Marine IODA/UFO Hackathon (March 25 - April 5, 2019)

Location

Foothills Lab 3300 Mitchell Ln, Boulder, CO 80301

Organizers

Technical: gvernier, Thomas Auligne, Travis Sluka

Administrative: Katherine Shanahan

Participants

Anna Shlyaeva (part time), Hamideh Ebrahimi, Rahul Mahajan, Shastri Paturi, Stylianos Flampouris, Stephen Herbener (part time)

Deliverables

Note: Testing will be done within the cycling of SOCA 3/4DHofX and/or 3DVAR.

☑ Applications that can be embedded in the SOCA workflow and will create observation files in a IODA format for a specific DA or HofX window.

☑ New UFO's: Cool skin, and generic implementation of Salinity profiles and sea surface salinity.

☐ Report/Reflection on code sprint.

Data base	UFO	Developer(s)	obs to ioda	ioda file concatenation	test: IODA	test: NL UFO	test: UFO TLM /AD	test: SOCA HofX	test: SOCA 3DVAR
FNMOC::Profiles (Profilers and moorings)	1. Insitu-temperature 2. Generic Salinity profiles	Rahul Guillaume	X X	X X	N/A	N/A	N/A	X X	X X
FNMOC::Surface Drifters	Generic SST	Rahul	X	X	N/A	N/A	N/A		
NESDIS::RADS	ADT	Guillaume, Shastri	X	X	X	X		X	X
NESDIS::CryoSat-2 thickness **(currently not available)**	Thickness	Guillaume, Travis							
NCEP-Data tank::L2-SST (AVHRR: GOES-16, VIIRS-NPP, HIMAWARI-8, NOAA-19, METOP-A)	1. Generic SST 2. Cool skin	Shastri, Stylianos, Hamideh	X X			X X	X X		
NCEP:: Profiles, ships, buoys, drifters, gliders, ...	1. Insitu-temperature 2. Salinity profiles	Shastri, Stylianos	X X	X X	X	X	X	X	X
NCEP::Altimeters	1. Significant wave height	Stylianos	X	X					
EMC::Ice fraction	1. Ice fraction 2. NASA team (if time permits)	Shastri, Guillaume	X	X	N/A	N/A	N/A		
JPL SMAP SSS	Generic SSS	Hamideh, Travis	X	X	X	X	X	X	X
RSS SMAP SSS	Generic SSS	Travis	X	X	X	X	X	X	X
GODAS all obs	All	Travis	X	X	N/A	N/A	N/A	X	X
GMAO all obs	All	Rahul	X	X	N/A	N/A	N/A		

NESDIS:: (L2 and L3) VIIRS AVHRR	Generic SST	Travis	X	X	N/A	N/A	N/A	X	X

Table 1: Tabulated list of deliverable. Check the empty box when done.

Prerequisites, to do before March 25

1. Build/test the SOCA bundle
2. Centralized server(s) holding observations in their original file formats:
   a. FNMOC
   b. NESDIS: RADS, L-2 SST, CryoSat-2 Thickness
   c. NCEP data tank
   d. SMAP SSS retreivals
   e. EMC sea-ice fraction (SSMI, SSMI-S, AMSR-2)
   f. GODAS observation data base available on Theia
   g. GMAO observation data base available on Discover/Shared Drive
3. Build Stephen Herbener's IODA-IO, if available (including the python interfaces).
4. Make sure all current Marine UFO's are in working order (Travis & Guillaume).
5. Setup HofX and 3DVAR cycling experiment (Rahul, Travis & Guillaume).
6. Prepare the nonlinear, tangent and adjoint of the cool skin UFO. (Hamideh & Guillaume).

Tentative Work plan

Some of us will work on the UFO during the 2 weeks, but for the most part, week 1 will be on IODA interfaces and week 2 on UFO's.

Week 1: IODA interfaces

Objectives: Provide observations to SOCA for cycling experiments. Develop interfaces to databases for NOAA/EMC and NASA/GMAO, usable in the SOCA cycling workflow. We will make use of Stephen Herbener's IODA-IO python package, if available.

Note: Describe the observation type you are working on in Stephen Herbener's IODA wiki.

Week 2: UFO

We will reassess our week 2 objectives at the end of the first week. In the meantime here is the tentative work plan: Refactor the existing marine UFO and implement new UFO's (including the basic QC needed to run a 3DVAR application).

Required tasks

- ☑ Anna Shlyaeva: Fix issues with the GeoVaLs writer
- ☐ gvernier & Travis: Implement needed GeoVaLs for QC and new UFO in SOCA

Refactoring or Generic implementation

- ☑ Insitu-profiles
- ☑ Salinity (generic)
- ☑ SST (generic)
- ☑ SSS (generic)
- ☑ Sea ice fraction
- ☑ Sea-ice thickness
- ☑ ADT
- ☑ Cool skin (new UFO)

Extras

If time permits:

1. ADCP Forward operator

2. Diurnal sea surface temperature
3. Sea-ice elevation
4. sea-ice fraction retreival for SSMI, SSMI-S and AMSR-2 implemented as a pre-filter