SynObs Updates

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Synergistic Observing Network for Ocean Prediction (**SynObs**)

UN Ocean Decade Project Under ForeSea

(Led by OceanPredict OS-Eval TT)

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Ocean Prediction Capacity of the Future ForeSea

Officially Endorsed at June 8th

- 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/coastal predictions.

- Strategy

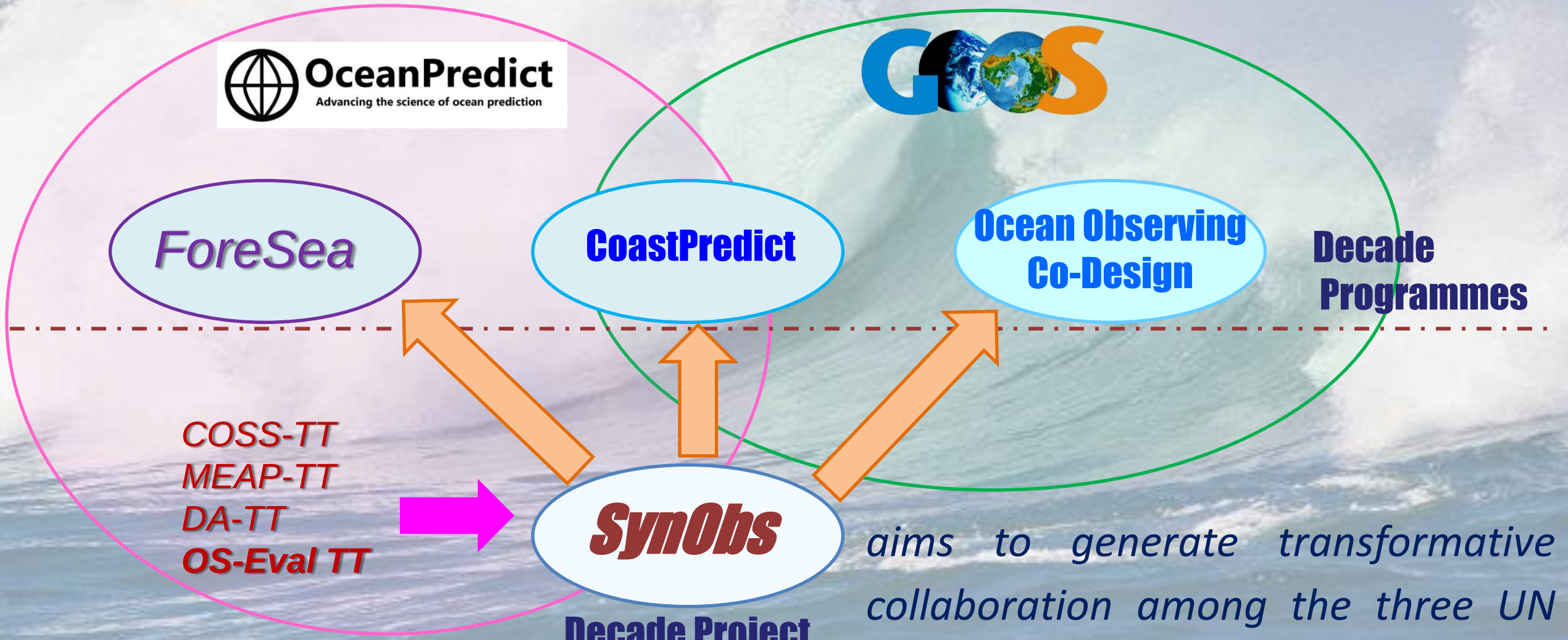
SynObs aims to identify the optimal combination of different ocean observation platforms through observing system design/evaluation, and to develop assimilation methods for maximum synergy among different observations.

- Scope

Targets of **SynObs** include open-ocean (global, tropical, mid-latitude, polar areas), coastal, and biogeochemical (BGC) observing systems

SynObs

SynObs: A common comprehensive project



aims to generate transformative collaboration among the three UN Decade Programmes.

Symposium toward Synergistic Observation Networks for Ocean and Earth System Predictions

15-18 Nov, 2022, Tsukuba Japan

- A Kick-off Meeting for SynObs
- Having presentations on the OS-Eval showcase, DA development, and earth system predictions, and discussion on the SynObs activity plan.
- It may be held as a completely online meeting according to COVID-19 status. We may also limit the number of people who can attend the on-site event.

★ Current SynObs Steering Team

- Having a meeting about every 2 months since Feb. 2022.
- The ST is currently discussing the specific implementation plan of SynObs.

Members

- **Fraser Davidson** (OPST)
- **Pierre De Mey** (COSS-TT)
- **Marjory Friedrichs** (MEAP-TT)
- **Yosuke Fujii** (Co-chairs, OS-Eval TT)
- **David Legler** (Ocean Observing Co-Design)
- **Andrew Moore** (DA-TT)
- **Peter Oke** (OS-Eval TT, CLIVAR/GSOP)
- **Elisabeth Remy** (Co-Chairs, OS-Eval TT)
- **Kirsten Wilmer-Becker** (OP Project Office)

We started this team from the minimum members. So, it is possible to add a coupled of members. If any suggestion on the membership, please let me know.

★ SynObs Activities currently being planned

1. Collaboration for evaluation and design
   - Collaboration on Multi-System OSE and OSSE
   - Preparation of the Nature Runs
   - Make an environment to promote the collaboration
2. Supports for DA scheme development
   - Summarize required development for extracting synergy from the targeted combinations
   - Observational campaigns
3. Providing information from ocean prediction systems in real time
   - Regular reporting on information of QC, innovations, increments, etc.
   - Explore the methods to evaluate observing system status in real-time operation
4. OS-Eval showcase and reporting
   - Collect OS-Eval examples and introduce them (Showcase)
   - Generate a report on observation requirements and design

★ Observing System Evaluation Showcase

- Collect OS-Eval examples performed by OceanPredict and other communities
- Subject of Evaluation: All ocean observation data including in-situ, satellite, open-ocean, coastal, physical, BGC …
- to appeal our capacity to evaluate observing systems and to demonstrate importance of ocean observations.
- Journal Special Issue and/or a webpage to introduce them.
- The first half of the SynObs project period (roughly 2022-2025)

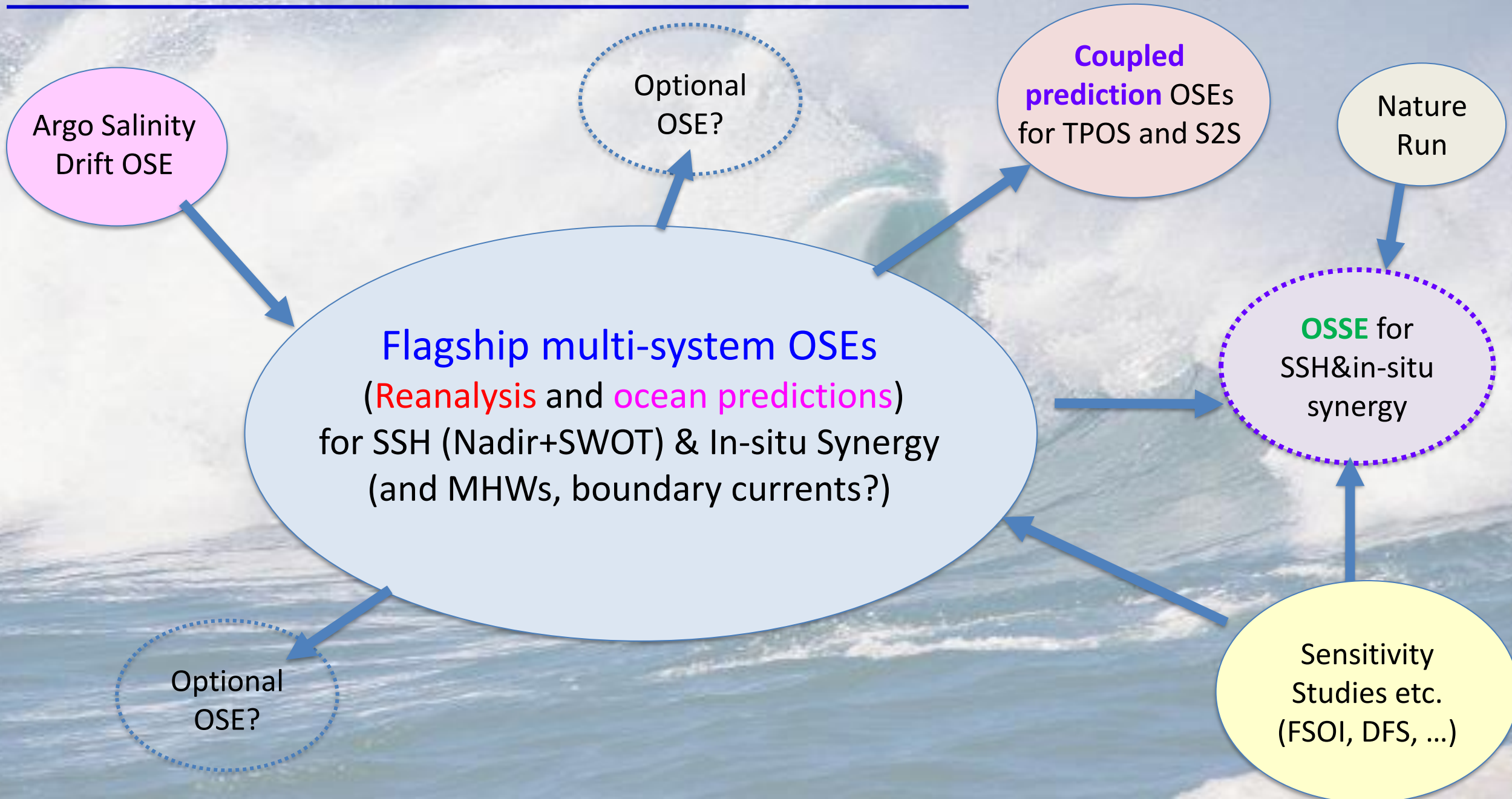
Do not hesitate to display your achievements on the showcase!

★ Expectations/Requests of OSE/OSSE to SynObs

- SynObs proposal defined 7 targeted combinations
  - Sat Alti SKIM, and Argo
  - Tropical buoy array, Argo, and Sat Alti
  - Sat SSS and in-situ
  - Sat SST-obs radiometers and near surface observations
  - Sat ocean color and BGC Argos
  - Sea ice concenteration and thickness
  - Coastal ocean and Open Ocean Observations

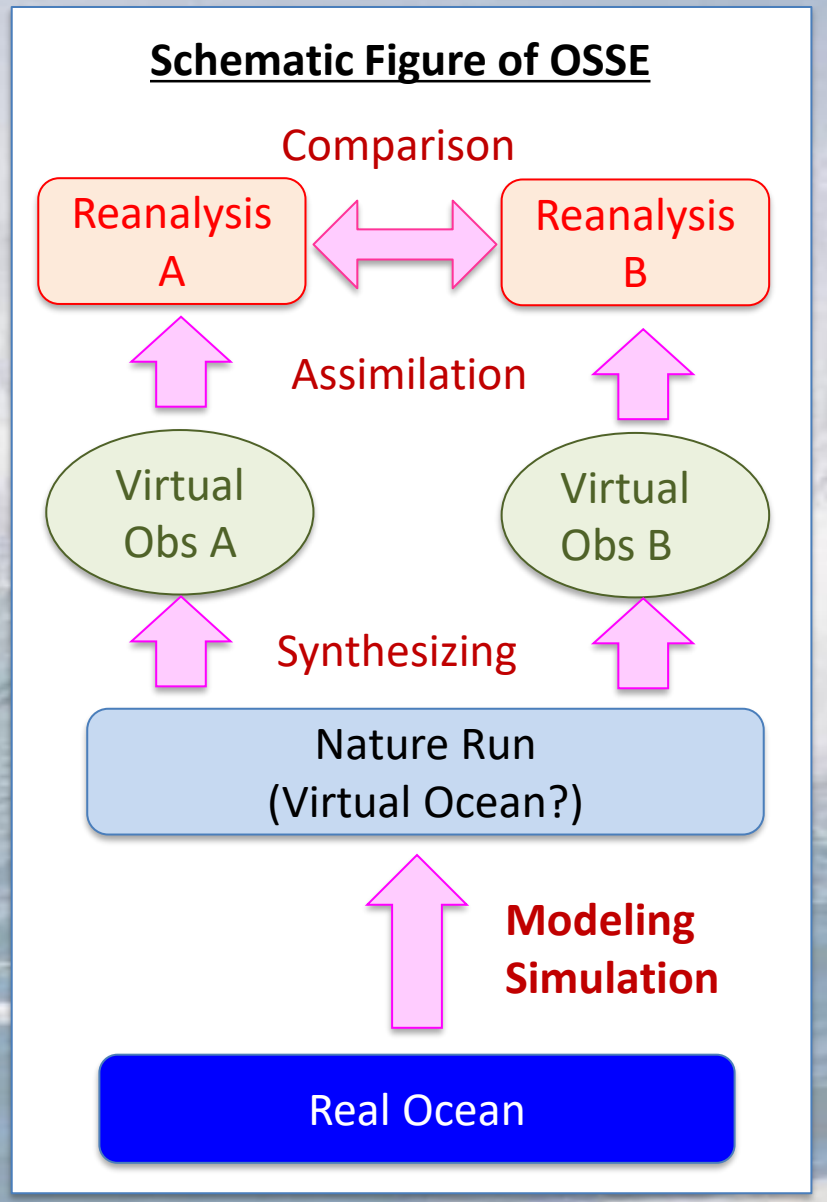
  (But it is not feasible to conduct collaborative OSE for all targets.)
- Ocean Observing Co-Design expects SynObs to conduct OSE/OSSEs for some of their exemplars (Marine Heatwaves, Boundary Currents, Tropical Cyclones, Storm Surge, Carbon Cycle, Biodiversity).
- TPOS-SAC requested OSE/OSSE for new TPOS, and ECMWF, NCEP, and JMA started to discuss on a collaborative OSE for S2S forecasts.
- Argo Science Team aims to enhance the communication with modeling communities.
  - The UN Decade forum was held in AST-23
  - Multi-system OSE for salinity drifts are currently on-going

★ Rough Plan of Collaborative OSE in SynObs



☆ Preparation of the Nature Runs (Collaboration with DITTO)

- A high-quality Nature Run is essential to make reliable evaluation through OSSE.
- But there are no sufficient resource and motivation to generate Nature Runs.
- For the time being, we develop a list of model simulation data which are available for a Nature Run.
- We also consider the possibility to collaborate with DITTO for preparing Nature Runs and conduct multi-system OSSEs.
- OSSE is actually the most familiar application of the concept of the digital twin ocean.
- The Japanese government relatively positive to contribute DITTO because it is one of the G7 project.
- Y. Fujii is currently communicating with the Japanese focal point to DITTO (JAMSTEC) to discuss on the possibility of providing Nature Runs and conducting multi-system OSSEs under the collaboration between DITTO and SynObs.



★ Other Activities Related to SynObs

- **OS-Eval TT Regular Meeting:** Jan 24th, Mar. 25th, Jun 23rd
- **CoastPredict**: Participating in the focus project PredictOnTime.
- Contribution to the **Ocean Observing Co-Design Workshop** (Planning, Keynote Presentation, contributing to the exemplars (MHWs, Tropical Storms and ?)
- Communication with **World Ocean Initiative (Economist Group)**
- **MEAP-TT** Meeting
  - Many advanced efforts on BGC data assimilation and marine eco-system applications were introduced.
  - SynObs is already well known in MEAP-TT and many members showed there interests to contribute to SynObs activities.
  - SynObs will try to coordinate their relevant achievements along with results on prediction of the physical ocean to evaluate and design the whole ocean observing system including physical and BGC observations.


Thank you