

# ***SynObs Introduction***

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# Synergistic Observing Network for Ocean Prediction



2021 United Nations Decade  
2030 of Ocean Science  
for Sustainable Development

## ◆ Objective

**SynObs** will seek the way to extract maximum benefits from the combination among various observation platforms, typically between satellite and in situ observation data, in ocean predictions.

## ◆ Strategy

**SynObs** aims to identify the optimal combination of different ocean observation platforms through observing system design/evaluation, and to develop assimilation methods with which we can draw synergistic effects.

## SynObs

## Contact

SynObs Co-Chairs: Y. Fujii (JMA/MRI), Elisabeth Remy (Moi)

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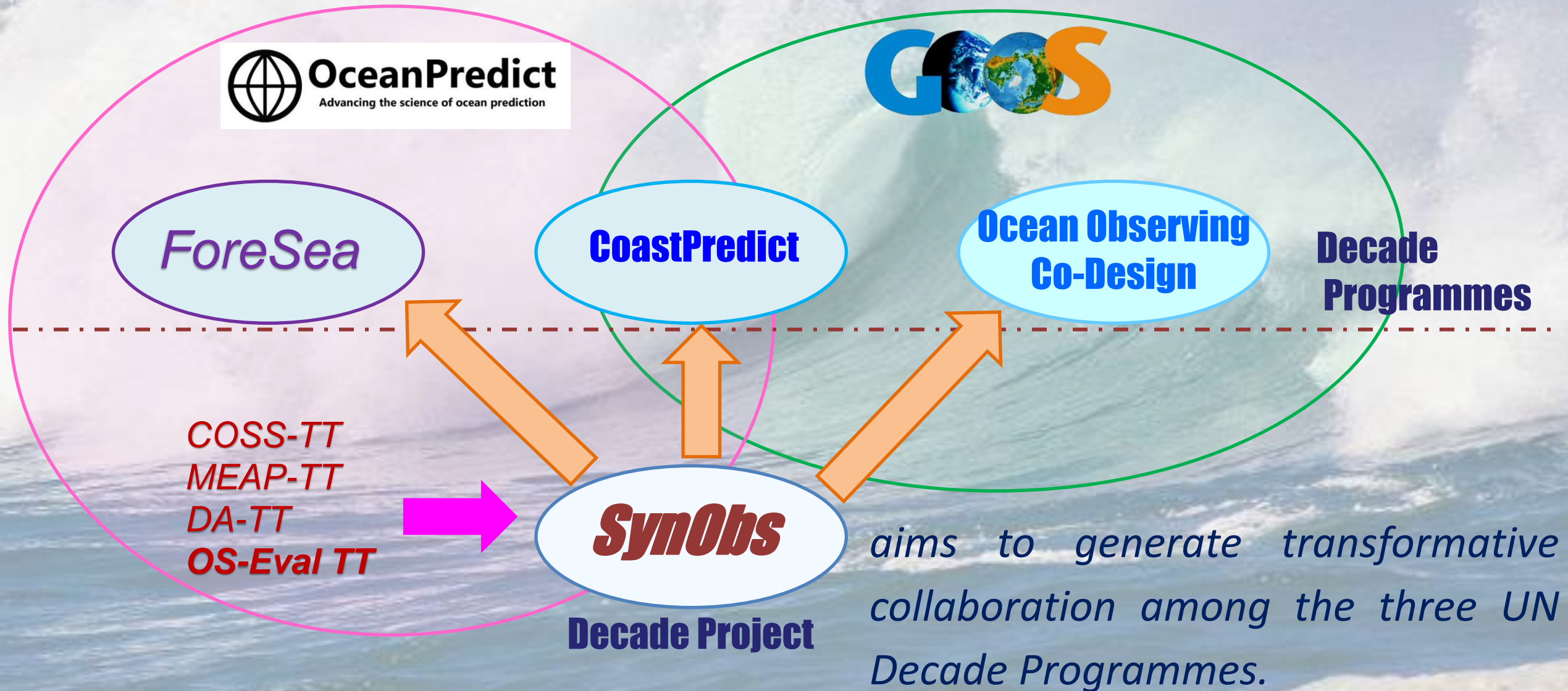
<https://oceanpredict.org/foresea/synobs/#section-overview>

## Mailing List

SynObsML@googlegroups.com

Please mail to [synobs@mri-jma.go.jp](mailto:synobs@mri-jma.go.jp) for joining

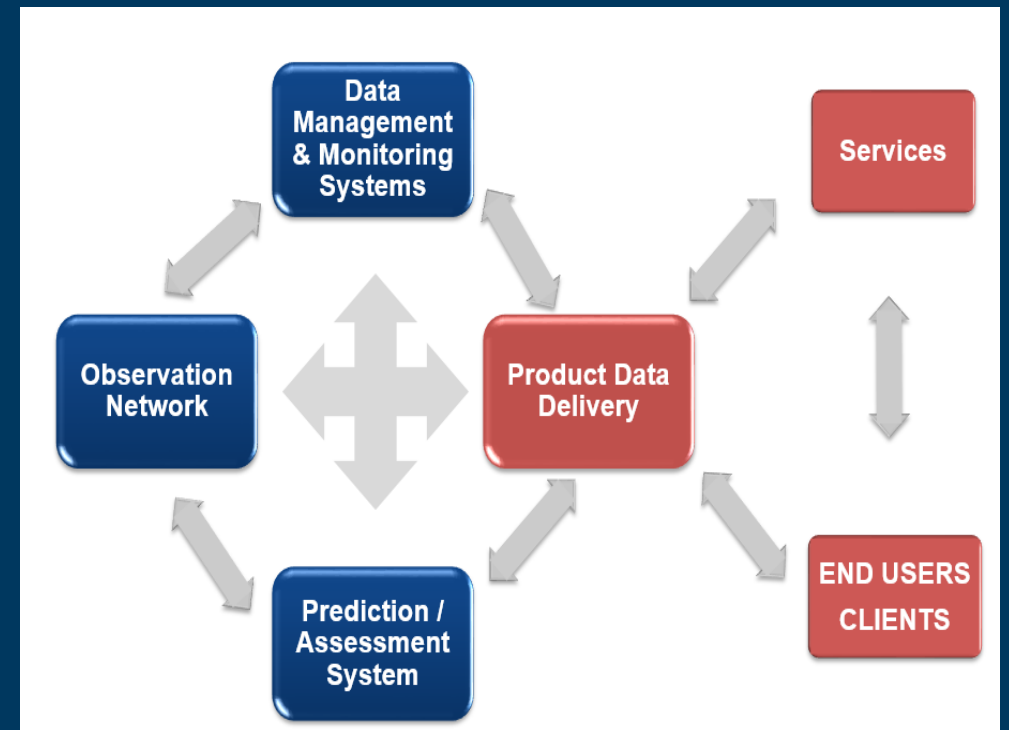
## SynObs: A common comprehensive project







## Ocean Information Value Chain



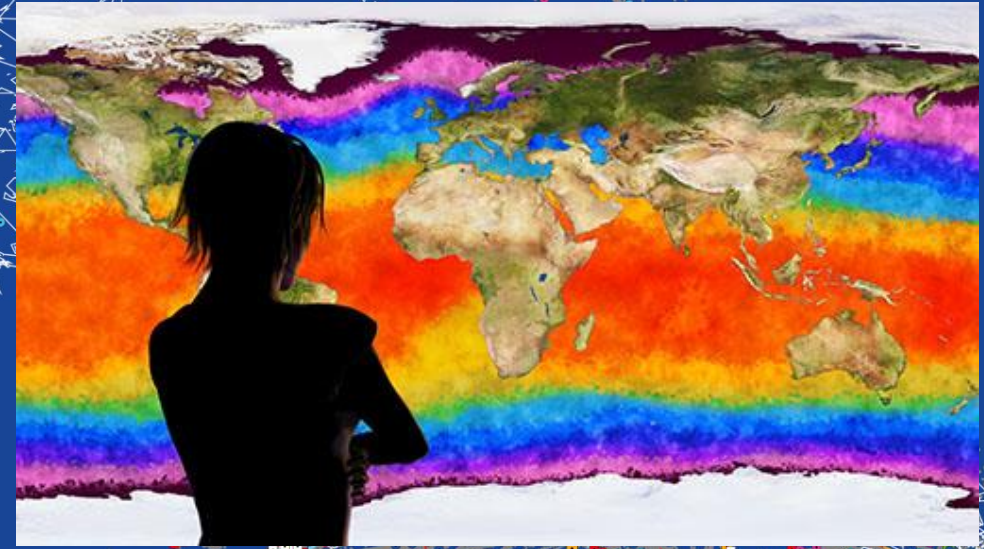
- UN Ocean Decade Program led by OceanPredict.
- OceanPredict is a community of scientists related to ocean predictions and operational oceanography, which continues since 1998.
- ForeSea aims to built a seamless ocean information value chain, from observations to end users, for economic and societal benefit.



# Ocean Observing Co-Design

by The Global Ocean Observing System

Aim to develop a more user-focused co-design process to evolve a truly fit for purpose, integrated, responsive ocean observing system



## Exemplar Project



Improving Carbon data



Improving Storm surge predictions



Advance Cyclone forecasting



Monitor Marine Heatwave impacts on biodiversity and economies



Sustaining development and conservation of living marine resources



Observing key current systems



# ★ SynObs Kickoff Workshop



- **15-18 Nov. 2023 in Tsukuba (Hybrid)**
- 146 Participants (Onsite: 38, Online: 108)
- 84 International participants (onsite 4, online 80)
- From USA, France, UK, Italy, Australia, Brazil, South Korea, Belgium, China, India, New Zealand, Ireland, Norway, Portugal, Saudi Arabia, South Africa, Spain, and Japan.
- 53 presentations (Invited: 6, Oral: 40, poster 7)



- **It was the good kickoff for SynObs.**
- Good opportunity to appeal the SynObs activity in Japan
- Good opportunity to communicate between ocean/coupled prediction and ocean observation communities.
- Discussed on the flagship OSE and other activities.
- **All (almost) presentations and the workshop summarizing report are available online:**  
<https://oceanpredict.org/archived-events/synobs-kick-off-and-es-eval-cp-tt-workshop/#section-presentations>

# ★ Outline of SynObs Activity Plan

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## 1. Collaboration for evaluation and design

- Collaboration on a Multi-System OSE and **OSSE (SynObs flagship OSEs/PSSEs)**
- Preparation of the Nature Run and virtual observation data ⇒ Use the GEOS/NASA high-resolution coupled simulation
- Establish a best practice based on the collaboration above.

## 2. Supporting DA scheme development

- Share the information on the development of DA schemes
- Planning of observation campaigns for DA scheme development

## 3. Providing information from ocean prediction systems in real time

- Explore the methods to evaluate observing system status in real-time

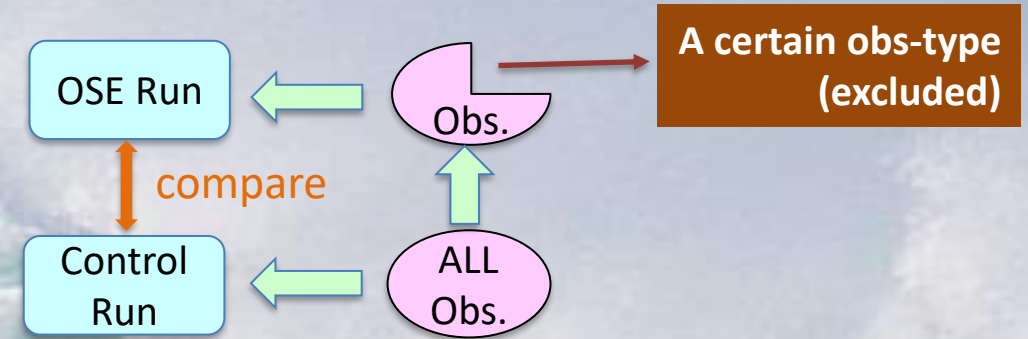
## 4. OS-Eval showcase and reporting

- Introduce OS-Eval examples to demonstrate its effectiveness (**Frontier Marine Science Special issue, Ocean Science Meeting 2024 Session, Showcase webpage, etc.**)
- Contribute to reports on observation requirements and design



# ★ SynObs Flagship OSEs/OSSEs

- ◆ Under the international collaboration, SynObs plans to implement OSEs/OSSEs using various ocean prediction systems with a common setting in order to remove the system dependency.
- ◆ OSEs (Use existing data)
  - ❑ 1-year assimilation in Jan.-Dec., 2022  
Preferably extended to Dec. 2022 (3 years)
  - ❑ 10-day prediction from the beginning of every pentad
- ◆ OSSEs (Use virtual data)
  - ❑ 1-year assimilation and 10-day prediction started from the beginning every pentad
  - ❑ Aim to evaluate SWOT, Satellite current Obs, new TPOS, Doubling Argo, TS Obs in the shelf seas and shallow oceans, etc. (perform specific OSSEs)
- ◆ S2S OSEs (20-year assimilation, 1 monthly forecast per month and 2 seasonal forecasts per year) are also planned.
- ◆ Collaborating with Ocean Observing Co-Design, TPOS, Argo, etc. for diagnosing the OSE/OSSE results



For OSE and OSSE								
1	CNTL	Ocean Model	SST	Argo 80%	Mooring	Other TS	Alt. (optional)	
2	NoAlt	Ocean Model	SST	Argo 80%	Mooring	Other TS		
3	NoArgo	Ocean Model	SST		Mooring	Other TS	Alt. (optional)	
4	NoMoor	Ocean Model	SST	Argo 80%		Other TS	Alt. (optional)	
5	NoSST	Ocean Model		Argo 80%	Mooring	Other TS	Alt. (optional)	
6	NoInsitu	Ocean Model	SST				Alt. (optional)	
7	SSTonly	Ocean Model	SST					
8	Free	Ocean Model						
9	HalfArgo	Ocean Model	SST	Argo 40%	Mooring	Other TS	Alt. (optional)	
10	Oper	Ocean Model	Oper. Setting	SST	Argo 100%	Mooring	Other TS	Nadir Altimeter



# ★ Possible Collaboration between COSS-TT and SynObs

## 1. COSS-TT members' contribution to the OS-Eval Showcase

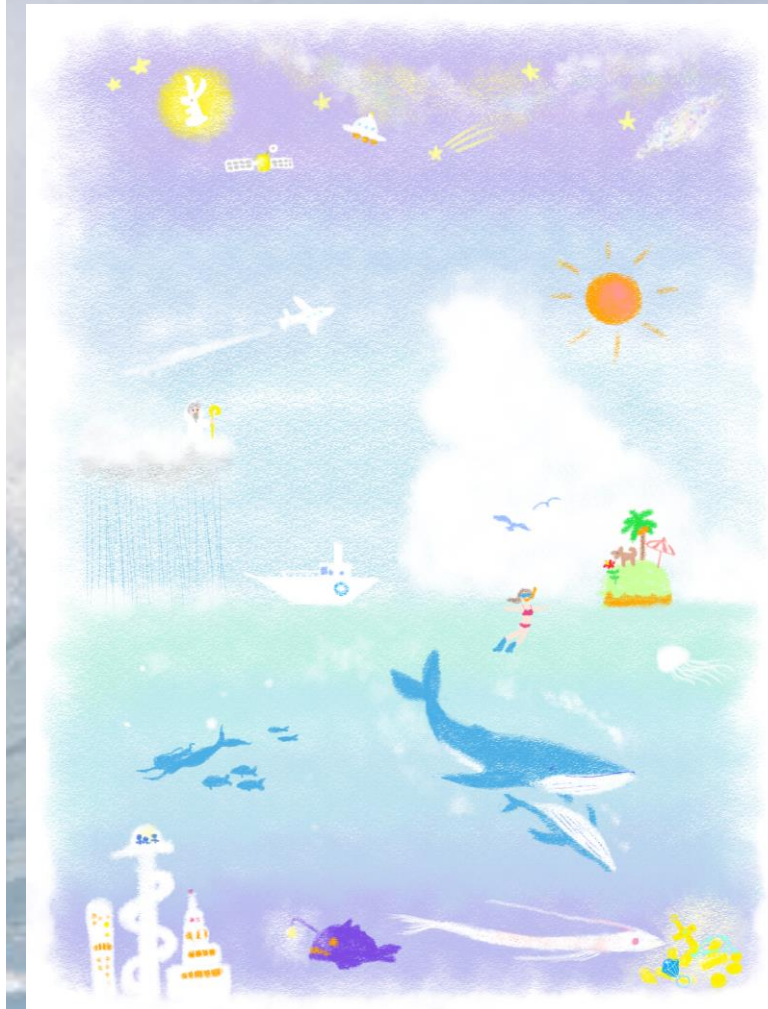
- Show many OS-Eval achievements not only for open oceans but also for coastal seas and BGC applications.
- Please consider to submit your paper to the Frontiers of Marine Science Special Issue!
- Also consider to attend the OSM2024 session!

## 2. Coastal Extension of the SynObs flagship OSEs/OSSEs?

- Perform OSEs/OSSEs using coastal systems with the setting common to the flagship OSEs/OSSEs
- Evaluate observing systems from both global/regional and coastal prediction perspectives simultaneously.
- OSSEs for shelf seas and shallow ocean TS observations

## 3. Share Observation impact information for reporting

- WMO Observation Impact Workshop (May, 2024)  
⇒ Rolling Review of Requirements
- Contribution to Ocean Observing Co-Design



A large, powerful ocean wave is captured in mid-break, with a massive wall of white foam and spray rising from the crest. The water below is a deep, dark blue, and the sky is a pale, hazy blue. The overall scene conveys a sense of immense natural power and energy.

Thank you!!