



**EuroGO-SHIP**  
Enhancing ocean observations

# A potential new research Infrastructure supporting European hydrography

**Lead Investigator: Elaine McDonagh (NORCE)**

December 2022 - November 2025





# Hydrography; one of the oldest ways of observing the ocean



- Shipboard observations
  - Top to bottom
  - Human Presence
  - (Virtually) unlimited power
  - High quality chemical analyses (pollutants, carbon system)
  - Calibration of remote assets
  - Model Initialisation
  - Change detection
- Undertaken by nearly every coastal state



Martin Visbeck @mvisbeck · Jan 22, 2022

Happy [#CTDApreciationDay](#) one of the workhorse technology for physical and biogeochemical oceanography. Many CTD systems also allow to take up to 30 water samples at different depths. A colleague once mentioned that water is more valuable than gold when including all costs



2

15

87





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Alan Berry @alanpberry · Jan 22

Even our @Eir\_OOS lego scientists celebrate #CTDApreciationDay 🤖



↻ 3

♥ 23

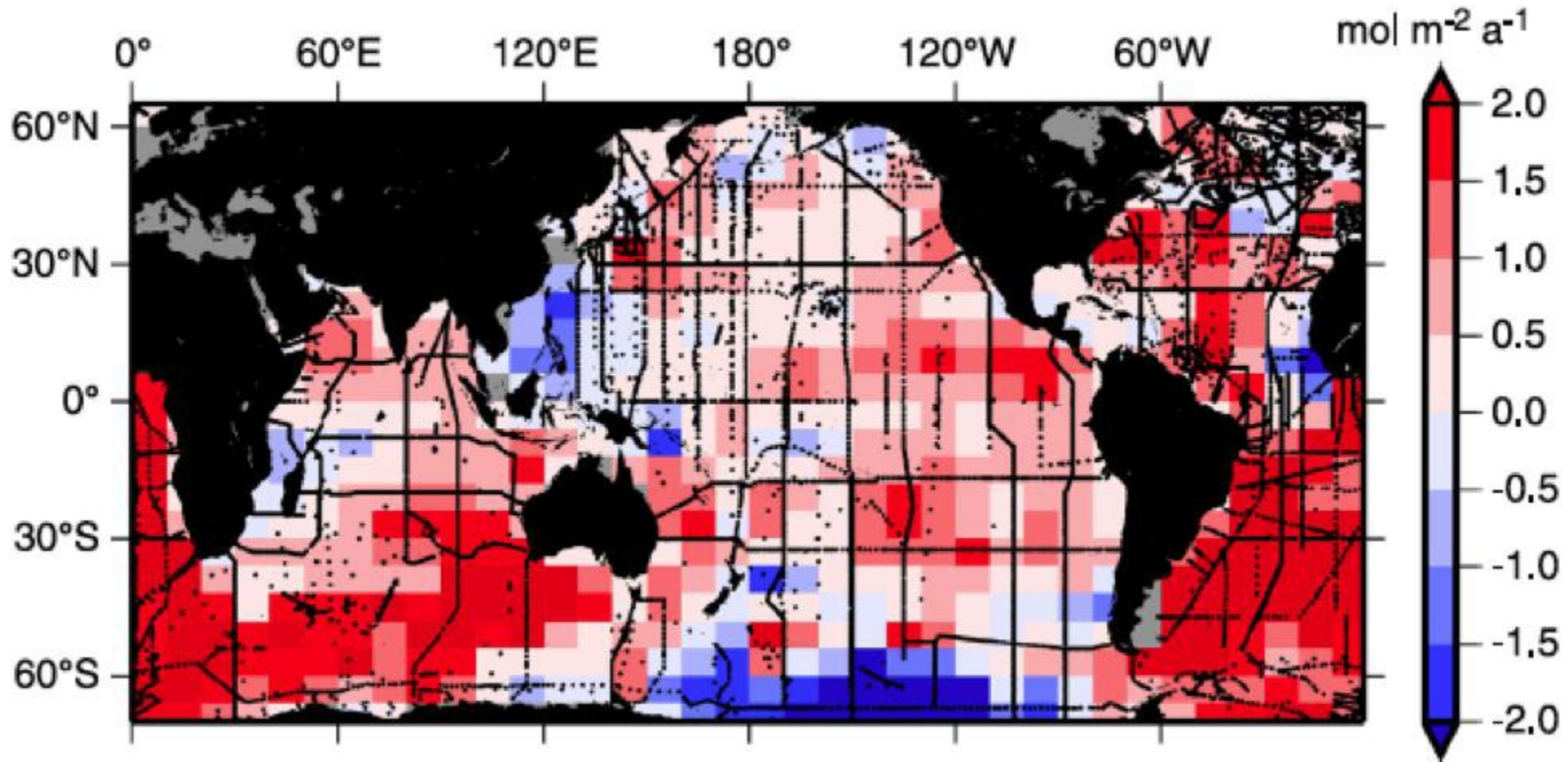
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Delivers information that cannot be acquired in any other way:  
Where is the 25% of the  $C_{anth}$  that has entered the ocean?



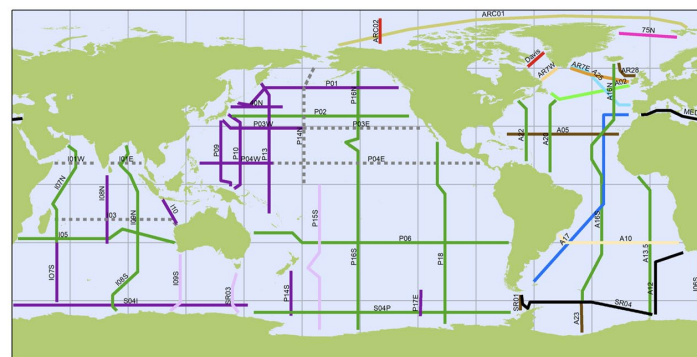


# International Context: International GO-SHIP

## Supporting the Global Ocean Observing System & Network



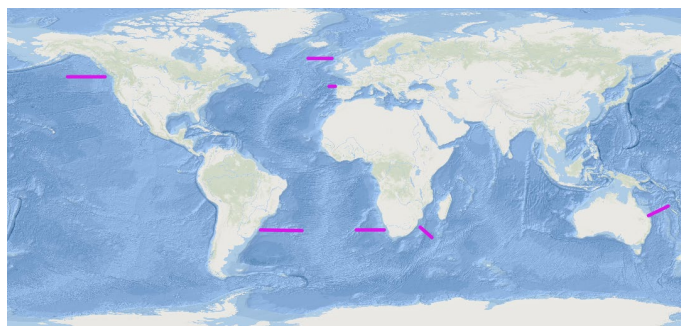
- **International Oversight**
  - Co-chairs and technical coordinator
  - Science Committee & Executive Board
  - Data management team
  - Best practices
- **Shared science objective:**
  - Decadal variability of ocean heat, freshwater and carbon uptake



GO-SHIP 2012-2023 Survey (55 Core Lines): Lines by Nation August 2019



Generated by www.jamops.org 11/08/2019



### Reference Sections

- Coast-to-coast or coast-to-ice
- Full depth
- Decadal repeat
- Level 1 parameters
- Station spacing
- Best practice
- Open data

### Associated Sections

- Depth requirements
- Decadal repeat
- subset of level 1 parameters
- Station spacing
- Best practice
- Open data



# The challenge

Providing infrastructure that supports all European ship-based hydrography

## Current issues & challenges:

- Certified reference materials
- Data
- Lack of agreed data and metadata formats for key data streams
- Diverse working practices
- Missed measurements
- Lack of national capacity for key measurements



## The Global Ocean Ship-Based Hydrographic Investigations Program (GO-SHIP): A Platform for Integrated Multidisciplinary Ocean Science

OPEN ACCESS

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## The ICES Working Group on Oceanic Hydrography: A Bridge From *In-situ* Sampling to the Remote Autonomous Observation Era

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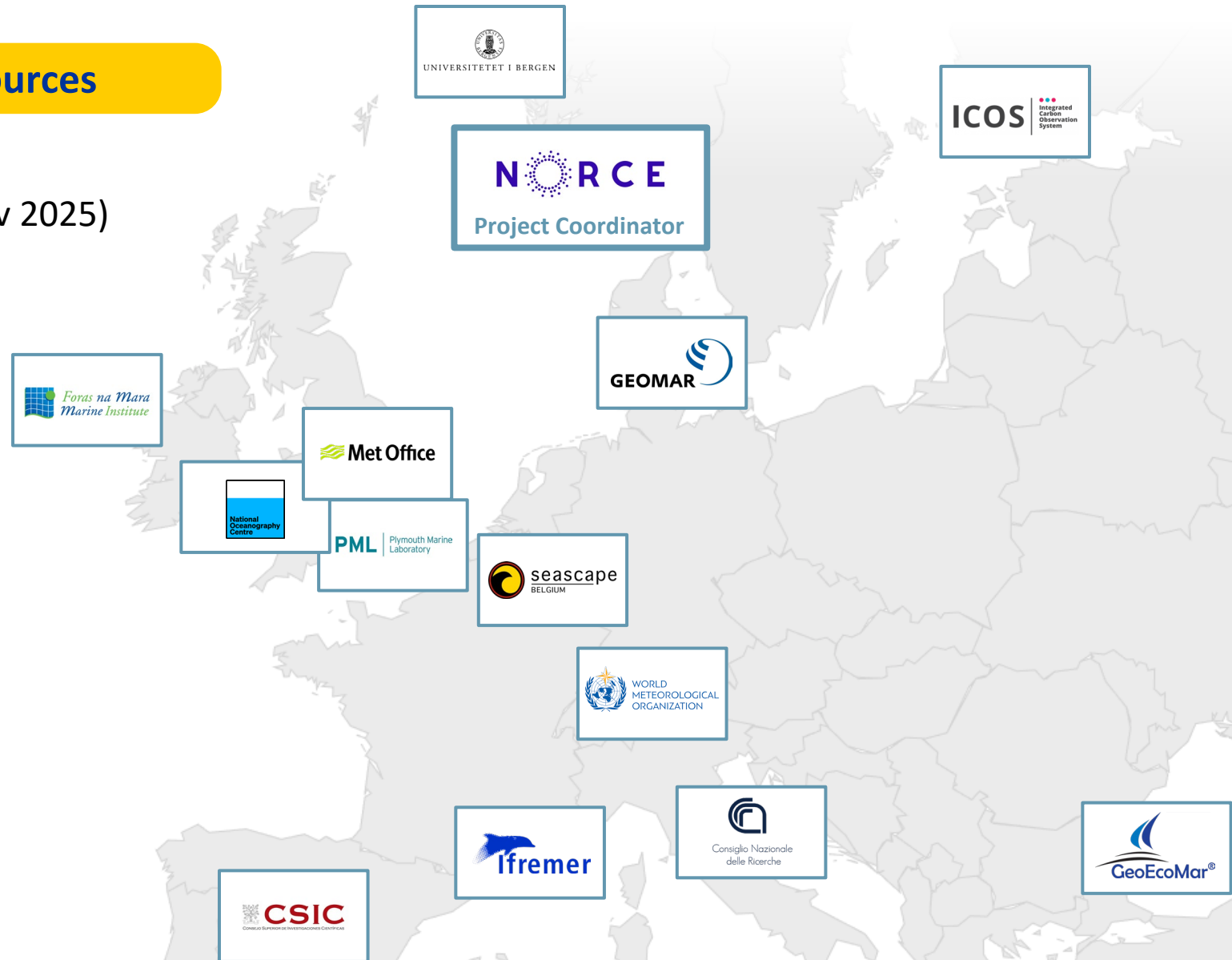
# EuroGO-SHIP

A European project funded by Horizon Europe



## Consortium & resources

- 14 Partners, 11 nations
- 36 months (Dec 2022 – Nov 2025)
- Funding: €2.998.546
- EU and UKRI Funding







# Our ambition

Could challenges be addressed by a new research infrastructure?



## EU Marine Research Infrastructure Landscape

End Users: Scientific, Ocean modelling, Satellite community

Data handling: Copernicus Marine, EMODnet, SeaDataNet



**EuroGO-SHIP:**  
**A new infrastructure**  
**for European ship-based**  
**hydrography**

Adapted image from the JERICO Report 'The joint European Research Infrastructure Network for Coastal Observatories: Achievements and Strategy for the Future' published in 2015





# EuroGO-SHIP

ENHANCING OCEAN OBSERVATIONS

## A Co-Designed Strategy

Shaping a new research infrastructure in support of more accurate ship-based observations from the surface to the bottom of the ocean

## Access to Facilities

Innovating models to make research infrastructures available across borders

**to make shared facilities more accessible and fit-for-purpose**

## Quality Control

Developing software and methods

**to facilitate the adoption of common data quality control procedures**

## Pan-European Coordination

Making the EU hydrographic system stronger than the sum of its component parts

**to maximise the return on the collective investment**

## Training

Surveying and scoping training needs & requirements

**to boost the skills of scientists undertaking observations**

## Best Practices

Adopting common ways of undertaking key tasks in a reproducible manner

**to obtain comparable datasets to the highest quality**



## Data Management

Mapping existing data pathways and linking to end users

**to ensure distribution of FAIR data and maximise benefit to society**



EuroGO-SHIP has received funding from the European Union HORIZON EUROPE Programme under Grant Agreement No. 101094690



# Task 3.2. Pilot Activities

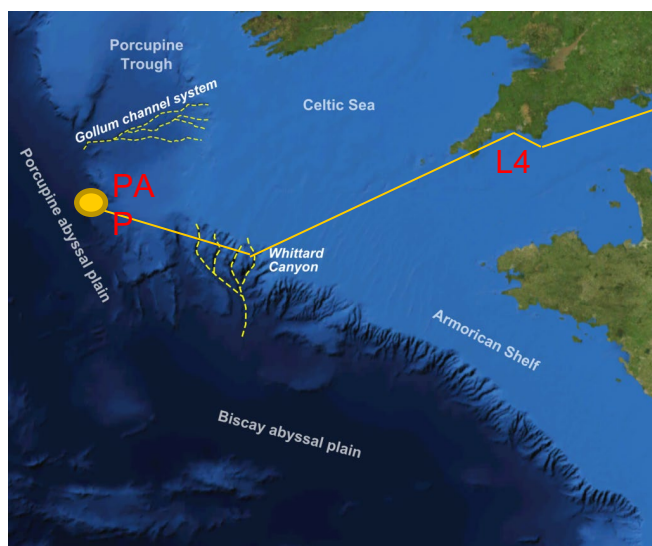
Update



## Nutrients: Comparison of long-term methods of nutrient sample storage

NOC (Southampton) cruise to the PAP (Porcupine Abyssal Plain) Sustained Observatory site in the North Atlantic Ocean,

L4, part of the Western Channel Observatory (WCO): long term study site by PML



PAP: 49°N: 16°W



RRS James Cook JC247



WCO



# Task 3.2. Pilot Activities

Update



## Nutrients:

Sampling and analysis according to the GO-SHIP Nutrient Manual (Becker et al. 2020).

Certified nutrient reference materials analysed on every run to ensure analytical and data quality and comparisons (KANSO, Japan).



Determine the scientific requirement and projected costs across Europe for nutrient CRMs relevant to European Seas

Eutrophic (high nutrients) to Ultraoligotrophic (low nutrient concentration) waters.

Current CRM's are made with mainly Pacific water (34-35psu).

European Waters: Atlantic (average salinity 35-37 psu), Mediterranean (38-40 psu), Black Sea (17-18 psu), and Baltic (average 6 psu).

These waters have differing nutrient balances from Pacific water.

Susan Becker, Michio Aoyama, E. Malcolm S. Woodward, Karel Bakker, Stephen Coverly, Claire Mahaffey, Toste Tanhua. (2020). GO-SHIP Repeat Hydrography Nutrient Manual: The precise and accurate determination of dissolved inorganic nutrients in seawater, using Continuous Flow Analysis methods. *Frontiers in Marine Science, Analysis Methods*, October 2020.





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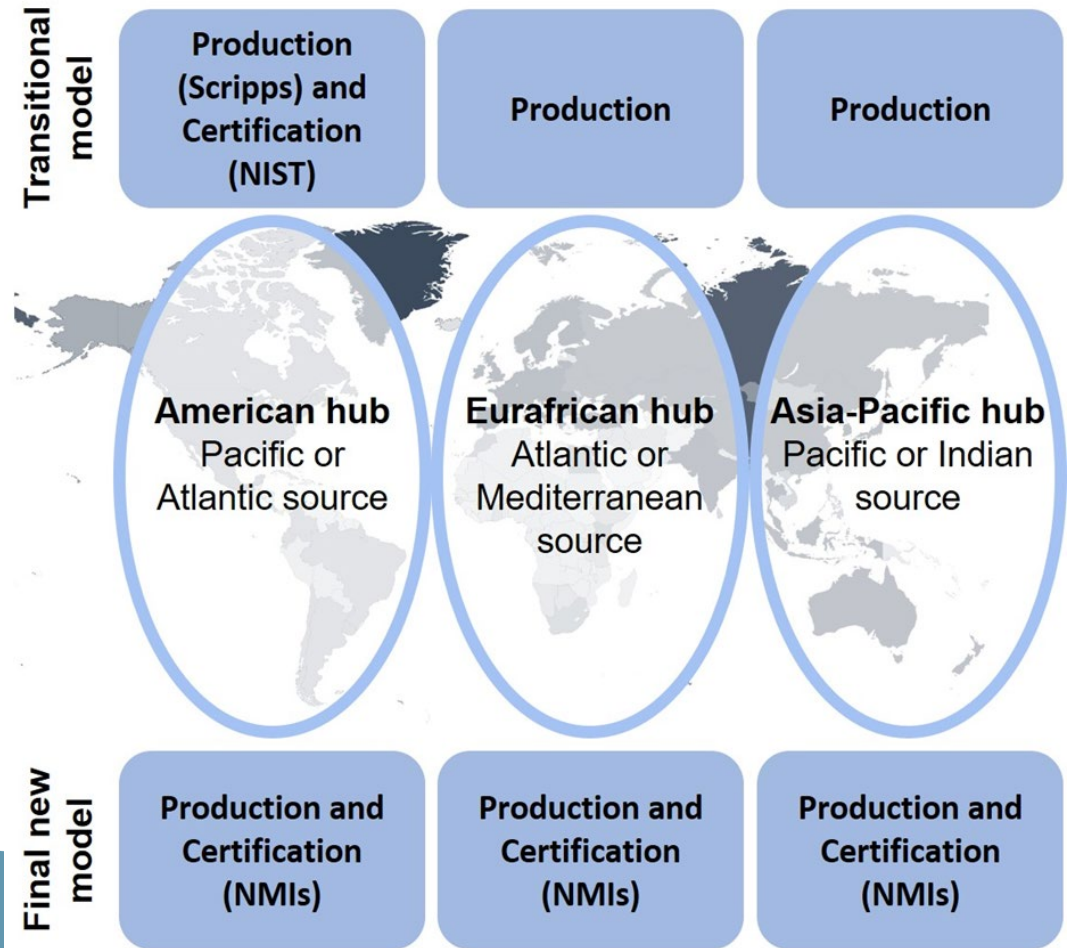
## Update



### Carbon secondary standards (Tobias)

- Prepare batch of secondary reference seawater
- Document production and evaluation
- Distribute secondary reference seawater

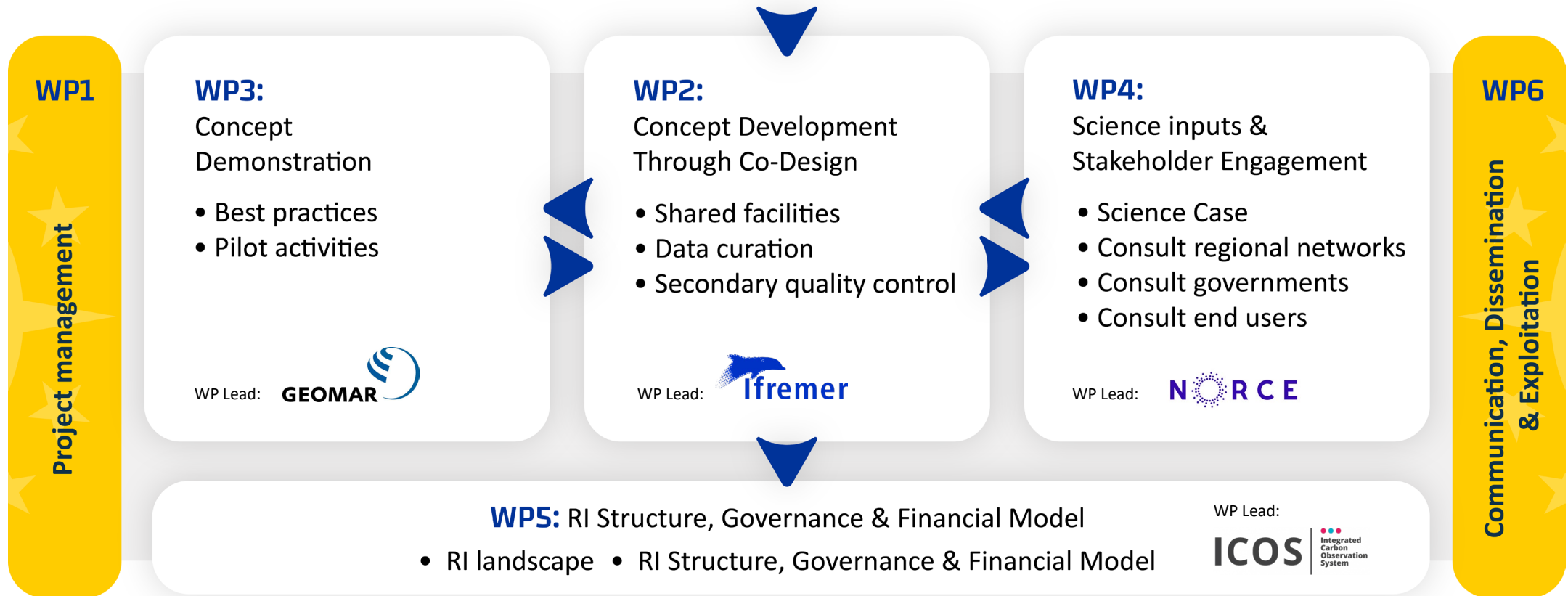
- A batch with ca. 100 bottles (250 mL each) prepared in June/July 2023
- We will run tests for short term stability (3-6 months) for cruises







### A EuroGO-SHIP Research Infrastructure Concept



# Enhancing ocean observations



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