Brokerage Event:

INDIA in Horizon Europe: Essential Ocean Variables (EOVs)

HORIZON-CL6-2023-CLIMATE-01-8

Scope of the call

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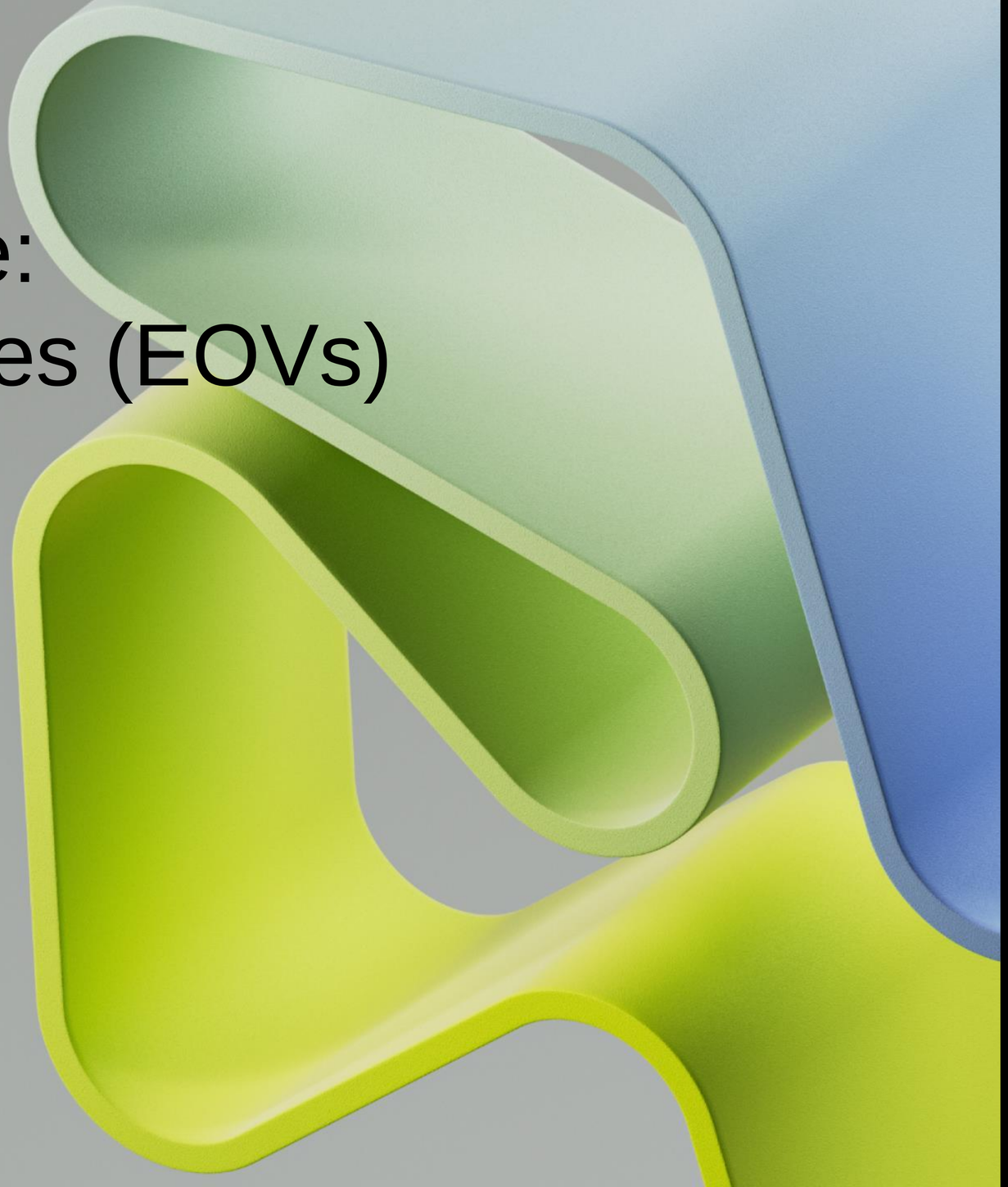
Research Council of Norway

Brokerage Event, Friday 17 February 2023
India: 2:00 - 4:30 pm -- Brussels: 09:30 – 12:00 am



Forskningsrådet

Why RCN and Arctic Norway in this Brokerage event?

- **Funding** Research and development (FoU budget)
- **Strategic Adviser** (Administrative budget)
- **Dialogue** with the research community
- **Mobilising** for Horizon Europe - NCPs

GOV – White Paper on the role of the Ocean in Norwegian foreign policy (2016-2017)


© Havforskningsinstituttet. RV Dr. Fridtjof Nansen

- Mobilisation event at **NCPOR, GOA in 2018** – H2020 cryosphere call
- Long history of joint **Indian-Norwegian cooperation**
- **Dedicated funding** under RCN – INDNOR (Polar, Hydrology, Geohazards, Marine)
- RCN **Ocean and Polar** research programmes, international cooperation
- India and Norway ocean countries with **long coastlines**
- **White papers** in Norway addressing ocean research and the blue economy
- **Polar Oceans** changing from white to blue
- NCP Ocean and Special Adviser on ocean and polar research
- **NERCI** – Nansen Env. Res. Centre at Kerala Univ. of Fisheries and Ocean Studies
- **Himadri** (NCPOR) facility at the Ny-Ålesund Research Station, Svalbard, Norway
- **Maitri** Antarctic station in Dronning Maud Land, close to Norwegian Troll Station

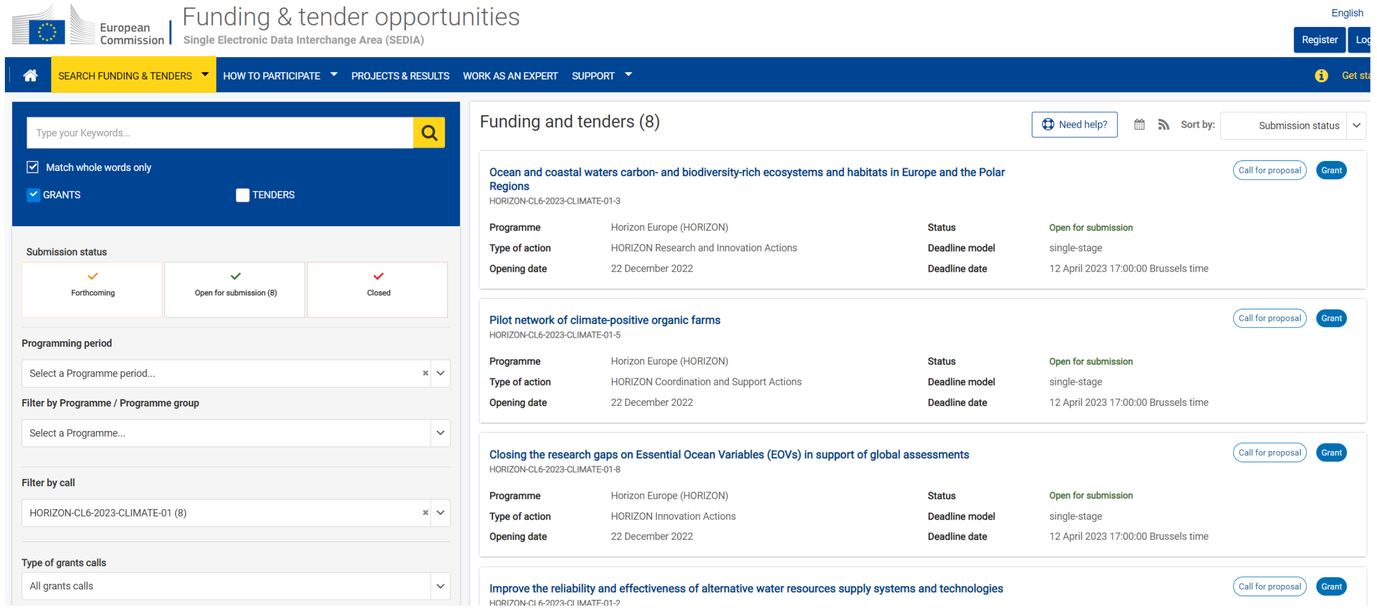
SVALBARD SCIENCE FORUM

NERCI

SC6 Call - *Land, ocean and water for climate action (HORIZON-CL6-2023-CLIMATE-01)*

8 topics with deadline in 2023:

- Ocean and coastal waters ecosystems (ocean and polar)
- **Essential ocean variables (EOVs)** (ocean and polar)
- Water security and water resources
- Climate smart farming
- Energy needs in agriculture



Budgets (EUR million):

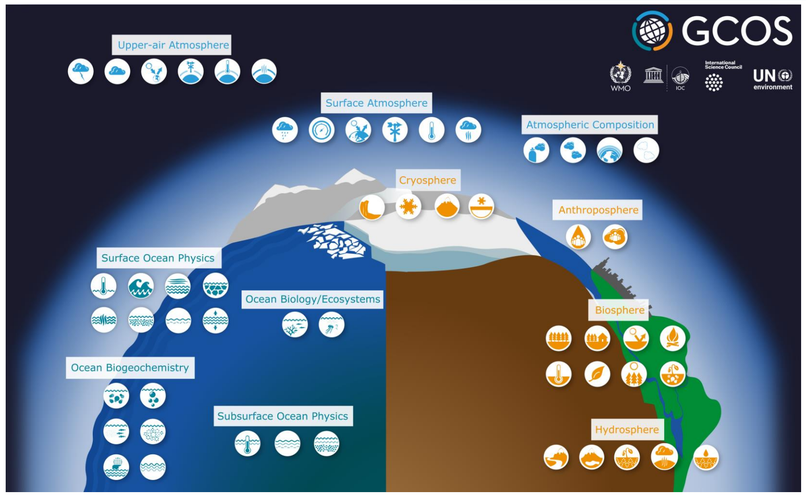
- **2023**: 90 + 18 (2024)
- Each proposal: 5-36

Deadlines (all calls):

- Singe-stage, opening 22 December 2022
- Deadline data: 12 April 2023

CORRECTION: Essential ocean variables (EOVs) –
this is an Innovation Action (IA), NOT Research and Innovation (RIA)

Closing the research gaps on **Essential Ocean Variables** (EOVs) in support of **global assessments** (IA):



Budgets (EUR million) - HORIZON-CL6-2023-CLIMATE-01-8**:**

- 2023: 17
- Each proposal: 5-6
- Indicative number of grants: 3
- Co-funding India: Associated partner, NOT coordinator: WP leader
- Associated partner(s): NOT signing HE Grant Agreement: Consortium Agreement

Deadline (singe stage): 12 April 2023 17:00:00 Brussels time

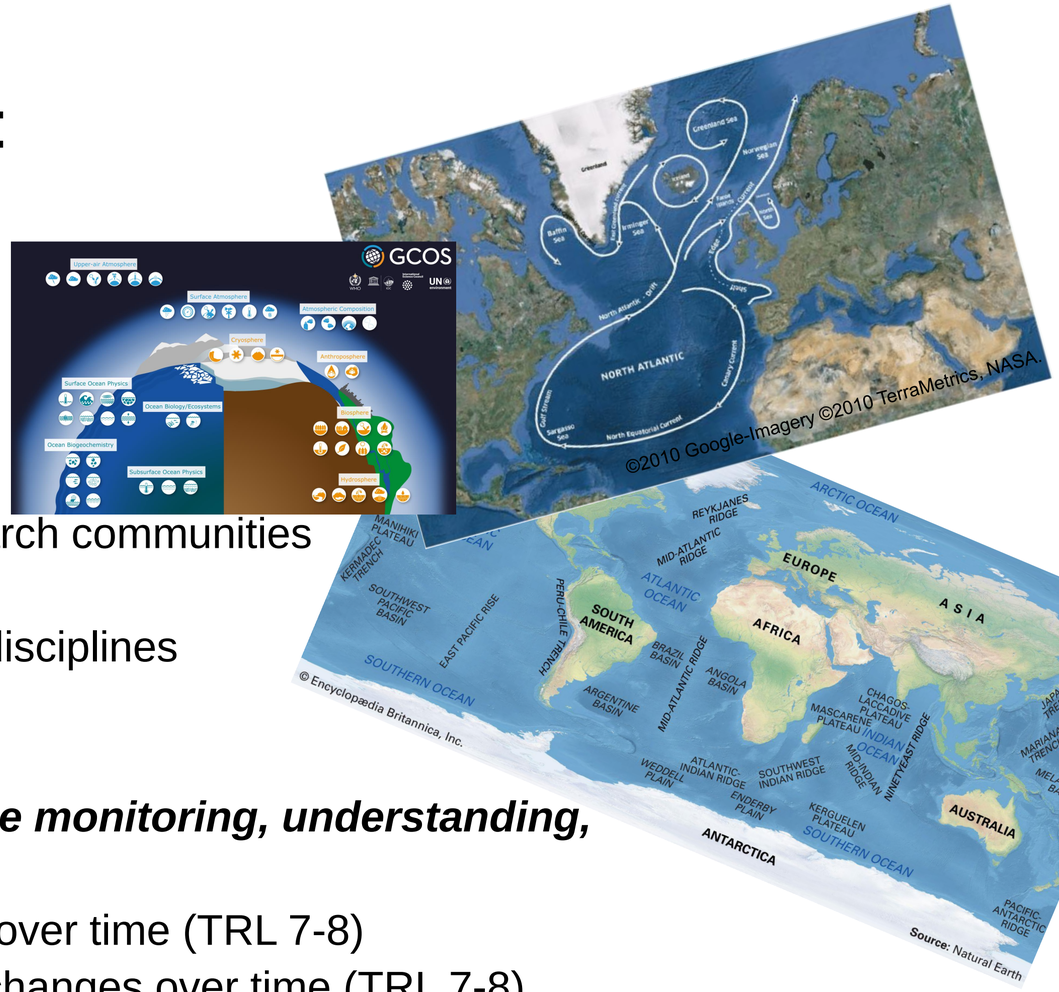
Important first questions to ask:

- What are and who defines the Essential Ocean Variables (**EOVs**) and Essential Climate Variables (**ECVs**)?
- How to understand the **SCOPE** of the call? What is the expected **OUTCOME** and **IMPACT** of the IA-project?
- How to identify those European research groups that are already preparing/coordinating proposals to the call?
- How to include a complementary Indian expertice / Work Package into those proposals?
- **What it the difference between the IA and the RIA?**

Essential Ocean Variables (EOVs) in short:

HORIZON-CL6-2023-CLIMATE-01-8:

Essential Ocean Variables (EOVs) for Global Assessments (IA)



- Call addressing
  - **i. integrated multidisciplinary ocean science**
  - ii. **physical, biogeochemical and biological/ecosystem** research communities
  - iii. **co-developing and defining** Essential Ocean Variables
  - iv. **integrating observations** from the different oceanographic disciplines
  - v. into **models for multidisciplinary analysis** and reporting.

- Proposals that address 1 of 3 alternatives, all towards ***improving the monitoring, understanding, reporting (Essential Variables) and projections of essential:***
  - i. ***physical oceanic processes*** related to climate and changes over time (TRL 7-8)
  - ii. ***biogeochemical oceanic processes*** related to climate and changes over time (TRL 7-8)
  - iii. ***biological and ecosystem oceanic processes*** related to climate and changes over time (TRL 5-6)

- ***Production of related Essential Ocean Variables and indicators***
- ***At regional or sea basin scale..***
- ***Collaboration among the «sister» projects***

Essential Ocean Variables (EOVs) in short:

HORIZON-CL6-2023-CLIMATE-01-8:

Essential Ocean Variables (EOVs) for Global Assessments (IA)

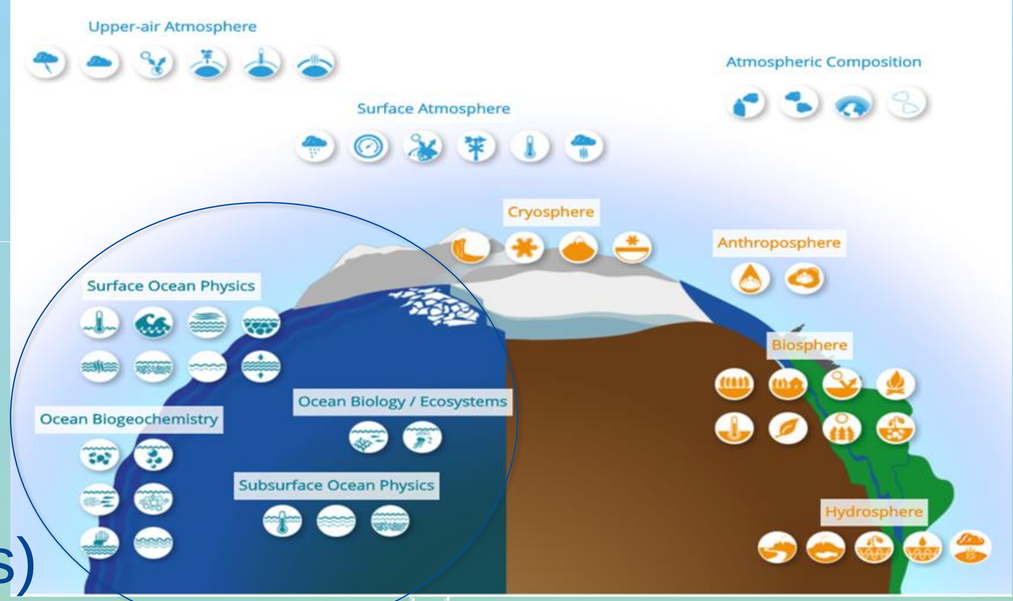
Scope:

- In general - proposals for topics under this destination shall contribute to set out **credible pathways that contribute to climate action** in all domains
- ….efficient monitoring, assessment, modelling and **data-driven decision-making support systems**

- ***Deliver*** ***ocean forecasts*** *and early warnings,* ***climate projections*** *and* ***assessments*** *and protect ocean health and its benefits*
- ***Contribute*** *to further develop* ***Global Climate Indicators***
- *The physics, chemistry, biology and biology/biodiversity of the ocean system are irrevocably* ***interlinked****.*
- *Multitude of* ***stressors****, natural and anthropogenic.*
- *Ocean observations, analysis and prediction tools essential for ocean ecosystems* ***sustainable management and conservation****, ongoing* ***trends and shifts****,* ***impacts of climate change*** *and management policies, knowledge for informed* ***policy decisions and literacy****.*
- *Standardized physical oceanographic essential variables providing valuable input to the* ***IPCC, IPBES, ..***
- *Expansion of* ***biogeochemical and ecological observation systems*** *delivering essential variables*
- *Standardisation and improved utilisation of* ***existing sensors, new sensor technology, suitable for ships, mooring and autonomous platforms, increased use of emerging remote sensing technologies at higher resolution****.*

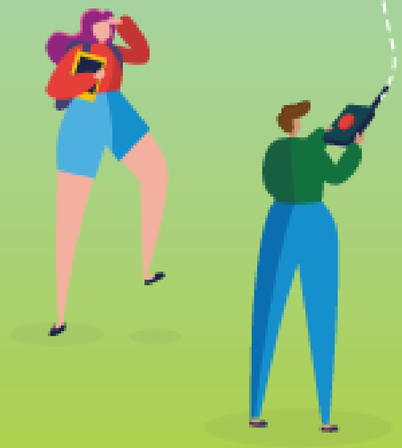
HORIZON-CL6-2023-CLIMATE-01-08

Closing the research gaps on Essential Ocean Variables (EOVs) in support of global assessments



Innovation Action

Indicative budget: *17 M€ in total*
(5-6 M€ per project)

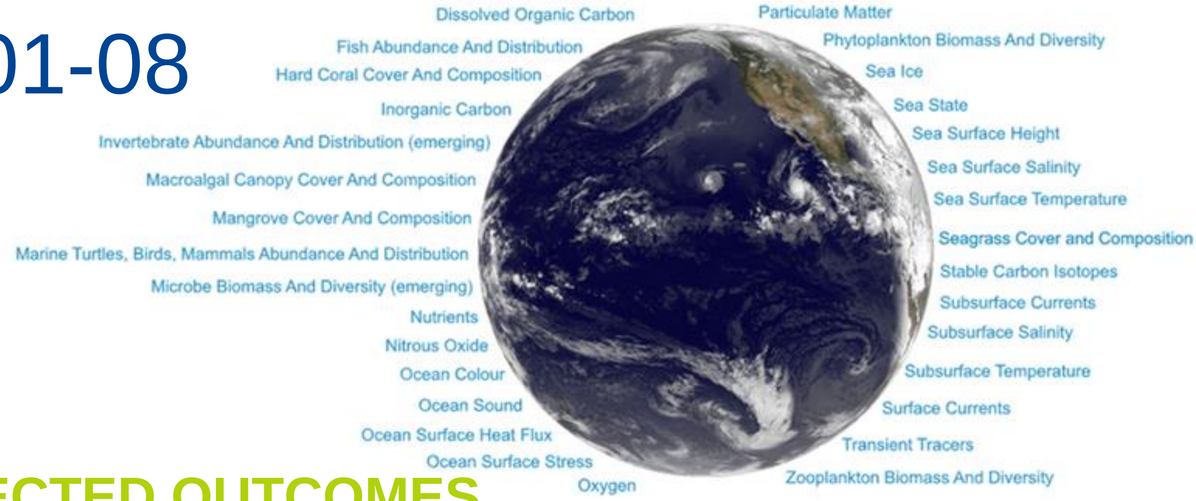


European Commission

HORIZON-CL6-2023-CLIMATE-01-08

POLICY CONTEXT

- In support to the **European Green Deal's** biodiversity and climate objectives;
- strengthening the **ocean - climate – biodiversity nexus research;**
- delivering **ocean forecasts and early warnings**, **climate projections and assessments** and **protecting the ocean health and its benefits**;
- look at the **physics, chemistry, biology and biodiversity** (including microbes and macro-organisms) of the **ocean system as irrevocably interlinked**;
- implementation of **protective and adaptive measures** for **ocean ecosystems sustainable management and conservation.**



EXPECTED OUTCOMES

- One of the major roles of the research conducted under this topic should be to **deliver integrated multidisciplinary ocean science by means of the physical, biogeochemical and biological/ecosystem research communities** coming together and joining forces for development of **Essential Ocean Variables**, **integration of observations** from the different oceanographic disciplines into **models for multidisciplinary analysis and reporting;**
- Enabled **evidence-based decision–making**;
- Sustained **European leadership in ocean–climate–biodiversity science nexus** supporting EU programmes;
- Significant contribution to the implementation of the **European Green Deal**, and to **global scientific assessments**.

European Commission

HORIZON-CL6-2023-CLIMATE-01-08

SCOPE

A) essential *physical* oceanic processes & indicators

- sea state
- ocean surface stress
- sea ice
- ocean surface heat fluxes
- sea surface & subsurface salinity
- sea surface height
- sea surface & subsurface temperature
- ocean circulation & surface & subsurface currents
- ocean layering & density gradient
- upwelling

In physical oceanography, essential variables have been collected globally in a standardized manner providing valuable input to the IPCC.

- **further develop** essential **physical ocean monitoring variables and indicators**, improve their **performances** (e.g. resolution, uncertainties) and support their **integration in climate models** in order to improve the understanding of **important feedbacks**;
- improve **monitoring and reporting** in **specific ocean areas** such as **at depth and in marginal areas**, **over the continental shelf slopes, coastal zones and polar areas;**
- contribute to the development of a more **quantitative understanding** and **predictability of the processes** that cause and maintain **ocean extremes**, and the conditions that are conducive for the generation of **extremes** and **tipping elements.**

KEEP IN MIND

International cooperation

European Space Agency, All-Atlantic Ocean Research and Innovation Alliance, Copernicus marine service, GOOS, Ocean Biogeographic Information System (OBIS), MBON of GEOBON, ICOS, GCOS

multidisciplinary and ecosystem-based approach

Make use of Copernicus and/or Galileo/EGNOS

Collaboration with sister projects

European Commission

HORIZON-CL6-2023-CLIMATE-01-08

SCOPE

B) essential *biogeochemical* oceanic processes & indicators

- oxygen
- nutrients
- inorganic carbon
- transient tracers
- nitrous oxide
- ocean colour
- particulate matter
- dissolved organic carbon
- elemental & isotopic tracers
- stable carbon isotopes
- marine debris

- **Expand** essential **biogeochemical ocean monitoring variables and indicators;**
- better representation of **essential biogeochemical processes in climate models** and enable **a better understanding** of the **links between ocean physical and biogeochemical variability**;
- combine **GHG measurements in regions especially critical for GHG fluxes with relevant biogeochemical measurements;**
- inform **models** and improve **predictions** of the **Earth system response to ocean acidification** and to the **ocean biological pump**, including the **long-term trends in ocean chemistry**, beyond the observational record;
- improve observations for the **interplay between carbonate chemistry** and a **variety of biogeochemical** and **physical processes**;
- contribute towards the **integration of more biogeochemical parameters, assimilation techniques, models and assessment strategies into ESMs**.

KEEP IN MIND

International cooperation

European Space Agency, All-Atlantic Ocean Research and Innovation Alliance, Copernicus marine service, GOOS, Ocean Biogeographic Information System (OBIS), MBON of GEOBON, ICOS, GCOS

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European Commission

HORIZON-CL6-2023-CLIMATE-01-08

SCOPE C) essential *biological & ecosystem* oceanic processes & indicators

- marine habitat properties
- calcifying organisms
- phytoplankton biomass and diversity
- zooplankton biomass and diversity
- fish abundance and distribution
- nekton migration
- marine turtles, birds and mammals abundance and distribution
- hard coral cover and distribution
- seagrass cover and distribution
- mangrove cover and distribution
- macroalgal canopy cover and distribution
- microbe biomass and density
- invertebrate abundance distribution
- ocean sound

- **further develop** essential **biological and ecosystem** ocean monitoring variables and indicators, and the development of **early warning systems** based on biological indicators;
- develop the **integration** between **climate models** (physics and biogeochemistry) and **ecosystem/marine habitat models;**
- further develop **observation processing** and assess **needs for additional observations** in support of biological EOVs and ECV development and validation;
- development of **common approaches and standards, and inter-calibrated protocols**;
- better representation of **essential biological and ecosystem processes in climate models**;
- advance our scientific understanding of how **extremes** affect organisms and ecosystems, in particular for the effect of **dual- or triple-compound events**;
- contribute towards the **integration of more ecosystem parameters**, assimilation techniques, models and assessment strategies **into ESMs**.

KEEP IN MIND

International cooperation

European Space Agency, All-Atlantic Ocean Research and Innovation Alliance, Copernicus marine service, GOOS, Ocean Biogeographic Information System (OBIS), MBON of GEOBON, ICOS, GCOS

multidisciplinary and ecosystem-based approach

Make use of Copernicus and/or Galileo/EGNOS

Collaboration with sister projects

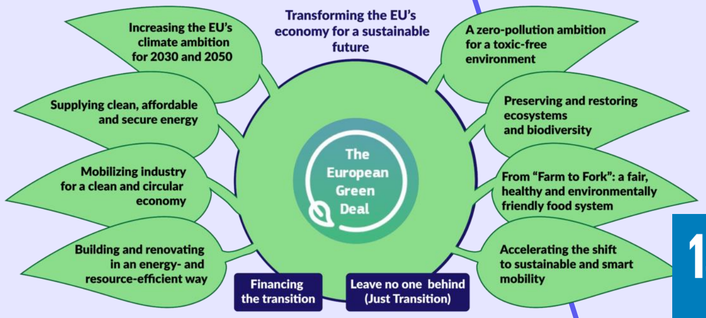
European Commission

Expected Outcome

HORIZON-CL6-2023-CLIMATE-01-8: Closing the research gaps on Essential Ocean Variables (EOVs) in support of global assessments (IA):

In line with the ***European Green Deal*** and, in particular with the objectives of *the* ***European Climate Law***, the ***EU climate adaptation and mitigation strategies***, the ***EU biodiversity strategy for 2030***, the EU proposal for a ***nature restoration law***, the ***Marine Strategy Framework Directive (MSFD*)**,

- successful proposals should further the European efforts in achieving climate–neutrality by advancing the understanding and **science to support adaptation and resilience of natural and managed ecosystems**
- in the context of a **changing climate and biodiversity loss** and
- by **efficiently monitoring, assessment and projections** related to climate change impacts, mitigation, and adaptation potential
- to **deliver solutions** for tackling emerging threats and ***support decision-making*** at regional, European and global levels.



Significant contribution to the implementation of the **European Green Deal** and its climate and biodiversity objectives, the **EU maritime strategy**, to the development of the **European Digital Twin of the Ocean** (both data and models components), and to **global scientific assessments**, such as the IPCC, IPBES and WOA, as well as to the UNFCCC Ocean and Climate Change Dialogue, **UN Decade of Ocean Science** and **UN SDGs 13 and 14**.

Expected Outcome

HORIZON-CL6-2023-CLIMATE-01-8: Closing the research gaps on Essential Ocean Variables (EOVs) in support of global assessments (IA):

Successful proposal results are expected to contribute to all of the **following expected outcomes**:

- **Further developed** key ocean monitoring indicators, Essential Climate Variables (***ECVs from GCOS***), Essential Ocean Variables (***EOVs from GOOS***) in **compliance with** international programmes (IPCC, WOA, IPBES, CMIP, CLIVAR, Ocean Health Index, UN Decade, ARGO) that support international global assessments and foster the development of a regional approach to ocean climate monitoring and reporting, overcoming current limitations and gaps;

- **Further improved** ***Earth System Models (ESMs***) representing key physical, biogeochemical and biological processes in the ocean with reduced uncertainty of climate change projections at regional scales, and reduced biases (i.e. in the WCRP Coupled Model Intercomparison Project (***CMIP7***) models for ocean and polar regions);

- **Better understood links** between ocean physical, biogeochemical and biodiversity (including microbes and macro-organisms) variability over time, and the impacts of environmental stressors on ocean health, GHG sources and sinks, biology and ecosystems, as well as advanced understanding and science in support of adaptation and resilience of ***natural and managed marine and polar ecosystems*** in the context of a changing climate, including its interaction with other natural or anthropogenic stressors like pollutants;

- **Strengthened development** ***of common, agreed standards*** for climate records content, format, quality and validation methodol

- **Enabled evidence-based decision–making** (e.g., developing early warning ocean climate indicators); Sustained European leadership in ocean–climate–biodiversity science nexus **supporting** EU programmes e.g., the **Copernicus climate service, marine service, EEA / JRC reporting** and complementing other relevant European programmes (e.g., science programme of the European Space Agency);

Relevant EU funded projects ++

HORIZON-CL6-2023-CLIMATE-01-8: Closing the research gaps on Essential Ocean Variables (EOVs) in support of global assessments (IA):

- **All Atlantic Ocean Research Alliance**
- **EU Polar Cluster**
- **GEOSS**
- **Copernicus**
- **ESA-EU: Earth System Science coordiantion**
  - **Future EO mission**
  - **ESA Ocean/Biodiversity/Polar Science Clusters -> Option A,B,C**
  - **ESA-STAR Tender publications system in 2023, 2024**

BUILDING AN ALL ATLANTIC OCEAN COMMUNITY
Implementing the Belém Statement

AORA ATLANTIC OCEAN RESEARCH ALLIANCE
THE ATLANTIC: OUR SHARED RESOURCE MAKING THE VISION REALITY

EU-PolarNet

AtlantOS

EU Polar Cluster

SO-CHIC Southern Ocean Carbon and Heat Impact on Climate

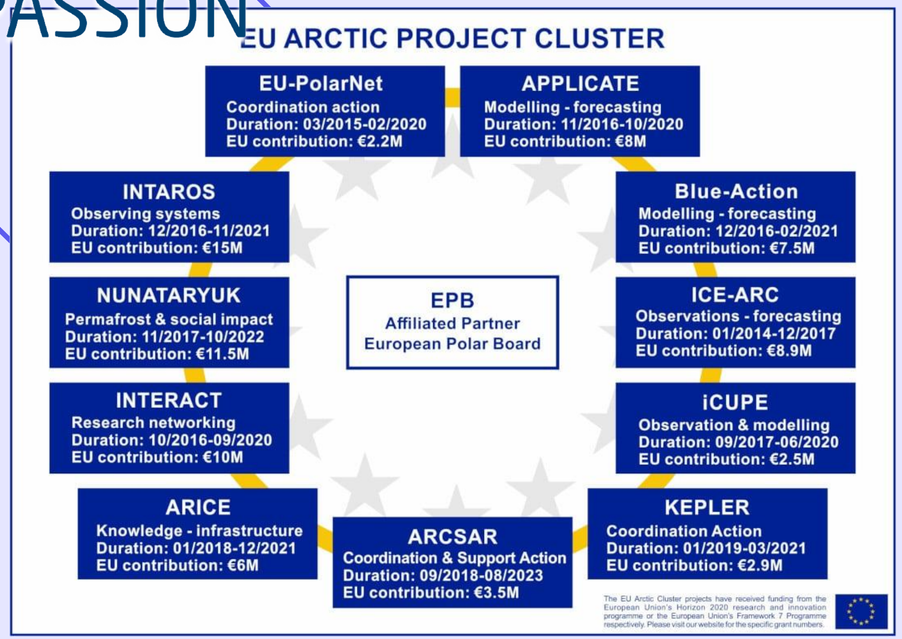
ARCTIC PASSION

GEOSS Global Earth Observation System of Systems

INTAROS

Copernicus Europe's eyes on Earth

esa European Space Agency



Type of action	Project characteristics	Who can participate?	Duration of projects	Funding level
Innovation Action (IA)	Close to the market, **innovation focus**. Create new, difference and better **products, processes or services**. May also include the development of prototypes, testing, demonstration, pilots, product validation in scale and market.	Consortia with partners from Academia, industry and also public sector. At least 3 legal entities from 3 member/associated countires.	2,5-3 years 2 -25 MEuro	60-70% for industry/private sectors 100% (for non-profit orgs) + 25% overhead
Research and Innovation Action (RIA)	Cooperation projects with **research focus**. Shall lead to the creating **of new knowledge or technology.** Includes basic and applied research and technological development. To a limited degree also demonstration and innovation activities.	Consortia with partners from Academia, industry and also public sector. At least 3 legal entities from 3 member/associated countires. .	3-4 years 2 -7 MEuro	100% + 25% overhead
Coordination and Support Action (CSA)	Funding for coordination and networking in specific fields of research and innovation. Collection of a knowledge base,	Consortia with participants from different countries, sectors, academia, industry, public sector, partnerships etc.		100% + 25% overhead

Technology Readiness Levels

Deployment	9	Actual System Proven in Operational Environment
	8	System Complete and Qualified
	7	System Prototype Demonstration in Operational Environment
Development	6	Technology Demonstrated in Relevant Environment
	5	Technology Validated in Relevant Environment
	4	Technology Validated in Lab
Research	3	Experimental Proof of Concept
	2	Technology Concept Formulated
	1	Basic Principles Observed

Essential Ocean Variables (EOVs) in short:

HORIZON-CL6-2023-CLIMATE-01-8:

Regional or sea basin scale:

- **Essential *physical, biogeochemical and biological & ecosystem* oceanic processes & indicators**
  - **i. continental shelf slopes, coastal zones, polar areas..**
  - **ii. mangrove cover, coral reefs, marine turtles**
  - **iii. ocean circulation, ocean biologic pump**
- **Complementary observations in regional basins?** North Atlantic, Indian Ocean, Southern Ocean...

Multidisciplinary Ocean Science:

One of the major roles of the research conducted under this topic should be to deliver integrated multidisciplinary ocean science by means of the ***physical, biogeochemical and biological/ecosystem research communities coming together*** *and joining forces for development of Essential Ocean Variables, integration of observations from the different oceanographic disciplines into models for multidisciplinary analysis and reporting.*

European institutions most likely to address the call

HORIZON-CL6-2023-CLIMATE-01-8: Closing the research gaps on
Essential Ocean Variables (EOVs) in support of global assessments (RIA):

- **International cooperation - project specifically mentioned in the call:**
  - **COMFORT, PolarRES, CrIceS, EuroSea, AtlantOS, EPOC, OCEAN ICE, OceanICU, Jetzon, DOOS**
  - **Copernicus marine service (CMEMS), GOOS, GCOS, Ocean Biogeographic Information System (OBIS), MBON of GEOBON, ICOS..**
  - **FAIR Data, INSPIRE directive, Copernicus, GEOSS, EMODnet**

- **Synergy projects in the call:**
  - **HORIZON-INFRA-2022-EOSC-01-03: FAIR and open data sharing** in support of healthy oceans, seas, coastal and inland waters
  - HORIZON-INFRA-2024-EOSC-01-01: **FAIR and open data sharing** in support of the mission adaptation to climate change.
  - HORIZON-CL6-2024-CLIMATE-01-6: **Ocean models** for seasonal to decadal and local to regional **climate predictions**
  - **HORIZON-CL5-2024-D1-01-02: Inland ice,** including snow cover, glaciers, ice sheets and permafrost, and their interaction with climate change
  - HORIZON-CL5-2024-D1-01-01: Enhanced quantification and understanding of natural and anthropogenic **methane emissions and sinks**
  - HORIZON-CL5-2023-D1-01-02: Climate-related **tipping points**.

- **Relevant Norwegian research institutions:**
  - **SINTEF, IMR, NIVA, UIB, UIT, NPI, NERSC, NORCE, DNV, UNIS, UIO**
- **Projects:**
  - **AORAC-SA, AtlantECO, AtlantOS, ATLAS, ECOTIP, EuroSea, FarFish, FutureMARES, ILIAD, INTAROS, MaCoBioS, MedAID, MEESO, MERCES, MISSION ATLANTIC, PANDORA, Respon-SEA-ble, SEAMLESS, SUMMER, TRIATLAS**

- **CORDIS - EU-funded projects since 1990**
  - **https://cordis.europa.eu/projects/en**
  - **Search for OCEAN VARIABLES or OCEAN OBSERVATION…**

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Research Council of Norway