



European long-term needs to support Environmental (Marine) Research Infrastructures by means of Oceanographic Vessels: Challenge and opportunity to enhance specific cooperation actions

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18th ERVO meeting, 10-12 May 2016, HCMR, Rhodes, Greece



Environmental Research
Infrastructures Providing Shared
Solutions for Science and Society

ENVRIPLUS includes all the **Environment Research Infrastructures** (RI) supported by European Commission. A 4 year project (14 M€).



Long term needs and commitments can be expected from the ERIC funded by the member countries **for one or two decades**

What are the wishes of Marine RIs towards the Oceanographic RV's?

What level of cooperation and coordination is needed ?



Eurofleets



EuroGOOS
European Global Ocean
Observing System



Cooperation access to Research Vessels

How do we organize a systematic implementation access to oceanographic vessels ?

Strategy of European Fleets
by EUROFLEETS-3?

Presentation
to ERVO-
Rhodes-2016

Specifications by
EMSO/FixO3,
EuroARGO, EMBRC, SIOS,
ICOS, KM3Net,...

Proposal to ERVO and
issue of a working plan

Research Vessels

- Technical capacities
- Services (installation, replacement, maintenances, cruises/interoperability equipment (ROV's, AUV's, Gliders, etc.)
- Periodicity-time constraints
- EU regional seas
- sites

Open discussion

- Feasibility
- Opportunities
- Cooperation
- Countries
- Regional seas

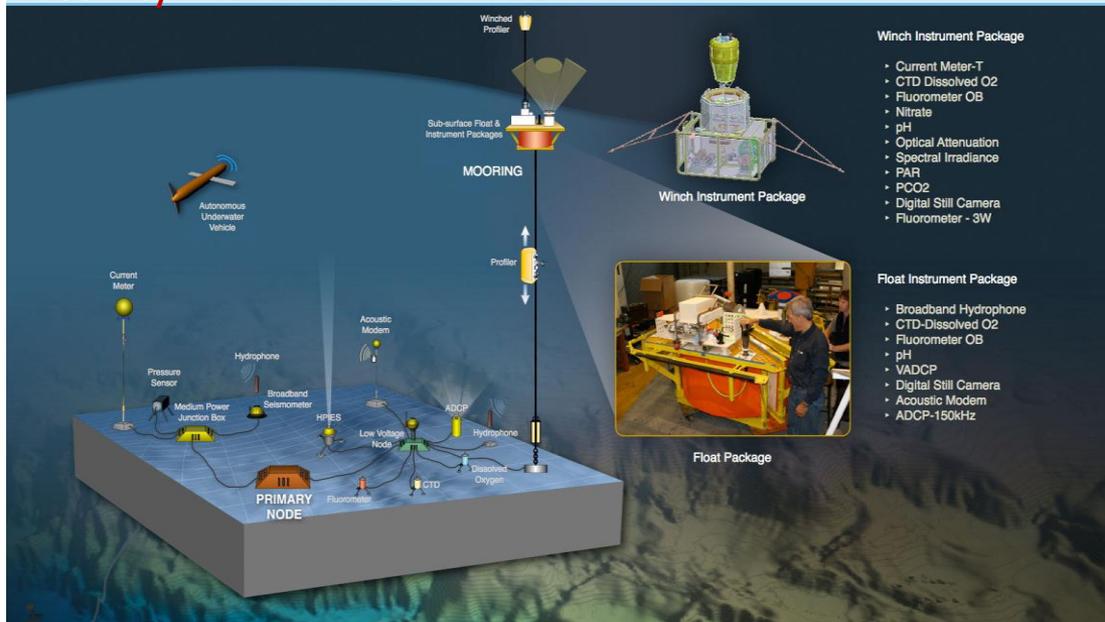
Possible RV's Actions

- Technology cruises
- Joint science cruises
- Opportunity of ships transit
- Pool of equipment
- Bartering
- Best practices and training



Framework European Seas

Activity: ALREADY STARTED



Some research infrastructures already have plans or preliminary views

EuroARGO ERIC - ARGO profiling floats
ICOS - Integrated Carbon Observation System
JERICO/JERICONEXT – Ferry box systems seldom on Research Vessels

Other RI's can benefit from voluntary ships including Research Vessels

SIOS – Svalbard Integrated Earth Observing System

EMSO ERIC – almost finalized the process to be a legal entity

FixO3 – includes moorings in addition to EMSO sites and some CO₂ measurements contributing to ICOS



EMSO – European Multidisciplinary Seafloor and water-column Observatory



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International Dimension

Ocean Networks Canada

DONET Japan

emso

ECSSOS China

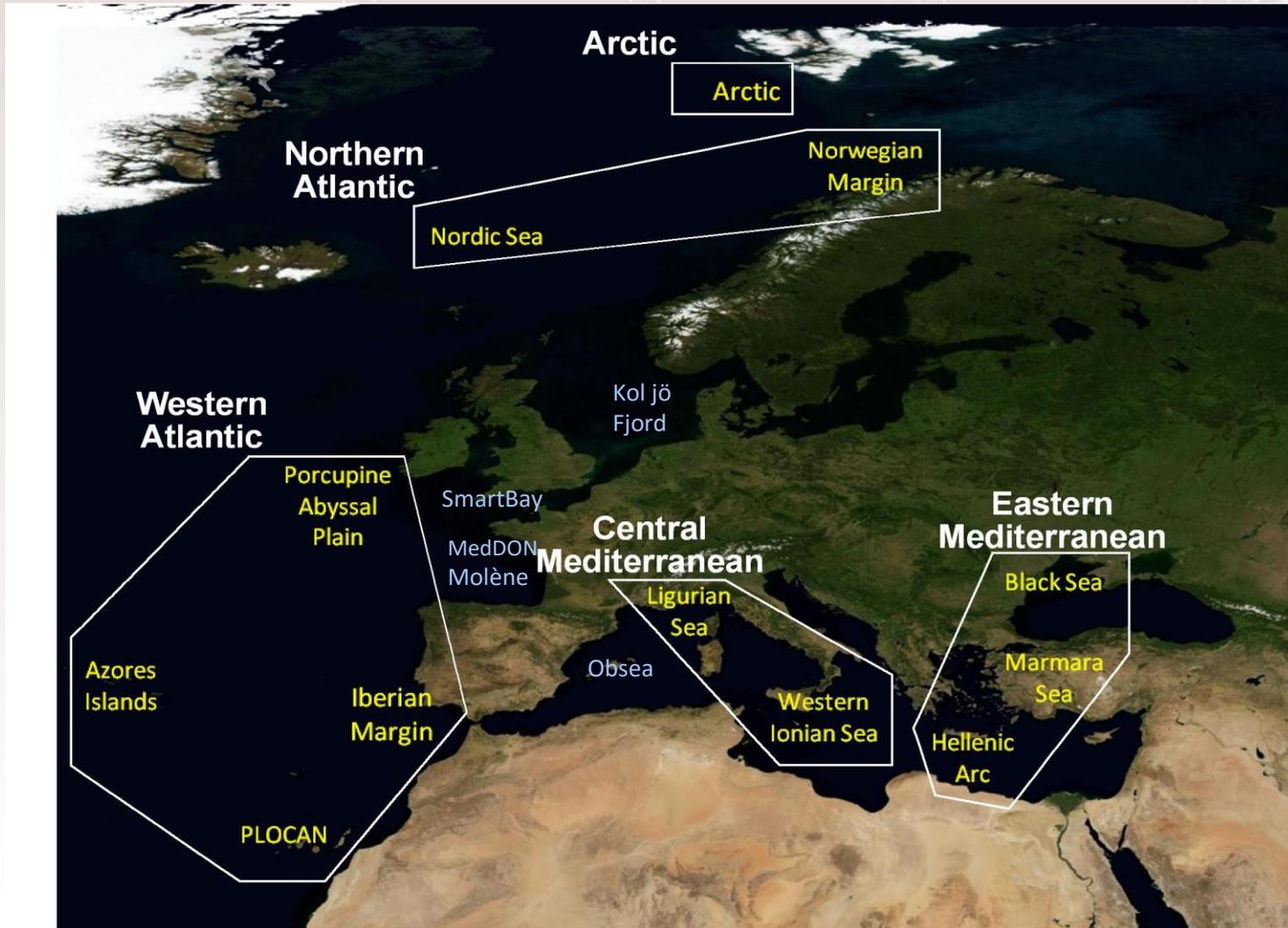
OOI United States

MACHO Taiwan

IMOS Australia



EMSO ERIC Regional Nodes; 11 nodes & 4 test sites



Major International Initiatives

Europe/Global

-  **Cross collaborations with:**
 - other ESFRI RIs, like: ECCSEL, EMBRC, EPOS, KM3NeT and SIOS
 - established or incoming ERICs, such as EURO-ARGO, ICOS and LIFEWATCH
 - new entry in the ESFRI Roadmap 2016, like: ACTRIS, DANUBIUS RI
-  **Cooperation with all Environmental RIs in the EU project **ENVRIplus****
-  **Participation in many EU projects (e.g., **FixO₃**, **MARsite**, **INDIGO**, ATLANTOS, NEXOS, JERICO-NEXT, **EMSODEV**)**
-  **Links with other EU initiatives (e.g., EUROFLEETS-2, SeaDataNet, EMODnet)**
-  **Contacts and exchanges with sister research infrastructure initiatives (**COOPplus**):**
 - ONC - Ocean Networks Canada (Canada)
 - OOI - Ocean Observatories Initiative (USA)
 - DONET - Dense Ocean floor Network for Earthquakes & Tsunamis (Japan)
 - IMOS - Integrated Marine Observing System (Australia)
 - ECSSOS - East China Sea Seafloor Observation System (China)
 - MACHO - MARine Cable Hosted Observatory (Taiwan)
-  **Cooperation and co-investment with industry (e.g., oil & gas, renewable energy, deep-sea mining, fisheries)**



SIOS – Svalbard Integrated Earth Observing System

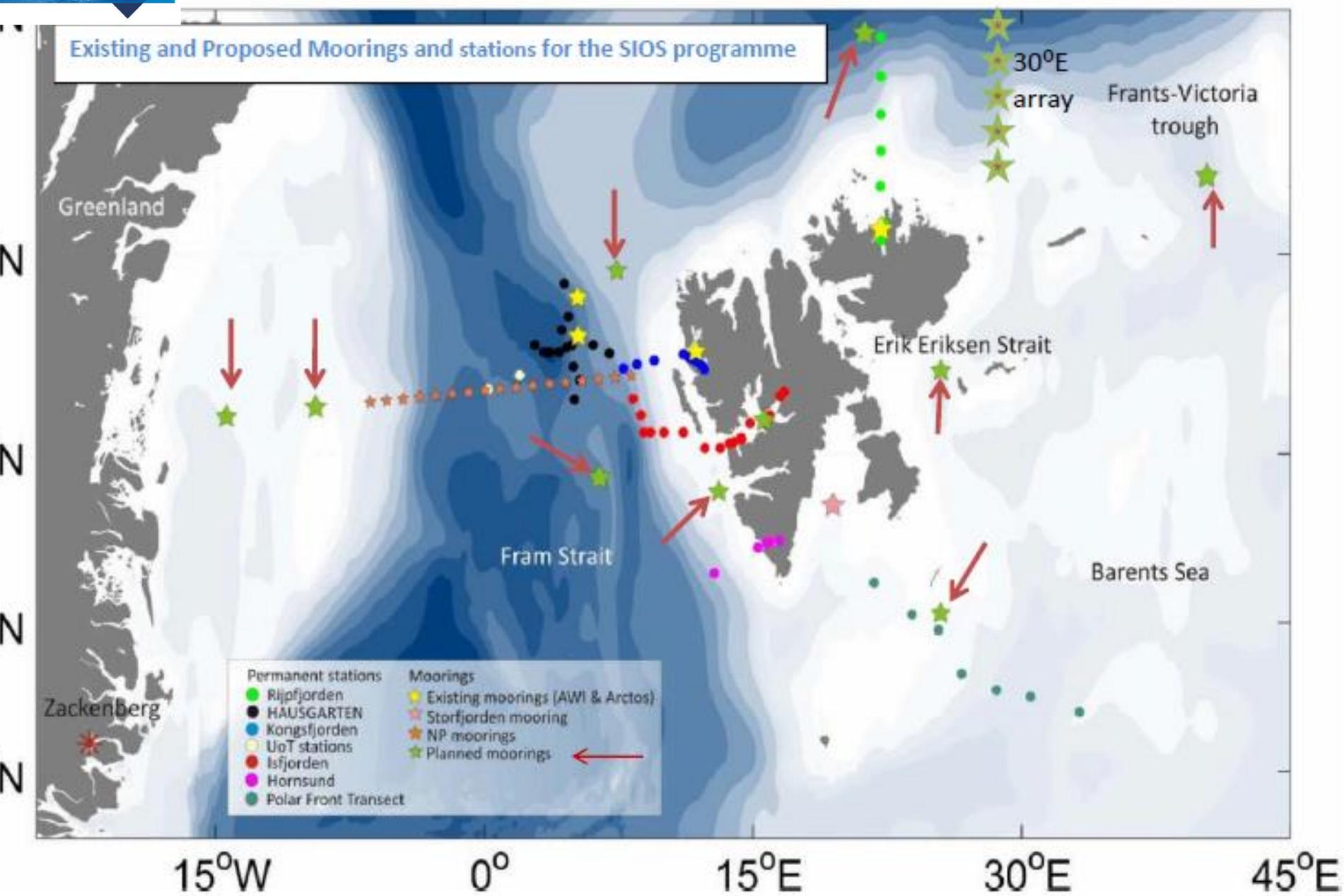
Plan of 2014 (Preparatory Phase)



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Existing and Proposed Moorings and stations for the SIOS programme



	Parameters	Platform	Possible Lead	Budget -k€	Priority (1, 2, 3)
Fram Strait (Deep)	Ocean acoustic data	Acoustic Arctic Laboratory	Norway	Existing	2
Fram Strait (WSC)	Mean temperature from tomography	Mooring	Norway	Existing	2
Northern Svalbard slope	Temperature, Salinity, currents	Mooring array (3 moorings)	UK	500	1
Yermak Branch of WSC (west flank of Yermak Plateau)	Profiles of ocean current, temperature and salinity	Array with 4 moorings	Norway	700	2
30 deg E array, north east Svalbard	Temperature, Salinity, currents	Array with 7 moorings	Norway	1300	2
Core of the West Spitsbergen Current	Sea current, temperature and salinity profiles	2 profiling moorings (MMP) with 2 Microcats each	Poland	30	1
Isfjorden, Bellsund, off shelf west of Bellsund/Smeerenburg, offshelf N of Rijpfjorden, Grønfjorden, Erik Eriksen Strait, Frans-Victoria Trough, N Barents Sea, E. Greenland Shelf)	Hydrography, Velocity, zooplankton biomass and vertical distribution, sedimentation, Chlorophyll, sea ice thickness	Moorings: CTD Temperature loggers, ADCP, Sediment traps, Fluorometer	ARCTOS	2500	2
Western Svalbard slope	Current profile with CTD/ fluorescence	Mooring (ADCP and 2 Microcats)	Poland	20	1
Fram Strait	Mean ocean temperature and currents, acoustic signals for glider navigation	Triangle tomography moorings	Norway	250	2
Fram Strait	Hydrography, Velocity, sedimentation, Chlorophyll, oxygen, nutrients	Upgrade of Fram Strait moorings with sediment traps and biological sensors	Norway	500	1

Repeat Sections

West Svalbard	T/S, Currents	RV Oceania	Poland	Existing	1
Fram Strait	T/S, Currents	Polarstern	Germany	Existing	1
Kongsfjord/KongHau	Temp/Salinity	Various Ships			2
Across Fram Strait	Tracers (S, d18O, N:P, alkalinity), revealing sources of Arctic Ocean freshwater components	CTD rosette water samples	Norway	Existing	1

(from Trulls Johannessen)

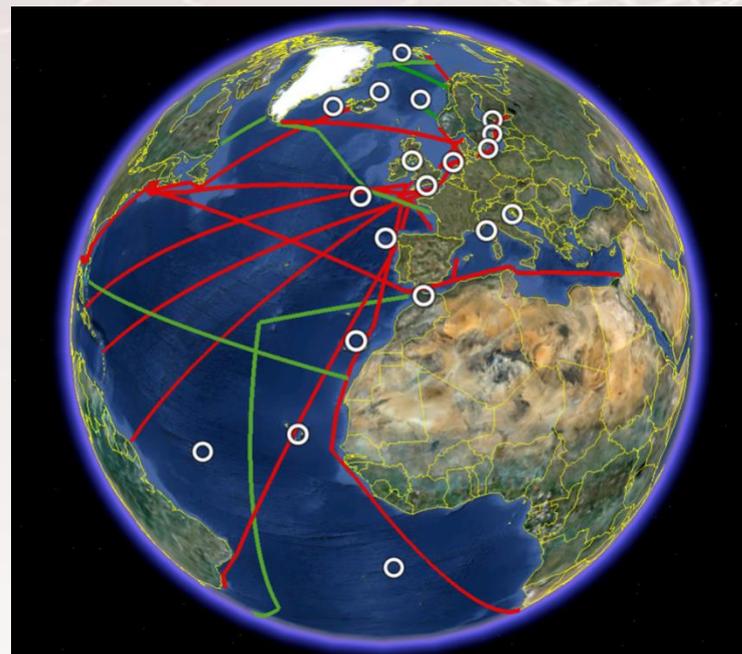
Atmosphere



Ecosystems



Oceans



European
multidisciplinary
& water column
observatory



ICOS Marine needs are expressed through IOCCP at international level.
It needs a focus on European requirements



Proposed Fixed Time Series Stations



21 stations suggested

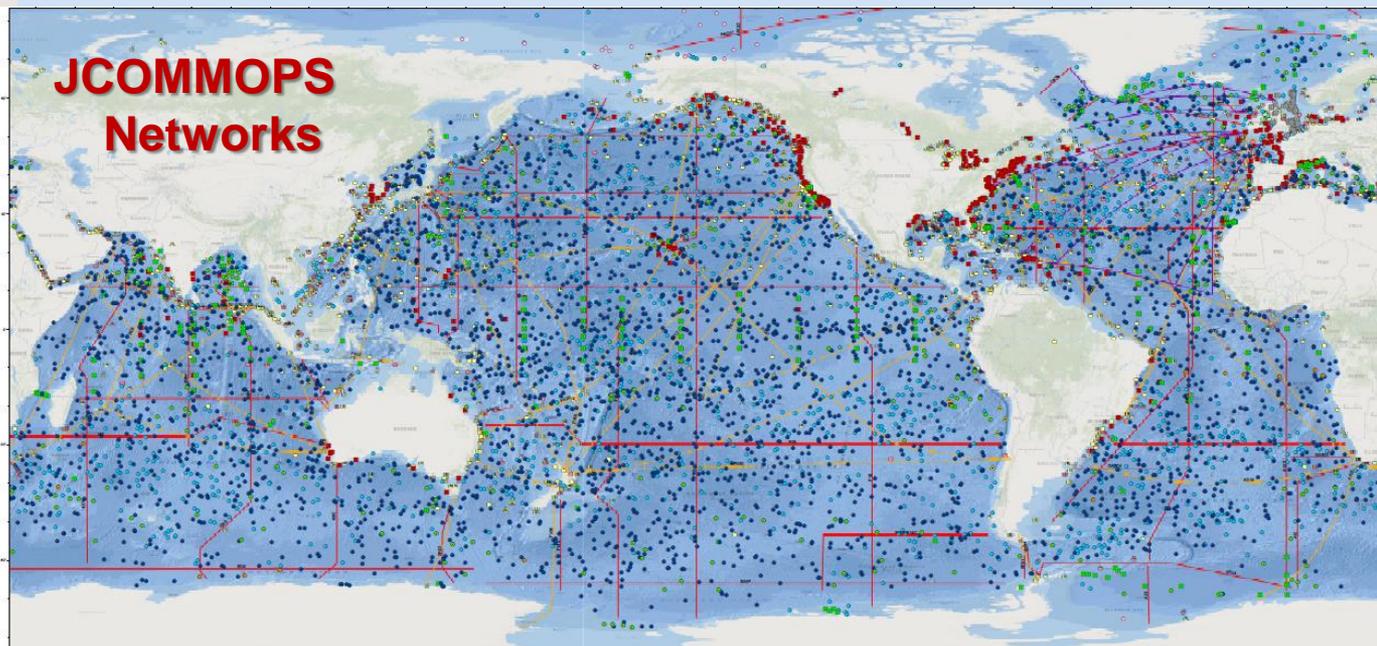
(from Truls Johannessen)

- Hausgarten**, Fram Strait - Germany
- Ocean Weather Station M**, 66°N / 2°E - Norway
- Irminger Sea**, 64.33°N / 28.00°W - Iceland
- Iceland Sea**, 68.00°N / 12.67°W - Iceland
- Östergarnsholm, Baltic Sea** – Sweden
- Utö**, Baltic Sea – Finland
- Marsdiep**, North Sea – Netherlands
- Liverpool Bay**, Irish Sea - UK
- L4**, western English Channel - UK
- E1**, western English Channel- UK
- Station Pap**, 49°N / 16°W - UK
- MINAS**, off Spain, 43°N / 11°W - Spain
- MOOSE**, Mediterranean, 43°N / 7.9°E – France
- PALOMA** – Italy
- ODAS** – Italy
- ENEA** – Italy
- GIFT**, Gibraltar, 35°N / 5°W - Spain
- ESTOC**, Canary Island, 29°10' N / 15°30' W - Spain
- Cap Verde Islands** - Germany
- PIRATA** 6°S / 10°W tropical Atlantic - France
- PIRATA** 8°N / 38°W tropical Atlantic – France

JCOMMOPS (IOC-UNESCO/WMO):

A coordination and support center for all sustained elements of the GOOS
(floats, drifters, ship of opportunity, ship lines, moorings, etc.)

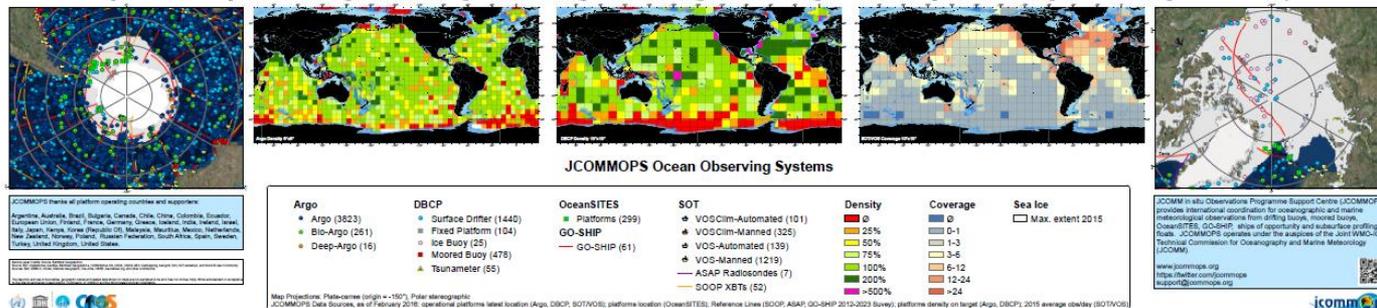
- 10 000 ocean observing platforms monitored in real-time
- (floats, drifters, moorings, ships, tsunameters, etc.)



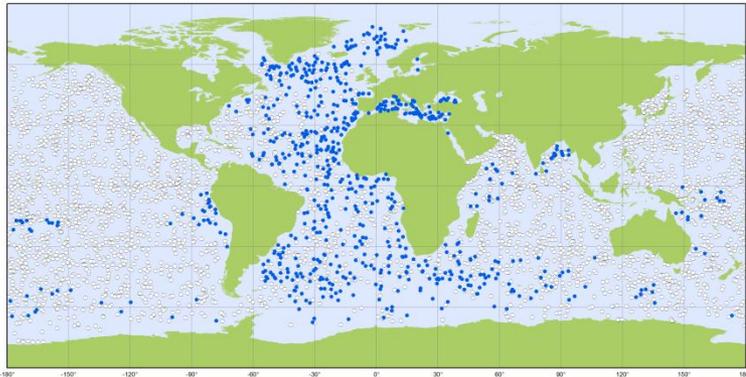
Monitors and analyzes networks performance

Website:

- Central gateway for platforms registration, planning, cruise plans
- Allows reporting on Member States and all partners contributions
- E.g. Ships used (through unique identifiers)

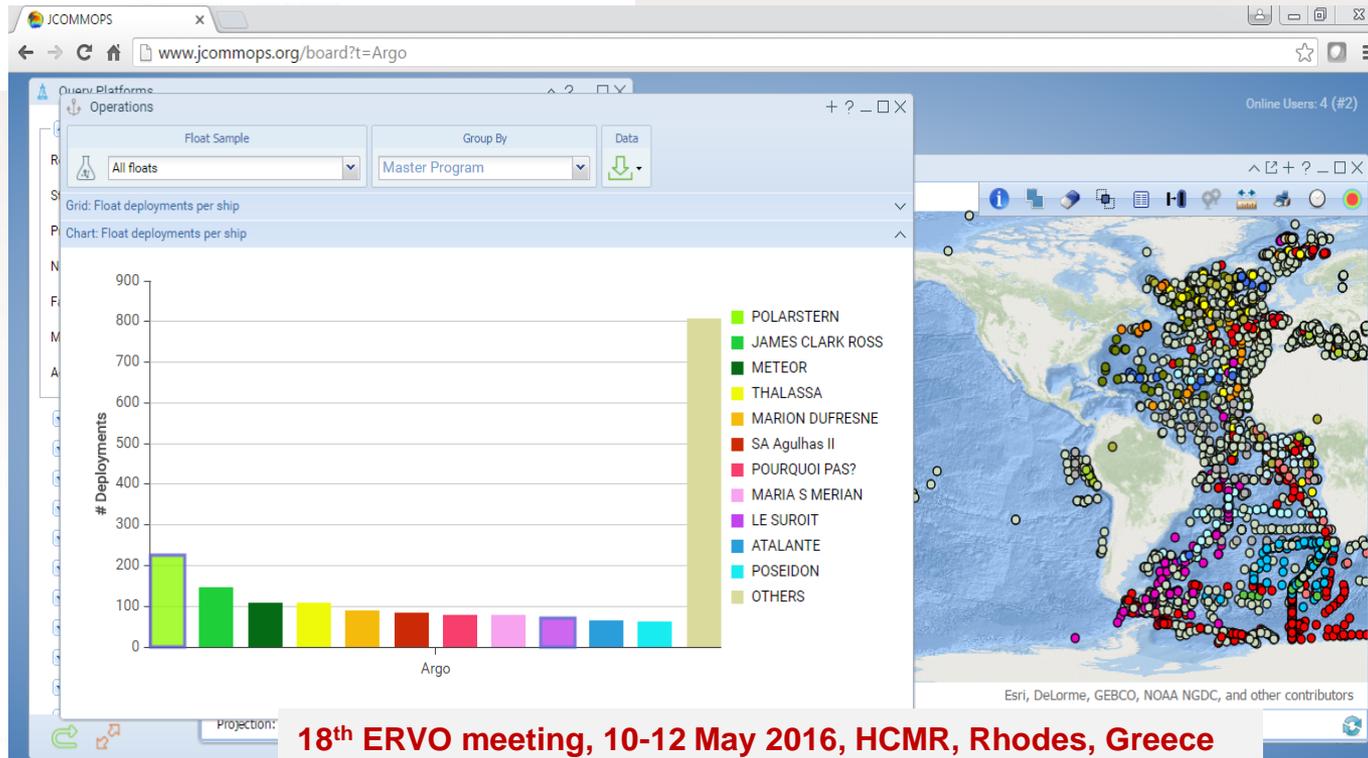


EUROARCO ERIC, ARGO, JCOMMOPS.ORG



Argo
EuroArgo
European contribution to the Argo program via EuroArgo Research Infrastructure
March 2016

- Encourages the sharing of cruise plans in advance (research, industry, sailing, NGOs, etc.)
- Need European partners to release this information for R/V in advance (3-6 months)
- Optimization of opportunities
- Visibility for all partners
- Ships crucial: common denominator of all obs. systems



EU Research Vessels Capacities for Unmanned Submarine Vehicles

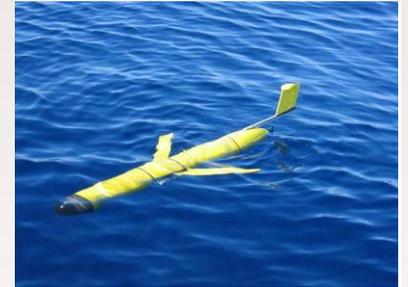
LEGEND												
	Proven deployment on RV											
	Possible deployment of ROV with minor modifications											
	Cannot deploy ROV, e.g. RV not available or no D.P.											
			ROV									
RVs	Country	Length	Holland 3000m	Quest 4000m	Victor 6000 6000m	Isis 6500m	IEO 2000m	Aglantha 2000m	Max Rover 2000m	Kiel 6000 6000m	ROV Phoca	MeBo
Marion Dufresne	France	120.50 m										
OGS-Explora	Italy	72.63 m										
Mare Nigrum	Romania	82.20 m										
James Clark Ross	United Kingdom	99.04 m										
Hesperides	Spain	82.50 m										
Italica	Italy	130.00 m										
NRP "Almirante Gago Coutinho"	Portugal	68.20 m										
Ernest Shackleton	United Kingdom	80.00 m										
Tridens	Netherlands	73.54 m										
Beautemps-Beaupré	France	80.64 m										
Miguel Oliver	Spain	70.00 m										
Cornide de Saavedra	Spain	66.70 m										
Le Suroit	France	56.34 m										
Urania	Italy	61.30 m										
Dr. Fridtjof Nansen	Norway	56.80 m										
Jan Mayen	Norway	63.80 m										
Johan Hjort	Norway	64.40 m										
Akademik	Bulgaria	55.50 m										



ACCESS TO RESEARCH VESSELS

Aiming to implement physical access to oceanographic vessels

- **Strategy of European Fleets** provided by EUROFLEETS 2 in FEG meeting Paris 2 May 2016.
- Include it in the implementation plans of other RIs such as EMSO ERIC
- Next year, ENVRPLUS will propose some quantitative request from all RIs



CONCLUDING REMARKS

Scientific & Societal demand for Environmental Marine Research Infrastructures

- **Oceans** are essential to quality of life on Earth. **Largest most complex Biome on Earth- ORIGIN OF LIFE**

- **Oceans dynamics** drive most of the ecosystems on Earth, and control on the Planetary Climate

-**70% of Volcanism on Earth Occurs Underwater.** Source of Hazards- Often Unpredictable

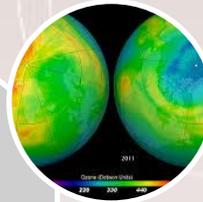
- **Oceans** are the **last unexplored frontier on Earth**

-There is a **increasing exigency to understand de oceans**

EMSO AIMS: For long-term monitoring series of sub-seafloor, seafloor and water column

To study Ecosystems, Global changes, Earth Sciences and Geo-hazards and for Environment protection

Marine component of **GMES** and **GEOSS** Platform for **Data Access and management**



Earths interactions hydrosphere, biosphere, lithosphere, atmosphere



Geohazard and early warning capacity for earthquakes ,tsunamis, gas-hydrates release and submarine slope failure and sediments instability

Research and long term and continuous monitoring has the highest priorities?



Interactions between ecosystems , biodiversity, biogeochemistry physic and climate for e.g. understanding present and past climate changes in the poles?

Regular operations are needed and prioritized for research, monitoring purposes, and maintenance of permanently installed observatories, based on the previous items?



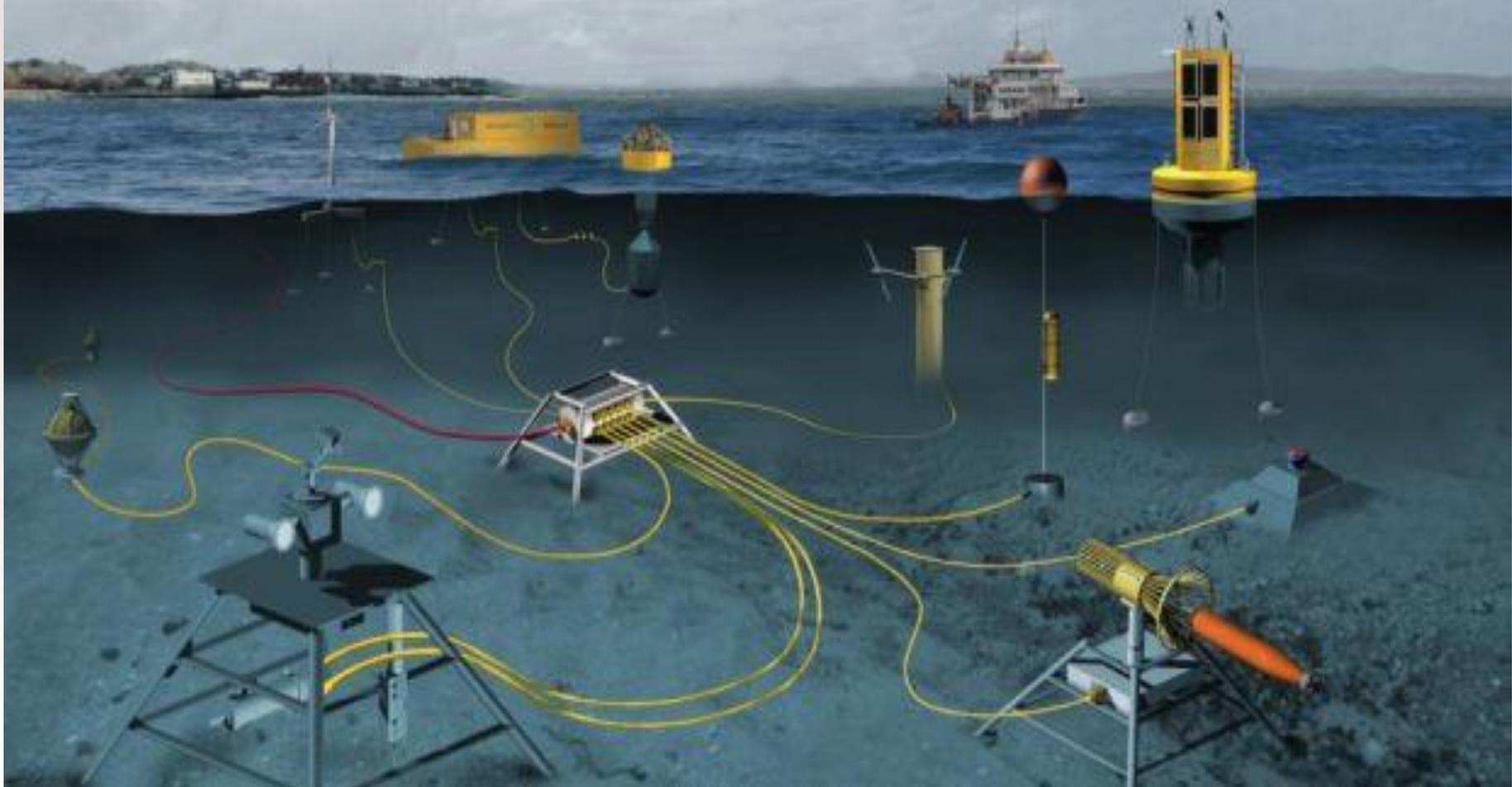
Impact of exploration and extraction of natural resources and living resources



Observation on how Natural and Anthropogenic changes Connecting scientific outcomes to stake holders and policy makers



Thanks for you attention



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