, C+	yes / Research	Italy
East Mediterranean		> 1 year	LR / 1 or 2 transects	P, C+	Yes / Research	Germany/Italy
Global Mediterranean		>5 years	LR / 1 or 2 transects	P, C+	Yes / Research	Germany

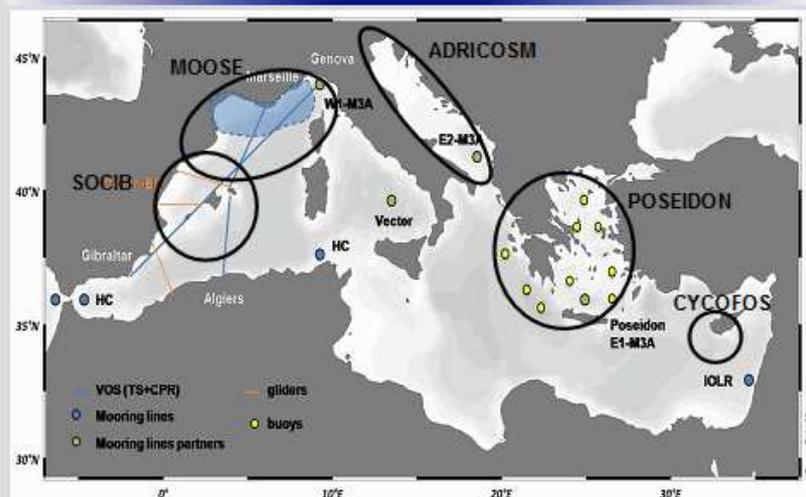
Main ongoing initiatives – National/Regional/International

MedGO-SHIP initiative



→ MedSHIP proposal to the EuroFLEET2 super integration call (PI: K. Schroeder / ISMAR-CNR)

Regional / National Observing systems



- System = Governance, clear data management/policy, sustained, funding commitment, ...
- Operational oceanography : SOCIB, POSEIDON, CYCOFOS, ADRICOSM
- Research : MOOSE
- Based on “platform” RIs : EuroARGO (profiling floats), FIXO3 (deep moorings/observatories), EGO (gliders)
- Similar data policy (INSPIRE) and same data center (CORIOLIS, SeaDataNet, ...)
- RT data → operational oceanography MYOCEAN and regional systems
- But no common “core parameters” nor methodologies.

FP7 PERSEUS project WP3: Upgrade-expand the existing observational systems and fill short term gaps

The purpose of WP3 is to upgrade and expand the present observing capacity in the SES towards the fulfillment of the scientific and society needs with emphasis on the characterization of present state, and to increase forecasting capabilities for the implementation of MSFD. The rationale behind the PERSEUS Observing Systems, and therefore its underlying strategy, entails the “enhancement, extension, and harmonization of multi-platform distributed and integrated existing observing systems” that monitor basin, sub-basin and local scales, for long-term periods, that will contribute to filling short-term data gaps with respect to key processes, and providing free streams of oceanographic data.

In these directions, WP3 will combine Observing Systems at different scales (basin, sub-basin, local) using different platforms (profilers & drifters, moorings, gliders and research vessels) to carry out sustained monitoring (SM) and specific Intensive Observation Experiments (IOP) that will be integrated through modeling and data management. This process will also establish unified quality control procedures and assure data availability through clear and strong commitment from all PERSEUS partners.

PERSEUS WP3 proposes to develop and implement new tools for Science by:

- Addressing the scales variability “problem” and the need to monitor at the right scales establish bases and correct them – It is a key Issue in the Mediterranean Sea.
- Developing a multi-platform observing and modeling systems approach.

For these issues the key challenge is integration existing and new components and also data availability.

b. Conclusions:

The countries that are interested in the Mediterranean region have large difficulties in establishing long term monitoring activities to follow the physical impacts and biogeochemical changes in relation with climate change. Despite CIESM support these actions are not supported by grants and proposals of the EU and the national budgets are declining.

There is a need also:

- To develop an Integrated Observing System. The challenge is to conduct the Research and Innovation activities necessary to address scientific state of the art priorities, enhance technology development and respond to society needs through the development and optimization of an Integrated Mediterranean Observing System, building on existing capacities.
- For a frame for general coordination.
- For better complementarities between National surveys and initiatives like MedSHIP.
- For networking and "pooling" of platforms: R/Vs, HF radars, on going for profiling floats, gliders, moorings.
- For specific support because of the strong "Transnational" character of the Mediterranean.
- To develop GO-Ship and other compliance activities like in the North Atlantic and a need to improve the observing networks and data systems.

1.2. A shared use of research infrastructures

Fleet managers who attended the Paris meeting [Feb. 2014] were very concerned about sharing research vessels in the Mediterranean region, and have expressed the following conditions:

- An international scientific program should be designed with broad participation,
- The program must be approved by an international committee with the participation of scientists from all countries concerned.

There is a huge interest in sharing vessels on a multiannual basis, and costs between the different countries.

Fleet operators are interested in this approach. Spain, France and Italy have asked to go further into a new stage. For this reason, SEASERA WP2/WP4 has been invited to the ERVO meeting (European Research Vessel Operators) in June 2014 to present these issues."

The EUROFLEETS2 Calls: The research operators also cooperate through EUROFLEET, an EU project to increase cooperation between fleet operators through sharing good practices, developing common technologies and allocating ship time for transnational access. EUROFLEETS2 is providing scientists with:

- 73 fully funded days of ship time on 8 Global/Ocean class research vessels
- 127 fully funded days of ship time on 14 Regional class research vessels
- 104 fully funded days of marine equipment-time to carry out ship-based research activities within any field of marine science.

Super-Integration Call (TNA 2): one single flagship project will be selected for the 4 years period giving access to several research vessels or to research vessels in combination with other infrastructures.

↳ a proposed case study MedSHIP through an Expression of Interest (Eoi) : the Mediterranean component of the Global Ocean Ship-based Hydrographic Investigations Programme (GO-SHIP) has been proposed to the Eurofleet 2 super integration call and was selected for the step 2 (Scientific Review Panel).

At the end, the proposal has not been selected because too large and ambitious with too important ship time requested compared to EUROFLEETS resources.

2- A scientific program for the Mediterranean Sea

Title: Developing an Integrated Observing System in the Mediterranean and Black Seas for a better management and sustainable exploitation of marine and maritime resources

Following the work performed in Seasera WP2 “common program” and in Seasera WP7 “Mediterranean Region”, the scientific community has defined the content of a common program for the Mediterranean and Black sea (**Annex 3**) to answer and propose the content a first version of the content of the common scientific international program.

2.1 Introduction

The challenge is to conduct the Research and Innovation activities necessary to address scientific state of the art priorities, enhance technology development and respond to society needs through the development and optimization of an Integrated Mediterranean and Black Seas Observing System (IMBSOS), building on existing capacities.

The Mediterranean and the Black Sea are the prominent marine domain situated at the south doorstep of Europe, shared by European and non European countries. These seas are localized in a “hot spot” region of climate change and biodiversity facets and are dealing with considerable and rapidly growing human pressure that could strongly influence their functioning, as described in the Strategic Research Agenda for Mediterranean and Black Seas (Seas-Era deliverables [1] and [2]). The sustainable exploration, exploitation and protection of this marine domain require a knowledge base and predictive capabilities which are currently fragmented or not yet available especially in the Southern part of the Mediterranean. The creation of this knowledge-base and predictive capability requires systematic collection of multi-platform ocean observations, including those emerging from MSFD implementation, recorded both remotely using Earth observation satellites and in-situ. Central to the development of this IMBSOS should be the acquisition of multi-platform observations at the coastal and offshore scales, their integration with remote sensed data across the whole Mediterranean and Black Seas in order to fill out the existing observational gaps and contribute to enhance model forecasting capabilities. Applications based on the Copernicus Marine Monitoring service and the European Marine Observation and Data Network (EMODNET) and others may enable addressing this challenge.

2.2 Scope:

The Integrated Mediterranean and Black Sea Observing System initiative should cover all the Mediterranean and Black Seas sub-regions, including the coastal zones with the objective to deliver the knowledge base supporting the understanding of the entire sea basins processes. The focus should be to fill the geographical observational gaps regarding the in-situ part of the sea basins observation and to integrate the biological dimension into these multi-platform observing systems. The use of ocean observation technologies enabling reducing the costs of in-situ ocean observation should be central to achieve adequate integration of coastal and offshore observations.

This must be achieved with a concern about optimization and harmonization of:

- The large infrastructure (vessels),
- The existing regional observing systems,

and through a close collaboration with the existing European infrastructures established for observing platforms as well as the existing networks of marine observatories, merging the long-term observing strategies developed within the FP7 PERSEUS project, and marine fisheries resources observations (CFP).

The research and innovation necessary to underpin the full and open discovery and access to the ocean observations and to facilitate the interoperable exchange of ocean observation as promoted through GEO (Group on Earth Observation) at the scale of the Mediterranean Sea, in line with the Strategic Research Agenda for the Mediterranean Sea Basin (Seas-Era Deliverables [1]), should require the participation of international partners from the southern part of the Mediterranean Sea.

2.3 Expected Impact:

- Enhance societal and economic role of the Mediterranean and Black Seas in Europe,
- Increase monitoring at the key scales, temporal and geographic coverage needed to answer science and society needs, as well as parameter range, of observational data in the Mediterranean and Black Sea,
- Integrate standardised in-situ key marine observations including physical, geochemical and biological data by a better coordination of and/or by sharing common vessels,
- Improve modelling outputs and forecast systems, reduce cost of data collection in support of ocean-related industrial and societal activities by sharing common data base free of access,
- Develop marine technology capabilities associated to new integrated observing systems and by this increase competitiveness of European industry and particularly SMEs within the marine industrial sector,
- Increase safety for offshore activities and coastal communities,
- Contribute to make better informed decisions and documented processes within key sectors (manufacturing, ICT, maritime industry, environment technology, marine science and fisheries),
- Improve the implementation of European and International maritime and environmental policies (e.g. Marine Strategy Framework Directive, Common Fisheries Policy, EU Integrated Maritime Policy, UNEP MAP, Barcelona convention) by EU countries and promote the use of these policies to non EU countries,
- Enhance documentation necessary to cope with global challenges such as climate change, acidification of the ocean, ecosystems assessment, scarceness of natural resources and global scale hazards.

[1] *Strategic Research Agenda for the Mediterranean Sea Basin, Seas-Era Deliverable 7.1.1, February 2012*

[2] *Black Sea Strategic Research Agenda, Seas-Era Deliverable 8.1.1, April 2012*

3- Other key outputs for Common Programs in the both basins

3.1 Transatlantic cooperation

Seasera WP2 “common program” played a significant role in the Galway conference (and the declaration) to push the priority of “long term monitoring of climate change impacts” that requires close cooperation between the Members states and their relevant funding agencies. The proposed common program to optimize transects across the Atlantic between the countries on both sides of the Atlantic, including the European Union, Canada and USA, has been presented at the Galway meeting (**Annex 4**):

In the conclusion of the Galway Statement on Atlantic Ocean Cooperation (extract) it is underlined the launching a Canada- European Union- United States of America Research Alliance (Galway, 24th of May 2013), particular in order **“to respond to the implications of global climate change and its impacts on marine and coastal environments and communities”**. **It also had been noted that “long-term ocean observations, such as proposed under the GEO and GMES initiatives, are critical to implement an ecosystem-based approach of resources management – and that it is the responsibility of both the EU AND the Member States to find appropriate ways, including Public-Private partnerships, to finance the operational aspects of these observations”**.

3.2 Common actions in H2020 (2014-2015) and for the next programming (2016-2017)

3.2.1 Galway outputs / H2020 (2014-2015)

The launch of the two EU flagship initiatives in H2020 SC2 2014-2015 – 1) BG-8-2014 and 2) BG-14-2014 is a very important opportunity to develop the optimization, efficiencies of an international scientific program and also ensure the mid-term of Ocean observations.

Surely the content of these two H2020 topics is developed by the relevant consortia that develop competitive proposals. But Seasera WP2 has suggested that the collaboration on joint long-term monitoring effort and the initiative on sharing vessels could be part of the tasks of the new Global TransAtlantic Alliance network (BG 14 H2020 call) , to be continued.

The objectives will be also to determine/recommend how existing and planned trans-Atlantic cruises could be more effectively harnessed to capture data on ocean circulation and measure the impacts of natural and anthropogenic (including climate change) inputs (Ref: Reykjavik Meeting).

- 1) *BG-8-2014: Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources*
- 2) *BG-14-2014: Supporting international cooperation initiatives: Atlantic Ocean Cooperation Research Alliance*

3.2.2 Common actions for H2020 next programming (2016-2017) focusing on the Mediterranean

WP2 defined the need for the development of H2020 initiatives for the Mediterranean Sea (eq. "BG-8 and BG-14"):

- **The optimization of observing systems including coordination and sharing infrastructures such as vessels** as a demonstration case for the proposed **Seasera common program content** "Developing an Integrated Observing System in the Mediterranean and Black Seas for a better management and sustainable exploitation of marine and maritime resources",

and

- **An international cooperation initiative through a Mediterranean Sea Cooperation Research Alliance including the non EU partners to implement new way of cooperation between North and South - (Annex 5) :**

In the Mediterranean, there are no marine ERA-Nets between all the surrounded countries (North and South). For other thematics, several on-going projects are active to produce common activities: in Agriculture within ARIMNET, in Energy and Fresh Water within ERANETMED.

These instruments are now preparing new coordination platforms and the next research agendas targeted to the Mediterranean area in general without specific concerns to marine and maritime activities.

However, different approaches and large differences still exist in the Mediterranean between European countries and countries in North Africa and the Middle East which do not allow overcoming a very low level of regional integration, resulting in a poor efficiency of research programmes and a low level of common initiatives that can benefit to the development of the non European countries. Important efforts are thus needed to create appropriate operational conditions in the concerned marine research communities so they can efficiently exploit the existing cooperation tools, programmes opportunities and financial instruments to create innovation activities, new cooperative programmes and sharing infrastructure.

In line with the objectives of the EU strategy for international cooperation in research and innovation (COM (2012) 497), proposals should contribute to establish a Mediterranean Cooperation Research Alliance among EU and all other countries bordering the Mediterranean, in order to better understand and increase our knowledge of the Mediterranean Sea Basin and its dynamic systems, and to promote the sustainable management of its resources. The related research areas may concerns in particular the marine ecosystem approach, chemical contaminants, geo-hazards (seismic risks, sediment stability), observing systems, aquaculture, fisheries, seabed and benthic habitat and all the anthropogenic & climate change impacts. Tourism activities and maritime transport are important sectors in the Med countries which need specific research for their development. Proposals should address these areas in an integrated way and should facilitate the mapping and connectivity of relevant on-going research activities

and programmes and the identification of research gaps. Proposals should contribute to aligning the planning and programming of research activities, in view of launching joint fundamental and applied research, and innovation initiatives, while building on existing ones (e.g. Joint programming Initiative "Healthy and Productive Seas and Oceans", EraNet's and also Euro-Mediterranean, national and multilateral initiatives). Proposals should facilitate a shared use of infrastructures including vessels, aquaculture facilities and other large equipments. Dissemination and knowledge transfer activities must be supported to lead to an optimal exploitation of projects results, fostering mobility, training and networking of researchers. Central to these activities, proposals should rely on the existing data and information networks, such as the CIESM, CGPM, Plan Bleu, PAP/RAC and all the other international initiatives. Finally, the proposals should include access to a common Data base with the overall objective the exploitability of the research results for policy making, decision makers and stakeholder consultation purposes. Representatives from ministries and funding agencies should be associated in the design of the proposals.

3.3 Future perspectives for the common programs

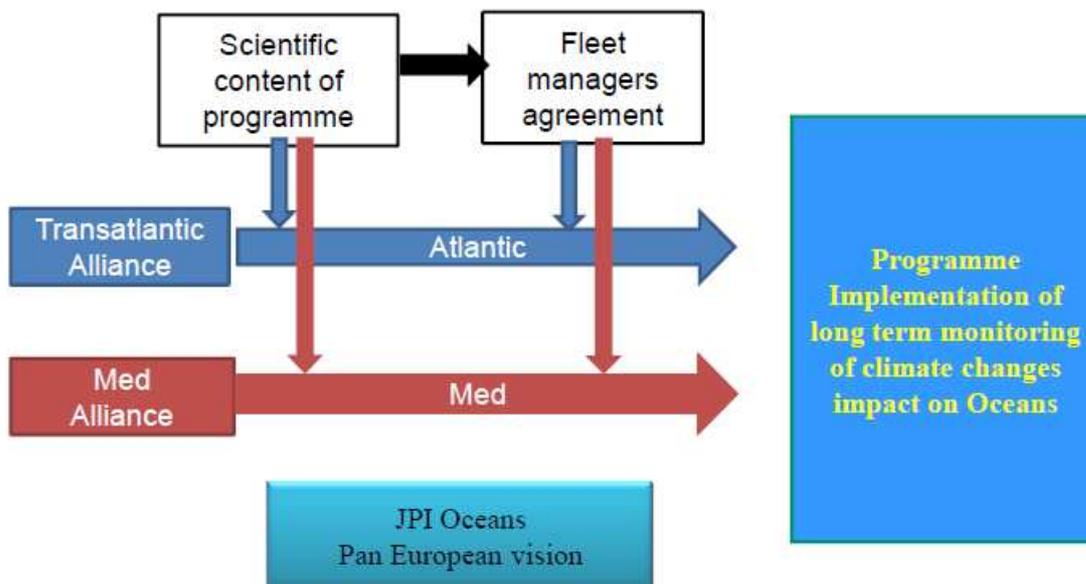
- For Atlantic ocean, to follow the joint long-term monitoring effort (H2020 BG8 funded proposal), as one of the major tasks of the new Global TransAtlantic Alliance Network (H2020 BG14 proposal),
- For the Mediterranean and Black Sea, to find ways and opportunities to finance the new international scientific program "Developing an Integrated Observing System in the Mediterranean and Black Seas for a better management and sustainable exploitation of marine and maritime resources",
- For the Atlantic and for the Mediterranean and Black Sea, to support a network of fleet managers to examine concrete solutions for sharing vessels for the international programmes in relation with ERVO and also the JPI OCEANS.

Conclusions

- The building of common programs is a step by step approach.
- WP2 “common programme” in connection with WP4 “infrastructure” initiated and financially supported the processes since 3 years with 4 related workshops.
- Some positive results: Galway declaration and H2020 topics ➡ BG8 opportunity and ➡ BG14 Transatlantic alliance with a specific request for “shared use of Atlantic research infrastructures”.
- JPI OCEAN: a tentative action with a specific case study on these issues under CSA WP on infrastructure.
- A proposed alliance for the Med to continue to address these issues.
- A proposed Programme implementation:



Programme implementation



Annex 1



Seas-Era Workshop on Common Programmes, Paris, 10 February 2014

Agenda

Welcome, Coffee & Tea from 9:00

Beginning of the meeting 9:45

9:45 -10.00

1 - Introduction

- Short rationale on common programmes, workshop objectives
Maurice Heral (ANR, Seasera WP2) 10'
- Welcome from the French research ministry, the “shared use of research infrastructures” issue
Emmanuelle Klein (MESR) 5'

10:00 - 11:20

2- Set-up the scene: the various on-going joint activities / Moderator Maurice Heral

Presentations:

- Seas-Era approach on “common programmes” (WP2), the two identified programmes “Atlantic” et “Med”, the link with “shared use of infrastructures” (WP4)
Maurice Heral (ANR) 15'
- JPI Oceans context
Florence Coroner (JPI Oceans secretariat) & Jean-François Masset (Ifremer) 15'

+ Round table on (~ 5 to 10' each, with few slides if necessary):

- CIEM initiatives, *Cornelius Hammer (CIEM)*
- BONUS 2 perspective, *Maurice Heral (ANR)*
- EUROFLEET2, about trans national access to research vessels, *Aodhan Fitzgerald (MI)*
- PERSEUS, about observing systems in Med, *Joaquin Tintore (SOCIB)*
- H2020 context, about Blue Growth related topics, *Jean-François Masset (Ifremer)*

11:20 – 12:00

3- Scientific issues and stakes, and related research infrastructures requirements in a multi-annual perspective: the scientists view point / Moderator: Joaquin Tintore

What are the scientific issues which can be addressed thanks to annual ocean transects repeated regularly: historical remind, current situation and needs. How elaborate and validate these scientific common programs common involving several European countries per basin on a decadal basis.

- Presentation for North Atlantic ocean, *V. Thierry (Ifremer) 15'*
- Presentation for Mediterranean Sea, *L. Mortier (Locean-IPSL) 15'*

12:30 - 13:00

4- For a shared use of research infrastructures within the frame of multi-annual common programmes: the national fleet operators view point.

Identify infrastructure to be mobilized and time allocation for the development of common programs, multi-annual joint programming for vessels and equipments concerned, selection of scientific expedition teams, logistical organization and financial aspect: Atlantic Specific outcome, Med Specific outcome

Round table with the fleet managers and the funders /Moderator JF Masset (Seasera WP4)

Atlantic:

Aodhan FitzGerald (MIR, Irland)

Olivier Lefort (UMS Flotte, France))

Caron Montgomery (NERC/Defra UK Shelf Seas Biogeochemistry Programm)

Ulrich Wolf (Juelich,Germany)

David Cox (BELSPO, Belgium)

Sigurdur Bjornsson (RANNIS, Iceland)

Nuno Lourenço (IPMA, IP) and Dina Carrilho (FCT, Portugal)

Alicia Lavín and Carlos Garcia Soto (IEO representatives, Spain)

Mediterranean Sea

Olivier Lefort (UMS Flotte, France))

Dimitris Velaoras (Representative of Greece)

Giuseppe Magnifico and Emilio Campana (CNR Italy)

Nuno Lourenço (IPMA, IP) and Dina Carrilho (FCT, Portugal)

Ulrich Wolf (Juelich ,Germany)

Alicia Lavín and Carlos Garcia Soto (IEO representatives, Spain)

13:00 – 13:50 Lunch break

13:50 – 14:20

4- Session 4 to be continued

14:20 -15:20

5- Needed agreement(s) process: the funding entities view point.

Agreements on common programmes, on common pot of ship time, on evaluation & selection process and committee(s), etc ...

Round table with the funding entities representatives / Moderator Maurice Heral

15:20 -16:20

6- Synthesis and recommendations

To establish general recommendations for common programmes process with shared use of research infrastructures, to propose short-term actions for a seamless continuation of Seas-Era momentum, in the context of : JPI Oceans / strategic agenda, Greek and Italian Presidencies, EUROCEAN Conference 2014, H2020 / on-going proposals and next WP 2016-2017, etc ...

Round table, all / Moderators JF Masset & Maurice Heral

16:20 - 16:30

Conclusion Maurice Heral

16:30 End of the meeting

Annex 2



Seasera Workshop on Common Programmes WP2 WP4 February 10, 2014 (ANR PARIS)

List Invited Experts and participants

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Alicia Lavin Physical Oceanography Spanish Institute of Oceanography (**IEO-Santander**)

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Annex 3

ERA-Net Seasera WP2 – Proposed scientific program for the Mediterranean

Developing an Integrated Observing System in the Mediterranean and Black Seas for a better management and sustainable exploitation of marine and maritime resources

Research and innovation actions

Specific Challenge

The challenge is to conduct the Research and Innovation activities necessary to address scientific state of the art priorities, enhance technology development and respond to society needs through the development and optimization of an Integrated Mediterranean and Black Seas Observing System (IMBSOS), building on existing capacities. The Mediterranean and Black Seas are the prominent marine domain situated at the south doorstep of Europe, shared by European and non European countries. These seas are localized in a “hot spot” region of climate change and biodiversity facets and are dealing with considerable and rapidly growing human pressure that could strongly influence their functioning, as described in the Strategic Research Agenda for Mediterranean and Black Seas (Seas-Era deliverables [1] and [2]). The sustainable exploration, exploitation and protection of this marine domain require a knowledge base and predictive capabilities which are currently fragmented or not yet available especially in the Southern part of the Mediterranean. The creation of this knowledge-base and predictive capability requires systematic collection of multi-platform ocean observations, including those emerging from MSFD implementation, recorded both remotely using Earth observation satellites and in-situ. Central to the development of this IMBSOS should be the acquisition of multi-platform observations at the coastal and offshore scales, their integration with remote sensed data across the whole Mediterranean and Black Seas in order to fill out the existing observational gaps and contribute to enhance model forecasting capabilities. Applications based on the Copernicus Marine Monitoring service and the European Marine Observation and Data Network (EMODNET) and others may enable addressing this challenge.

Scope:

The Integrated Mediterranean and Black Sea Observing System initiative should cover all the Mediterranean and Black Seas sub-regions, including the coastal zones with the objective to deliver the knowledge base supporting the understanding of the entire sea basins processes. The focus should be to fill the geographical observational gaps regarding the in-situ part of the sea basins observation and to integrate the biological dimension into these multi-platform observing systems. The use of ocean observation technologies enabling reducing the costs of in-situ ocean observation should be central to achieve adequate integration of coastal and offshore observations.

This must be achieved with a concern about optimization and harmonization of:

- the large infrastructure (vessels),
- the existing regional observing systems,

and through a close collaboration with the existing European infrastructures established for observing platforms as well as the existing networks of marine observatories, merging the long-term observing strategies developed within the FP7 project PERSEUS, and marine fisheries resources observations (CFP).

The research and innovation necessary to underpin the full and open discovery and access to the ocean observations and to facilitate the interoperable exchange of ocean observation as promoted through GEO (Group on Earth Observation) at the scale of the Mediterranean Sea, in line with the Strategic Research Agenda for the Mediterranean Sea Basin (Seas-Era Deliverables [1]), should require the participation of international partners from the southern part of the Mediterranean Sea.

Expected Impact:

- Enhance societal and economic role of the Mediterranean and Black Seas in Europe.
- Increase monitoring at the key scales, temporal and geographic coverage needed to answer science and society needs, as well as parameter range, of observational data in the Mediterranean and Black Sea,
- Integrate standardised in-situ key marine observations including physical, geochemical and biological data by a better coordination of *and/or* by sharing common vessels,
- Improve modelling outputs and forecast systems, reduce cost of data collection in support of ocean-related industrial and societal activities by sharing common data base free of access
- Develop marine technology capabilities associated to new integrated observing systems and by this increase competitiveness of European industry and particularly SMEs within the marine industrial sector,
- Increase safety for offshore activities and coastal communities,
- Contribute to make better informed decisions and documented processes within key sectors (manufacturing, ICT, maritime industry, environment technology, marine science and fisheries),
- Improve the implementation of European and International maritime and environmental policies (e.g. Marine Strategy Framework Directive, Common Fisheries Policy, EU Integrated Maritime Policy, UNEP MAP, Barcelona convention) by EU countries and promote the use of these policies to non EU countries,
- Enhance documentation necessary to cope with global challenges such as climate change, acidification of the ocean, ecosystems assessment, scarceness of natural resources and global scale hazards.

[1] *Strategic Research Agenda for the Mediterranean Sea Basin, Seas-Era Deliverable 7.1.1, February 2012*

[2] *Black Sea Strategic Research Agenda, Seas-Era Deliverable 8.1.1, April 2012*

Annex 4

Flyer Seasera WP2 “Common Program” for the Galway Conference



Galway 23 May 2013

INTERNATIONAL LONG TERM MONITORING OF THE NORTH EAST ATLANTIC

A test case for sharing vessels facilities: the achievement of long term common programmes on impact of climate change on physical circulation, geochemical and biological consequences in North Atlantic Ocean.

The objective of the ERA-NET scheme is to develop and strengthen the coordination of EU public research programmes conducted at national or regional level. It provides a framework to network and mutually open national or regional research programmes, leading to concrete cooperation such as the development and implementation of joint programmes or activities.

The ERA-NET scheme is an European network intended for programme owners (typically national ministries/regional authorities...) and programme managers (such as research councils or funding agencies...) to identify national and regional programmes they coordinate or open up mutually.

So (i) they contribute to the research strategy of their relevant sectors based on the inventory of research activities in the different EU countries, (ii) launch calls for research projects and (iii) contribute to the alignment of national programmes through common activities.

Seas-era is an ERA-NET dealing with Marine Environment since 2011.

For the Atlantic region, the first step of the Common programs process has been successfully achieved (report D.2.1.1 of Seas-Era). The topic identified after this long process of inventory and prioritization in the Atlantic regions concerns: **“impact of climate change on key physical thermo-haline circulation in North Atlantic, including biogeochemical and biological consequences The proposal is an alignment of the national programmes for converges addressing the long term evolution monitoring of climate change.**

Several reasons can explain this convergence such as:

➤ **The scientific relevance and importance of the research topics in relation with:**

- Consequences of circulation change on geochemical cycles,
- Impact of the ocean circulation on future climatic evolution conditions for North Atlantic countries,
- Role of ocean in carbon assimilation,
- Impact on biological productivity of the system,

➤ **The international context:**

- IPCC recommendations to increase knowledge about the role of ocean interactions and to include all these interactions in the models to give more realistic scenarios of evolution of global warming at the regional level,
 - The international approach is a necessity as a large number of EU members **states** are concerned as well as North American countries,
 - The long duration of the programmes: long term monitoring for several decades,
 - The absence of International Agreement at the state level despite some coordination under IOCCP, CLIVAR and the GO-SHIP programme, and also at regional level: ICES,

- There is no EU strategy and EU support for these long term research activities,
- Each country performs in isolation its own research, sometime with bilateral initiatives,
- These studies cross the Atlantic are very expensive: possibility of mutual benefits of the vessel costs,
 - At this time of financial crisis, many projects are in danger (OVIDES, BASIN ...) and could be not maintained on a regular basis.

Within 2 workshops with experts in charge of their national programmes, Sea-Era is preparing the precise content of a long term monitoring programme coupling physical, geochemical and biological observations to follow and to model the impact of climate change. A detailed implementation plan will be submitted soon. **For that it appears there is an urgent need to share vessels between the countries who are interested in participating to the cross Atlantic surveys from the EU and the American side.**

The ERA-Net Seas-Era cannot do this task alone, as it is a long term issue and Seas Era will end next year. It is the reason why Seas-era has tried to work more closely with the Joint Programming Initiative (JPI) OCEANS for the EU side.

- **Joint programming** is a concept introduced by the European Commission in July 2008 and is one of the initiatives aimed at implementing the European Research Area (ERA). The concept intends to tackle the challenges that cannot be solved solely on the national level and allows Member States and Associated Countries to participate in those joint initiatives where it seems useful for them.
- **Objective of the JPI:** To increase the value of relevant national and EU R&D and infrastructure investments through a concerted effort achieved by jointly planning, implementing and evaluating national research programmes.
- **How:** Member States and Associated Countries are expected to coordinate national research activities in the broadest sense. The pooling of resources and development of common research and innovation agendas shall serve as a basis for long-term cooperation in which complementarities and synergies are exploited in order to tackle grand societal challenges. Joint research activities are including sharing infrastructures such as vessels.

The proposed case study for the JPI is **to invent a new way of sharing large vessels infrastructure to implement a common international programme.** It is different from the EU exchange of boat time: OFEG and different from the offer of EUROFLEET 1 and 2. Members of the JPI will have to commit their fleet managers trying to find the way to plan self-organization for next decade in close relation with North American Agencies.

The objective is to build **annual trans-Atlantic international campaigns** with scientists of all the interested countries between Norway, Germany, France, Iceland, Spain, Ireland, Great Britain and others for the EU side. Canada and USA which are actually doing that work without coordination and collaboration with EU should be involved in the process.

Implementation: identify a platform with partners from the 2 sides of the Atlantic to promote and support this idea. It could be a joint Working Group between JPI Ocean for the EU and with the Canadian and USA Agencies.

Maurice HERAL

WP2 common programme of SEAS-ERA

Member of the governing board of JPI OCEAN

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Annex 5 - An international cooperation initiative through a Mediterranean Sea Cooperation Research Alliance (including the non EU partners)

Proposed H2020 TOPIC by ERA-Net Seasera

Supporting international cooperation initiatives: Mediterranean Sea Cooperation Research Alliance

Coordination and support actions (CSA)

Specific Challenge

Marine and Maritime scientific and technological cooperation is instrumental in building dialogue, sharing knowledge and mutual understanding between different scientific communities, cultures and societies. It is a key component to tackle major societal challenges, underpin policies, and stimulate innovation. In the frame of its Integrated Maritime Policy, the EU has adopted the 'Blue Growth' initiative and sea basin strategies to ensure that appropriate measures are taken to ensure sustainable growth. The Mediterranean Strategy has been established to manage maritime activities, protect the marine environment, prevent and fight pollution among others. In the Med, there are no marine ERA-Nets between all the surrounded countries (North and South). For other thematics, several on-going projects are active to produce common activities: in Agriculture within ARIMNET, in Energy and Fresh Water within ERANETMED.

These instruments are now preparing new coordination platforms and the next research agendas targeted to the Mediterranean area in general without specific concerns to marine and maritime activities.

As a continuing effort of the Euro-Mediterranean Partnership, the Article 185 perspective aims at enhancing regional cooperation and partnership between the two shores of the Mediterranean and mainly acts to promote regional cooperation projects while ensuring that countries from both shores are placed on equal footing. Furthermore, historically, bi national cooperation has also been active between European and non European countries generating progresses and growth in specific areas.

However, different approaches and large differences still exist in the Mediterranean between European countries and countries in North Africa and the Middle East which do not allow overcoming a very low level of regional integration, resulting in a poor efficiency of research programmes and a low level of common initiatives that can benefit to the development of the non European countries. Important efforts are thus needed to create appropriate operational conditions in the concerned marine research communities so they can efficiently exploit the existing cooperation tools, programmes opportunities and financial instruments to create innovation activities, new cooperative programmes and sharing infrastructure.

Scope:

In line with the objectives of the EU strategy for international cooperation in research and innovation (COM (2012) 497), proposals should contribute to establish a Mediterranean Cooperation Research Alliance among EU and all other countries bordering the Mediterranean, in order to better understand and increase our knowledge of the Mediterranean Sea Basin and its dynamic systems, and to promote the sustainable management of its resources. The related research areas may concern in particular the marine ecosystem approach, chemical contaminants, geo-hazards (seismic risks, sediment stability), observing systems, aquaculture, fisheries, seabed and benthic habitat and all the anthropogenic & climate change impacts. Tourism activities and maritime transport are important sectors in the Med countries which need specific research for their development. Proposals should address these areas in an integrated way and should facilitate the mapping and connectivity of relevant on-going research activities and programmes and the identification of research gaps. Proposals should contribute to aligning the planning and programming of research activities, in view of launching joint fundamental and applied research, and innovation initiatives, while building on existing ones (e.g. Joint programming Initiative "Healthy and Productive Seas and Oceans", EraNet's and also Euro-Mediterranean, national and multilateral initiatives). Proposals should facilitate a shared use of infrastructures including vessels, aquaculture facilities and other large equipments. Dissemination and knowledge transfer activities must be supported to lead to an optimal exploitation of projects results, fostering mobility, training and networking of researchers. Central to these activities, proposals should rely on the existing data and information networks, such as the CIESM, CGPM, Plan Bleu, PAP/RAC and all the other international initiatives. Finally, the proposals should include access to a common Data base with the overall objective the exploitability of the research results for policy making, decision makers and stakeholder consultation purposes. Representatives from ministries and funding agencies should be associated in the design of the proposals.

Expected Impact:

- The creation and implementation of a Mediterranean Alliance really dedicated to the Mediterranean Sea issues.
- Improve the international cooperation framework of marine research programmes thus creating the basis for the development of future large-scale joint international marine research programmes.
- Engage the non European countries on an equal footing on research programmes and activities, in particular for observing activities in their jurisdictional waters.
- Establish a long term knowledge sharing platform for easy access to available information and data.
- Establish a long term plan for access and for sharing research infrastructures (vessels, aquaculture...)
- Propose a future ERANET Cofund on marine research in the Med