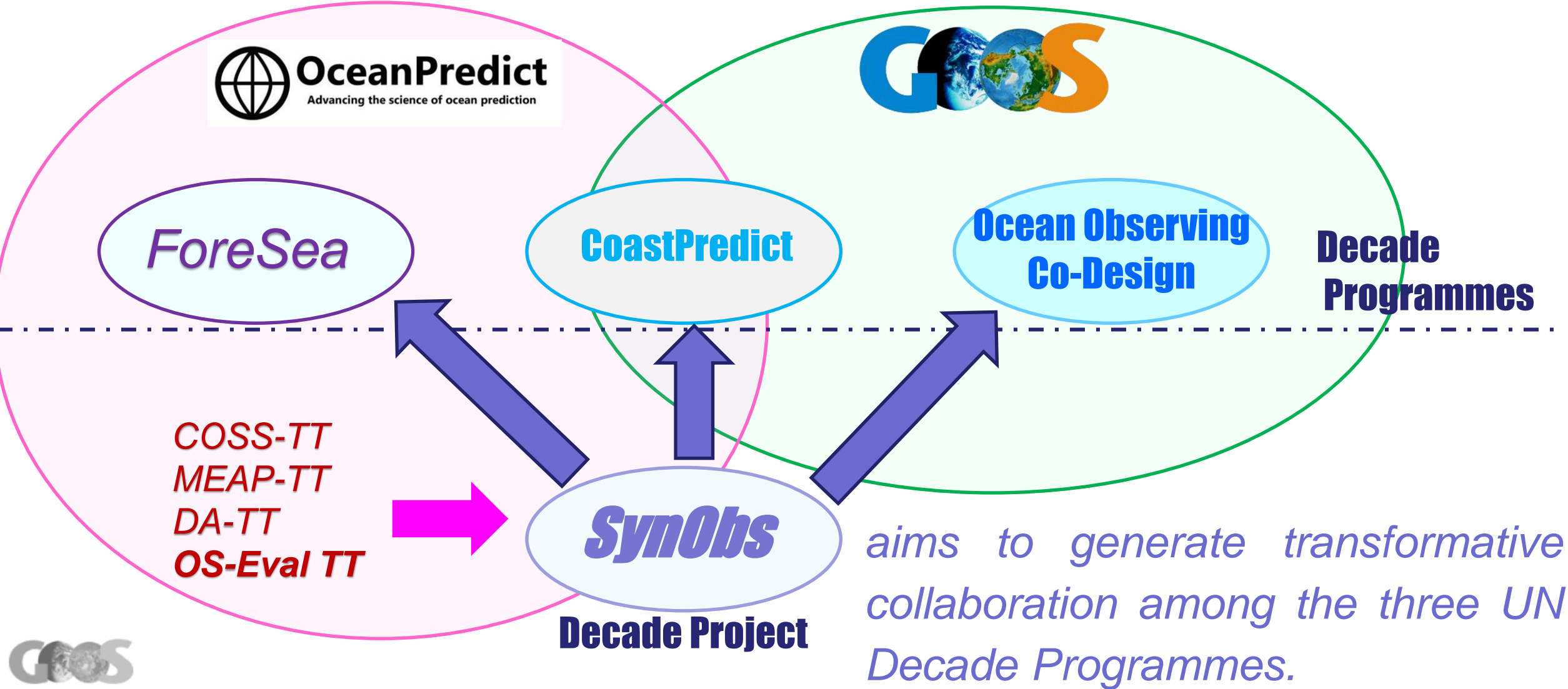


Current Status of SynObs

Yosuke Fujii (JMA/MRI, OceanPredict OS-Eval TT Co-Chair)

SynObs: A common comprehensive project



Synergistic Observing Network for Impactful and relevant Ocean Predictions (**SynObs**): A UN Ocean Decade Project

◆ Objective

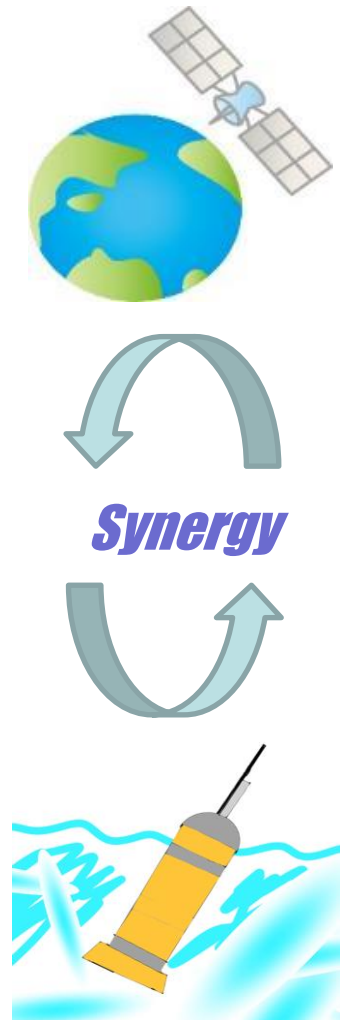
SynObs will seek the way to extract **maximum benefits from the combination among various observation platforms**, typically **between satellite and in situ observation data**, or between coastal and open ocean platforms, in ocean/coastal predictions.

◆ Strategy

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

◆ Scope

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



Focus on Synergy among Various Observations

- To lead a transformative change on ocean predictions in this decade, we need to maximize benefits from the whole ocean observing network
⇒ SynObs focuses on synergies among different ocean observing systems
- Combination of observations targeted in SynObs
 1. Satellite altimeters, satellite ocean current observations (SKIM) and Argo floats
 2. Argo floats, Tropical Moorings, and satellite altimeters in the tropical regions.
 3. Satellite SST, Moorings, Argo floats, and sea surface atmospheric parameters
 4. Satellite SSS, Argo floats, and other in-situ observations
 5. Satellite ocean colour observations and in-situ (Argo) observations
 6. Observations of sea ice concentrations and sea ice thickness
 7. Coastal ocean radars and sensors, gliders, drones, satellite remote sensing, and Argo floats



★ Submission of the SynObs application form



- ◆ **Due Date:** January 31st
- ◆ To be Submitted as a project **under ForeSea**, but clearly written that SynObs will be managed as a common comprehensive project among ForeSea, CoastPredict, and Observing System Co-Design
- ◆ **Lead Institution:** OceanPredict Observing System Evaluation Task Team
 - But we will register the address of JMA/MRI as the lead institution physical address, which means that JMA/MRI will be considered as the contact point of the TT and sign the endorsement as the representative of the TT.
- ◆ **Lead Contact Partner:** Yosuke Fujii (JMA/MRI)
- ◆ **Partner Institution Name:** 1. JMA/MRI, 2. Mercator Ocean International, 3., 4., 5 ?
 - We are currently confirming what institutes can officially support SynObs thorough the web questionnaire.
 - Current draft of the application form is open on the web page. You can input the comments through the web questionnaire.
 - Address of the questionnaire (you can access the draft from here):

<https://oceanpredict.org/synobs-support/>



◆ SynObs Steering Team (currently selecting the initial members)

- ✓ Aim to start with a small number of members
- ✓ We plan to invite a steering team member from each collaborating Decade Programme: ForeSea, CoastPredict, ObsCoDe, as well as the OP TTs, and a few additional members from OS-Eval TT.
- ✓ Will be extended as necessary.
- ✓ We will also discuss the crucial agenda on the management of SynObs in this web meeting series.

◆ Regular (online) meeting

- ✓ We will discuss the crucial agenda on the management of SynObs in the regular meetings.

◆ Establishment of the advisory board is not planned. ⇒ **Expectation:** We will get necessary advice from steering and advisory groups of the UN Decade programmes.

★ Other activities related to SynObs



◆ Ocean Decade Laboratory – A Predicted Ocean (Sep. 15-17th)

- Participated the satellite Event hosted by ForeSea, CoastPredict, and Ocean Observing Codesign, and make a recorded introduction on SynObs

◆ Communication with other communities

- GOOS (Ocean Observing Co-Design), CoastPredict, Argo (US, Japan), Fishery Observation Group, etc.

◆ Timeline of the activity and implementation plan

- We need to generate a **schedule of SynObs** activities (or **the respective implementation plan**) in the near future (maybe in the first half of the next year – TBC).

◆ Kick-off Meeting (originally a joint OS-Eval TT & CP-TT symposium)

- **15-18 Nov, 2022, Tsukuba Japan**

A large, powerful ocean wave is shown crashing, with a massive wall of white foam and spray rising from the base of the wave. The water is a deep blue-green color, and the sky is a pale, hazy blue. The wave is the central focus of the image, with its crest curling over. The text "Thank you" is overlaid in the center of the wave.

Thank you



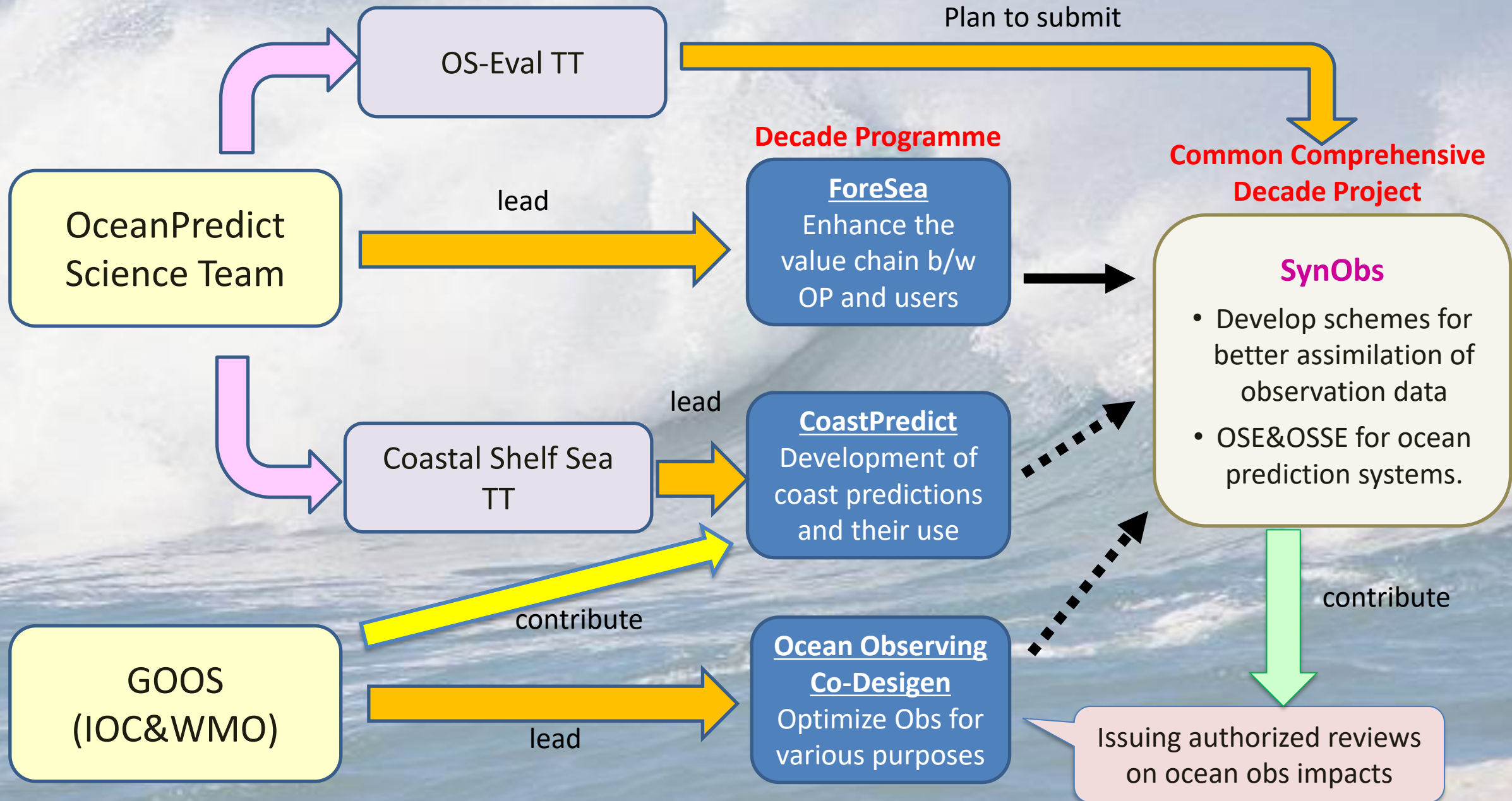
Symposium toward Synergistic Observation Networks for Ocean and Earth System Predictions

15-18 Nov, 2022, Tsukuba Japan



- ◆ A Kick-off Meeting for SynObs
- ◆ Open for all researchers who are interested in evaluation and effective use of ocean observations in ocean and earth system predictions.
- ◆ Having a presentation about the evaluation/design of ocean observation networks, DA development for effective use of observations, and earth system predictions.

★ OceanPredict contributions to the UN Ocean Decade



★ Proposal of Collocated observation of Argo and sat atmos. sounder

Initially proposed by Santha Akella, and SynObs supports this idea.

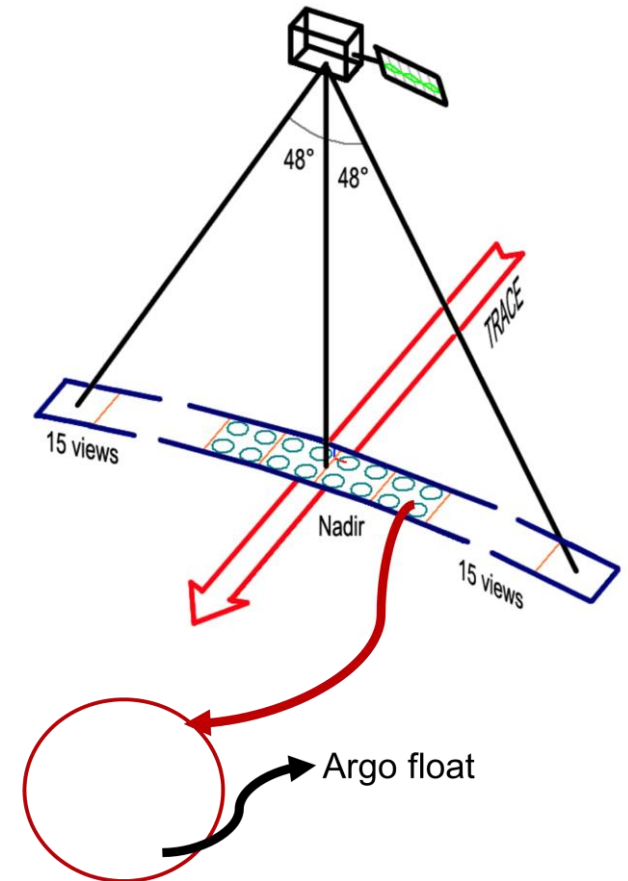
◆ What is proposed?

- Collocated observation of Argo floats with hyper-spectral satellite measurements, for e.g., Infrared Atmospheric Sounding Interferometer (IASI) on European polar orbiting satellite MetOP-C.
- IASI makes a sounding of atmospheric temperature and humidity profiles.
- The next profiling time is indicated to Argo floats via Iridium communication in order to make a collocated observations
- Continuing observation of Argo to the near-surface depth is desirable.

◆ Why the collocated observation are valuable?

- Correlation between atmospheric and ocean variability
⇒ Error statistics in coupled DA system
- Validation of coupled model and DA systems
- Effective data for assimilating into coupled DA

IASI (MetOP-C)



Outcomes to the society

- A straightforward reason for sustaining the ocean observing network
- A guideline toward a synergistic ocean observing network for “A Predicted Ocean”
 - Suggest effective investment for the ocean observing systems
- Improved ocean/coastal prediction capacity.
 - Make benefits to marine disaster prevention, marine economy promotion, marine ecosystem management, climate predictions, etc.



★ Expected Activity in SynObs

1. **Multi-system evaluation of observing systems**, including OSE, OSSE, and ensemble or adjoint-based evaluations.
2. **Development of data assimilation schemes for synergy**
 - ✓ Assimilating low-level processed satellite data (direct assimilation)
 - ✓ incorporate background error covariance between atmospheric and oceanic elements.
3. **Collocated satellite-in situ observation campaigns** (e.g., Argo and hyper-spectral atmospheric observations from satellite)
4. **Development of best-practices** for evaluating the performance of ocean observing networks composed of various observing platforms
5. Construction of a **real-time ocean observation impact monitoring framework**
6. **Generating information and recommendations** on ocean observation impacts and designs ⇒ **Reports in Ocean Observing Co-Design**