



SynObs Web Meeting 5

Agenda

1. Summary of on-going and planned SynObs activity
2. Confirmation of the current status of the flagship OSEs
3. Discussion on the flagship OSE setting, including a presentation on the OSSE presentation in NOAA/QOSAP (by L. Cucurull)

★ Summary of on-going and planned SynObs activity

1. The flagship OSEs (OP and S2S) OSEs are ongoing.
Tentative Deadline: Reanalysis Run: End of 2023
Prediction Run: End of April 2024
2. Joint working group with OOPC and CLIVAR GSOP? (Proposed by P. Oke)
3. Collaboration with WMO S2S project is confirmed (F. Vitart in ECMWF)
4. Plan to apply to the fund of US NSF AccelNet for the collaboration among Ocean Observing Co-design exemplars and SynObs supported by UCAR
 - For travel cost for workshops in US, Storage, heiring scientists or research assistant
5. Ocean Science Meeting 2024 Science Session? (We get only 7 abstract.)
6. EGU 2024 Science Session is proposed (led by A. Peterson)
7. SynObs special correction on the Frontiers in Marine Sciences
 - Abstract Deadline: Sep. 24th ⇒ Oct. 15th, Manuscript Dead: Feb. 2024
 - Plan to submit an introduction paper on the flagship OSEs (Please provide early results!)
7. Another introduction paper on the flagship OSEs (to BAMS?) -> Submit around Mar. 2024?
8. The flagship OSE guideline will be officially published from the OceanPredict website (in Oct.?)
9. WMO Observation Impacts workshop (27-30 May 2024, Abstract Deadline: Dec. 2024)
10. OceanPredict Symposium (18-22 Nov, 2024, Paris)

★ Confirmation of the current status of the flagship OSEs

1. Experiments are on-going in each operational center/research institute

Tentative Deadline: Reanalysis Run: End of 2023

Prediction Run: End of April 2024

2. Guideline of the flagship OSEs (which will be published from the OceanPredict website.)

<https://docs.google.com/document/d/1Py7QY1tI6hIaqeQ079ndB3u2w8UAh98uPjPxOckbrfw/edit?usp=sharing>

3. The data will be distributed from JAMSTEC-APL server

- Sample NetCDF file (in the expected format) are provided from

<https://drive.google.com/file/d/1oeB-7irUW6Mn0Vc4KGsbMGKMR7Q4goXO/view?usp=sharing>

(github for sample data creation) <https://github.com/shokido/SynOBS>

4. Results will be analyzed by several volunteer groups.

5. The activity and early results will be introduced in

- Introduction paper for the Frontiers in Marine Science special collection
- Another introduction paper (on BAMS?)
- WMO Observation impact workshop
- OceanPredict Symposium 2024

★ SynObs flagship OSEs (OSE settings and the schedule)

OSE Settings for OP and S2S OSEs

◆ Control Run (CNTL)

- Basically, regular observation data are assimilated
- 20% of Argo data are withheld and used as reference.
- Participants can choose whether or not to assimilate satellite altimetry data

◆ OSEs

- Data of a targeted observation type are excluded (e.g., NoArgo, NoMoor, NoSST etc.)

OP OSSE setting will be discussed at SynObs web MT.

- SWOT, Satellite surface current obs, shallow sea profiles by gliders and other sources will be evaluated.

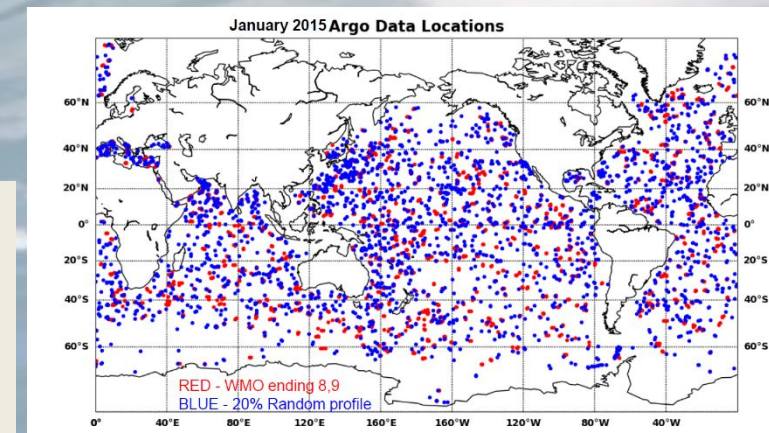
◆ Schedule

- Until the end of 2023: Assimilation (Reanalysis) Runs
- Until Apr 2024: Prediction Runs
- May 2024: WMO OIWS
- Nov 2024: OceanPredict Symposium

Suggested OSE Settings

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

Distributions of Argo floats whose last digits of WMO number is 8 or 9 (red) and 20% random profiles (blue). Example for January 2015 (Thanks to Li Ren, NASA/GMAO.)



★ How will we analyze OSE/OSSE results?

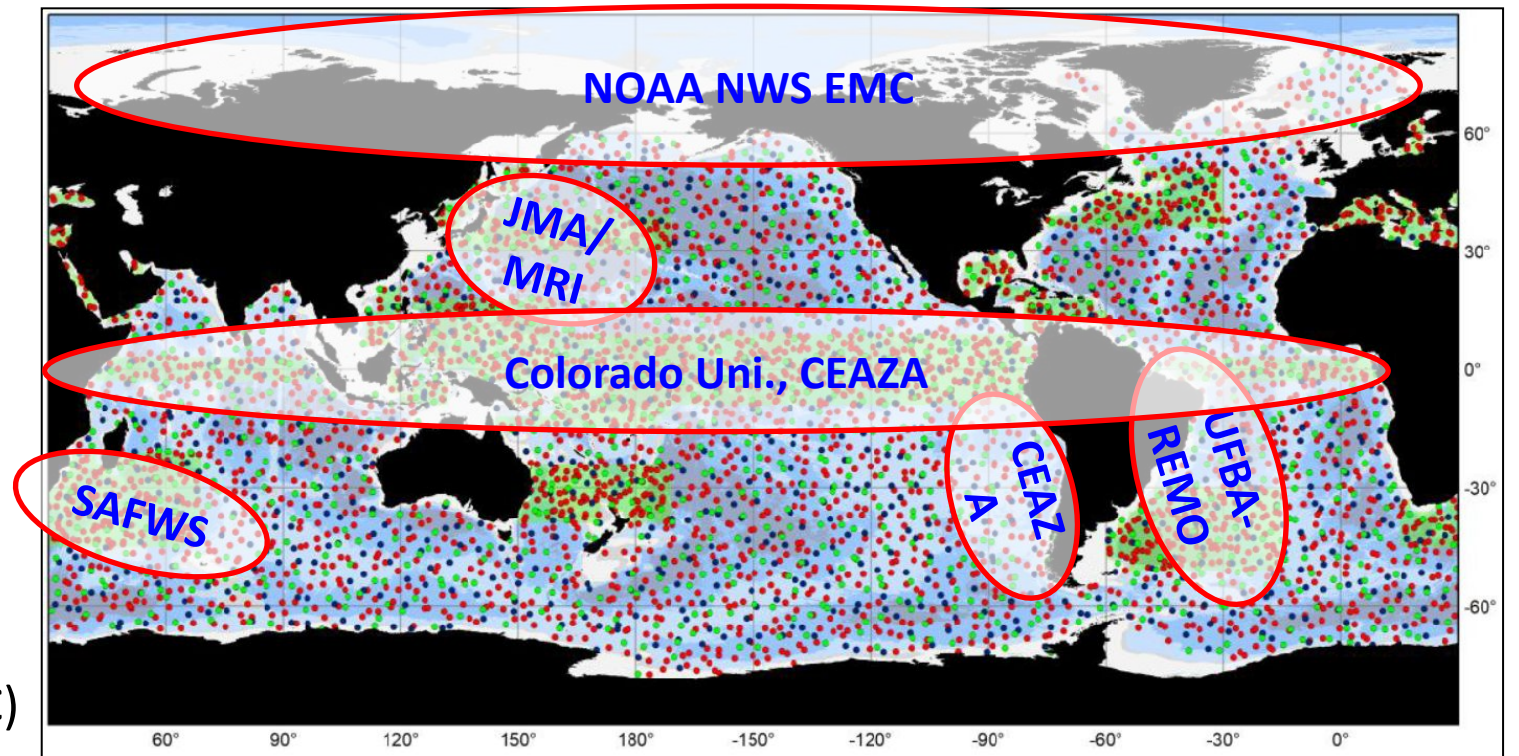
□ Assign variables/diagnostics or regions to potential groups and request analysis.

□ Analysis of variables or diagnostics for the global ocean

- ◆ Impact of Argo on heat budget and surface flux (ECCC)
- ◆ Diagnostics related to tropical cyclone (Ocean Observing CoDesign TC Exemplar Team)
- ◆ Comparison b/w forecasted value and Argo observation (OceanPredict IV-TT)
- ◆ Trajectory of Drifters (UKMO)
- ◆ Heat budgets and MHWs (ECMWF)
- ◆ Near-surface ocean current (ABoM)

□ Regional Analysis

- ◆ MLD in tropics (Colorado Uni)
- ◆ Tropical waves - Peru coast (CEZA)
- ◆ WN Pacific (JMA/MRI)
- ◆ Brazilian Coast (UFBA-REMO)
- ◆ Agulhas Current (SAFWS)
- ◆ Arctic and Antarctic (NOAA NWS EMC)



	Daily	Pentad/Weekly	Monthly	Point Location
OP-OSE Analysis	Var: OP-G2 Res: 0.25°, 0.1°, Int: Daily	Var: OP-G1 Res: 0.25°, Int: Pentad		Argo (Daily) Mooring (Hourly)
OP-OSE Prediction	Var: OP-G2 Res: 0.25°, 0.1°, LT: D1, D3, D7	Var: OP-G1 Res: 0.25°, LT: P1, P2		Argo (D1-10) Mooring (H1-H240)
S2S-OSE Analysis	Var: S2S-G1 Oc Res: 1°, Int: Daily		Var: S2S-G2 Res: 1°, Int: Monthly	Argo Mooring (Daily)
S2S-OSE Prediction	Var: S2S-G1D Oc+Atm Res: 1°, LT: D1-D35	Var: S2S-G1 Oc+Atm Res: 1°, LT: W1-W18	Var: S2S-G1 S2S-G1 Oc+Atm Res: 1°, LT: M1-4	Argo (D1-126) Mooring (D1-126)

Group	Included Variables
OP-G1	3D-TSUV, SSH, SIC, SIT, SWHF, LWHF, LAHF, SNHF, NetHF, NetWF, Taux, Tauy Optional: TotalHF, TotalWF, Analysis Increment (3D-TSUV, SSH)
OP-G2	SST, SSS, SSU, SSV, SSH, 0-50mT, Z20, Z26, TCHP, MLD005, 15mU, 15mV
S2S-G1	Ocean: In S2S DB: SST, SSS, SSU, SSV, SSH, 0-300mT, Z20, MLD001, 0-300mS, SIC, SIT Additional: 0-50mT, Z17, Z26, Z28, TCHP, MLD005, ILD05, SWHF, NetHF Atmosphere: 3D-TSUVQ, T2m, U10m, V10m, Precip, LWHF, SWHF, LAHF, SNHF, Taux, Tauy, MSLP, Total Cloud Cover, OLR
S2S-G1D	Ocean: SST, SSH, SIC, MLD001, ILD05, netHF Atmosphere: OLR, U200, U850
S2S-G2	3D-TSUV
Point Location	Argo: TS Mooring: TSUV, SWHF, NetHF

★ Some points on the output data

□ All output data at the observed time and location (point location data), except for the point location data at the Mooring position for OP OSEs, are supposed to be calculated from daily output (average) of the native grid data.

□ **Tropical Cyclone Heat Potential (TCHP, Units in kJ/cm^2 , Definition in the Guideline)**

Calculated as the oceanic heat content relative to 26 degree above Z26, that is, integrate the following HC from the surface to Z26,

$$\text{HC} = C_p \times \rho \times (T - 26)$$

where C_p is the constant specific heat of seawater, ρ is the density of seawater, and T is [the potential temperature](#) with respect to 0 m. [Use \$3.985 \times 10^4 \text{J}/\text{kg K}\$ as the constant specific heat of seawater.](#) Use [the average of the potential density](#) with respect to 0 m averaged between 0 m and Z26 (calculated for each profile) as the density of seawater.

□ Some centers may not be able to provide certain requested output variables (e.g., heat flux components, analysis increment etc.). If his is the case, please contact me. Basically, we ask those centers provide data on a best-effort basis.

★ Discussion on the flagship OSE setting

- ◆ **Nature Run:** GEOS/NASA High Resolution coupled Simulation (Period: about 1 year)
- ◆ **General Format:** Same as OP OSEs (1 year reanalysis run + 10 day predictions from every 5 days)
- ◆ **Targets**
 - ✓ SWOT (+ future swath altimetry satellites?)
 - ✓ New TPOS Design
 - ✓ Gliders (TS observations in shallow sea areas.)
 - ✓ Ocean current satellites?
 - ✓ Argo doubling?
 - ✓ Others?
- ◆ **Priority and Time schedule**
 - ✓ Many centers/institutes plan to conduct OSSEs after OSEs are completed.
 - ✓ But some centers/institutes put a higher priority on OSSEs (NOAA/QUOSAP, Mercator?)
 - ✓ Perhaps it is better to decide on OSSE settings, etc. to meet the needs of such groups.
- ◆ **How do we prepare the virtual observation?**

★ Possible OSSE setting

◆ Reference and Calibration

- ✓ CNTL, NoArgo, NoALT: with the same setting as in OP OSEs.

◆ For SWOT evaluation

- ✓ FullAlti: CNTL + Nadir Altimeters + SWOT
- ✓ SWOT: CNTL (except for Nadir Altimeters) + SWOT
- ✓ SWOTnoArgo: CNTL – Argo + SWOT
- ✓ MultSwath: CNTL + SWOT + other 2 or 3 Swath satellites/

◆ TPOS

- ✓ NewTPOS/oldTPOS: CNTL + New TPOS/old TPOS data (Maybe possible to substitute oldTPOS by CNTL)

◆ Gliders (TS profiles in the shallow sea regions)

- ✓ We need to define a expected glider network to generate the virtual data

◆ Ocean current satellites

- ✓ Surface ocean current observation with a distribution planed by the satellite mission.

◆ Argo doubling

- ✓ Argox2: The number of the Argo floats are doubled.