



# Blue-Cloud2026

A federated European FAIR and Open Research Ecosystem  
for oceans, seas, coastal and inland waters

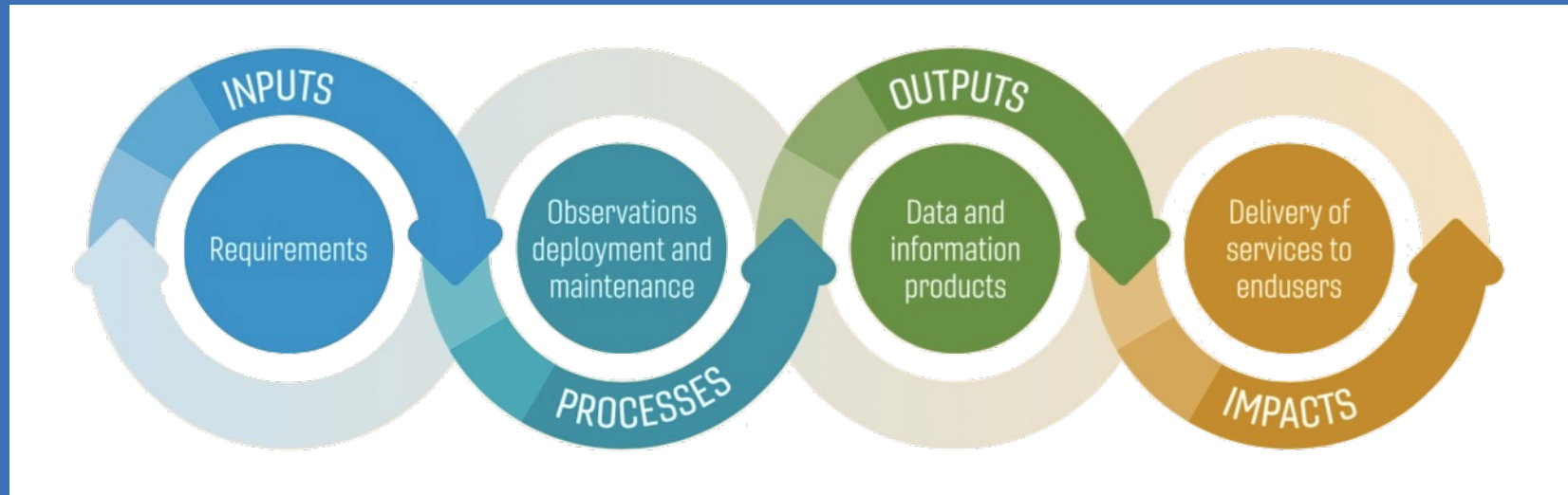
## Exploitation opportunities for the observing system

Blue Cloud KoM, Feb 13, 2023

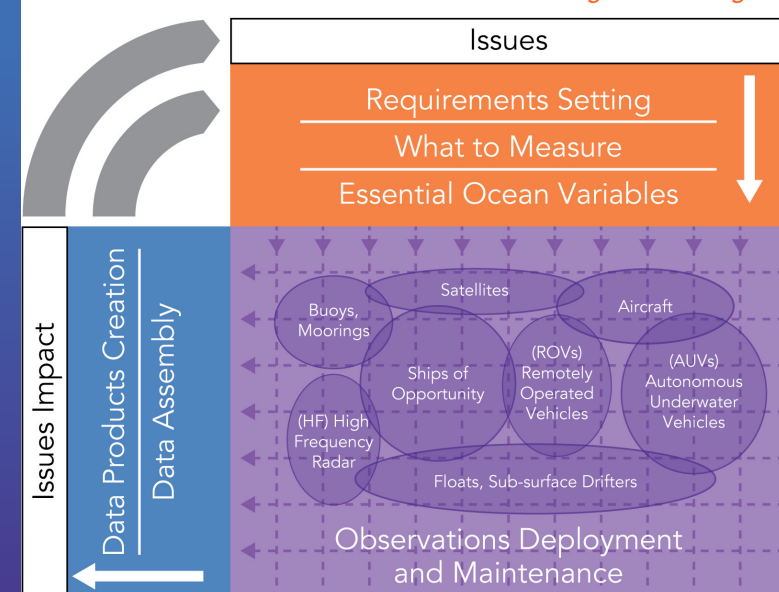
Toste Tanhua



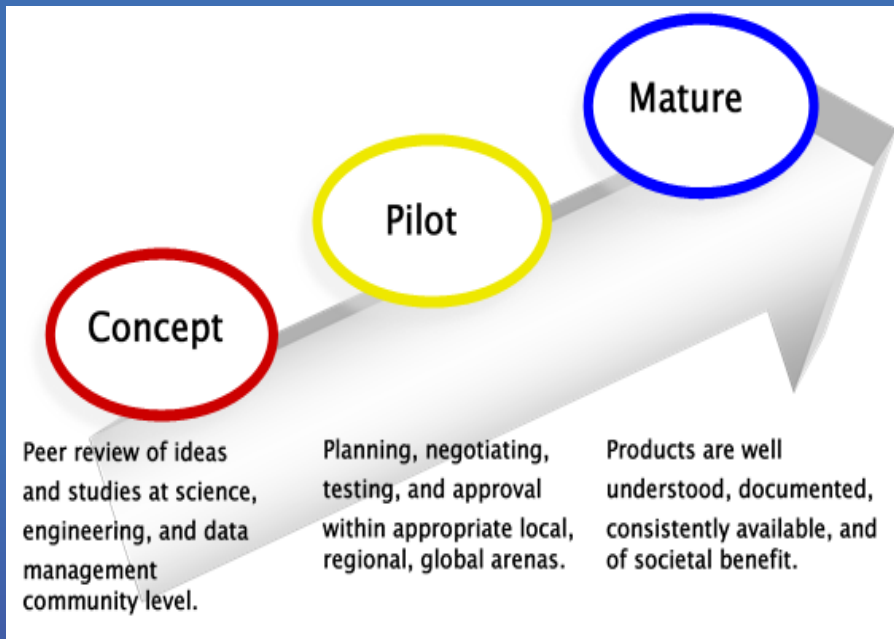
# The ocean observing value chain



Framework for Ocean Observing Process Diagram



# Innovation potential along the value chain

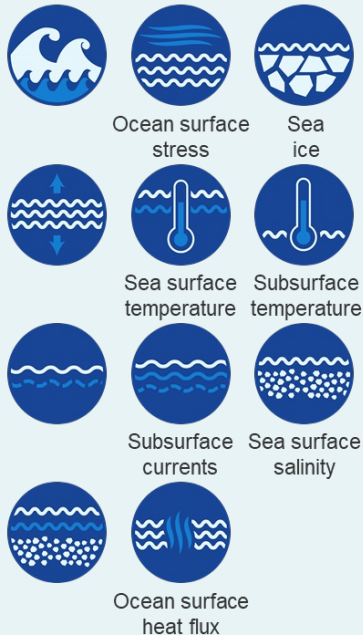


<b>Level 9</b> "Sustained"	53%	28%	6%
<b>Level 8</b> "Mission Qualified"	63%	50%	22%
<b>Level 7</b> "Fitness for purpose"	100%	67%	8%
<hr/>			
<b>Level 6</b> "Operational"	95%	46%	18%
<b>Level 5</b> "Verification"	100%	83%	42%
<b>Level 4</b> "Trial"	94%	89%	67%
<hr/>			
<b>Level 3</b> "Proof of concept"	100%	100%	100%
<b>Level 2</b> "Documentation"	100%	100%	86%
<b>Level 1</b> "Idea"	100%	100%	92%
<hr/>			
	<b>SOCAT</b>	<b>GLODAP</b>	<b>MEMENTO</b>

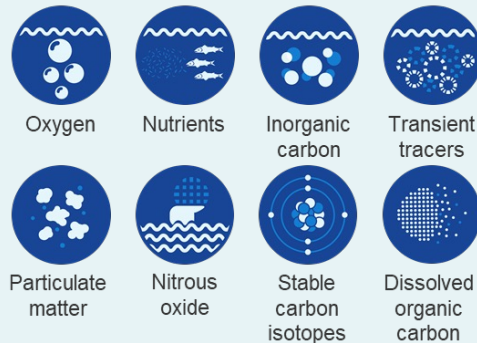
# Essential Ocean Variables

## 34 Essential Ocean Variables (EOVs)

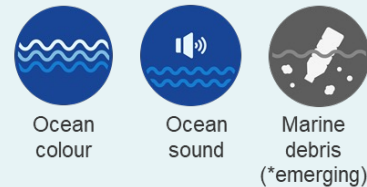
### Physics



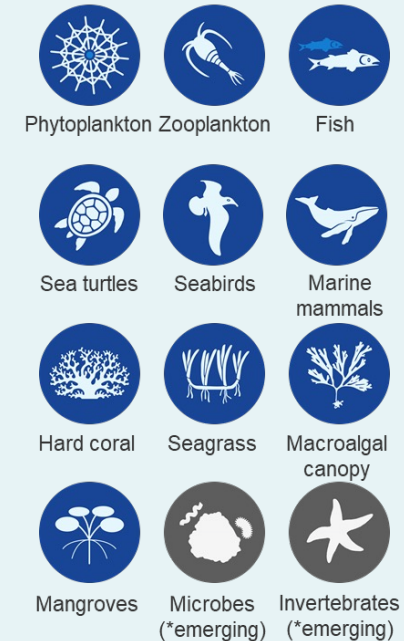
### Biogeochemistry



### Cross-disciplinary



### Biology & ecosystems

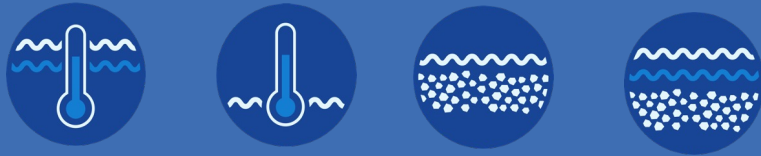


Because EOVs are perennial, they allow the observing system to change and develop around them as technology and capability evolve.

Focusing on EOVs enables ocean observations that cut across different observing platforms and offer the best, most cost effective plan for providing an optimal global view for each EOV.

# Delivery of EOVS information – EOVS Workbenches

EOV Work Bench for physics: temperature and salinity



EOV Work Bench for eutrophication: chlorophyll, nutrients, oxygen



EOV Work Bench for ecosystem-level EOVS



# The Ocean Information value chain



End user, societal, and economic information **needs and requirements** related to the ocean



End user and societal **services and benefits** realized: ecosystem services, efficiencies, safety, etc.

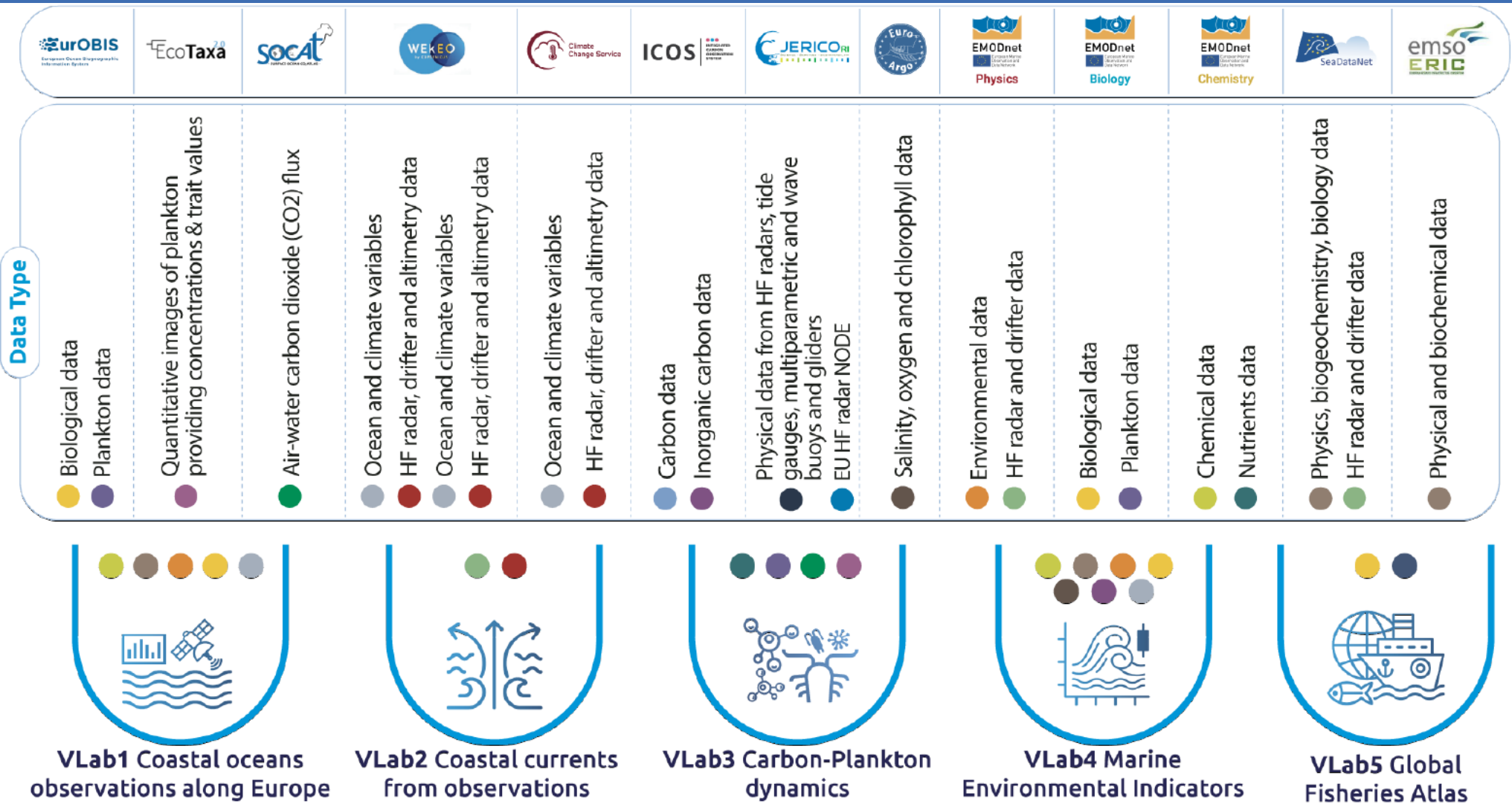


- The New Blue Economy in the US is valued at **US\$8 billion** in annual revenue.
- Canada estimates the revenues of the Canadian activities to between **\$1.1-\$1.3 billion CAD**
- the United Kingdom estimated the market size at **£1.65 billion**

Market size and growth potential

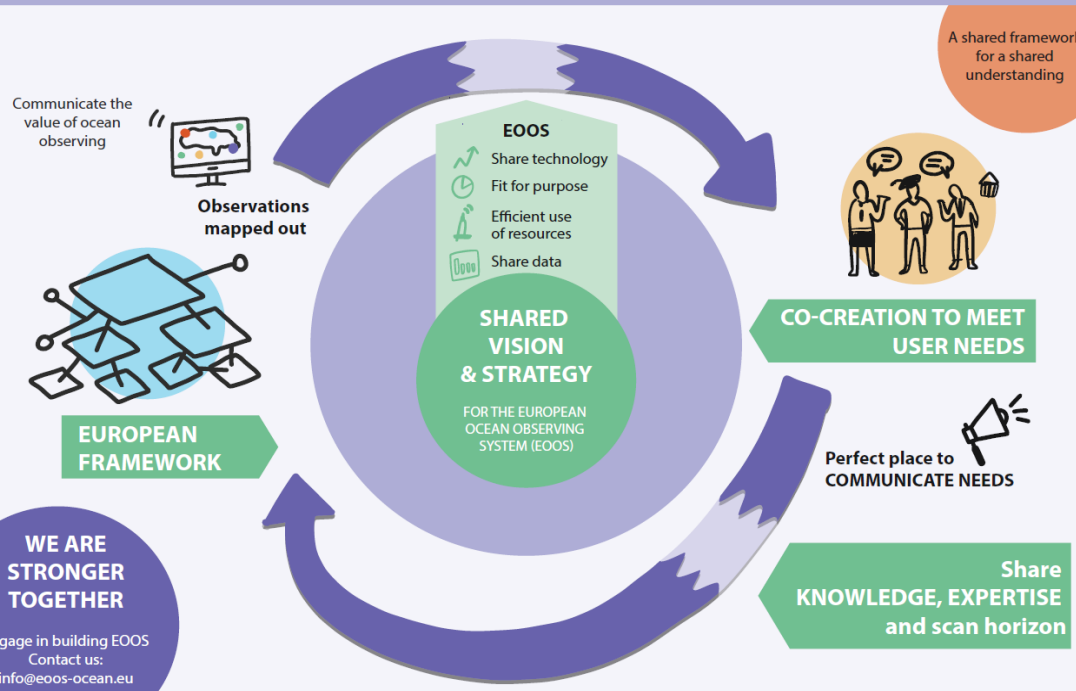


# Virtual Labs – From Observations to Value

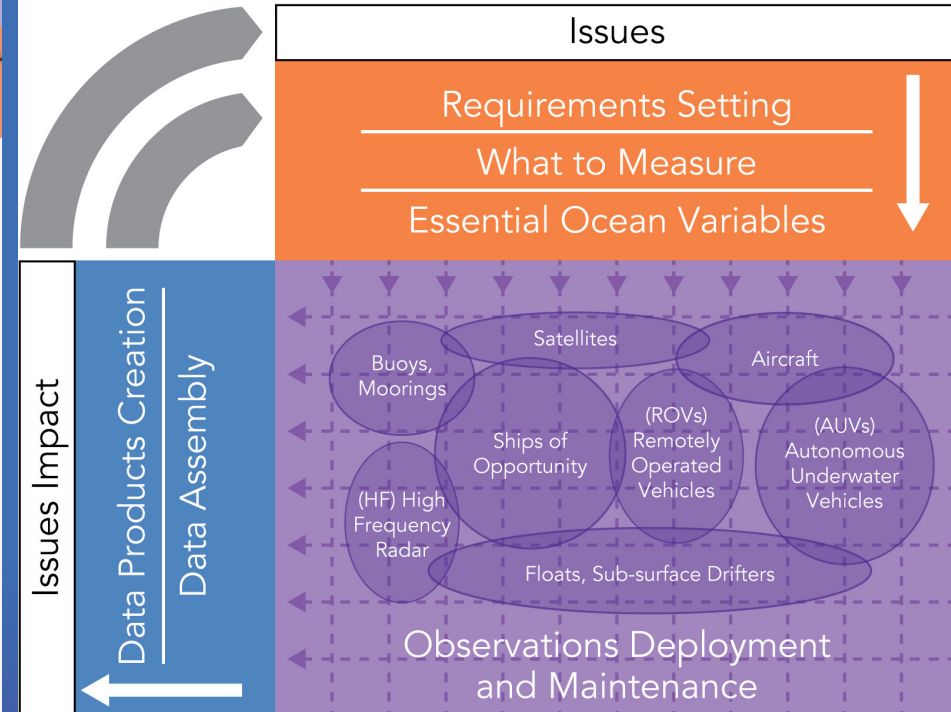


# The Feedback loop

## HOW CAN WE ACHIEVE SUSTAINABLE OCEAN OBSERVING IN EUROPE?



## Framework for Ocean Observing Process Diagram



European Ocean Observing System (EOOS) Framework for Ocean Observing Strategy, 2018

# Thank you

## For more information

[www.eurosea.eu](http://www.eurosea.eu)  
[eurosea@geomar.de](mailto:eurosea@geomar.de)

 @Euro\_Sea

## Project coordination

GEOMAR Helmholtz Centre for Ocean Research Kiel  
Duesternbrooker Weg 20, 24105 Kiel, Germany  
Project leader: Toste Tanhua  
Project manager: Nicole Köstner  
Finance manager: Anja Wenzel