Marine data assimilation with SOCA/JEDI

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1. What is JCSDA / JEDI / SOCA
2. current status of marine DA
3. future plans for marine DA
Joint Center for Satellite Data Assimilation (JCSDA):
Interagency partnership dedicated to improving and accelerating use of research and operational satellite data in weather, ocean, climate and environmental analysis and prediction systems.
JCSDA Marine JEDI - what is JEDI

JEDI goals:

(see earlier JCSDA JEDI talk)

- reduce duplication of DA effort between JCSDA partners
- develop model and domain agnostic data assimilation system with
  - multiple data assimilation methods
  - generic observation operators and quality control
- Create system applicable for both research and operations
- modernize software (C++ based, CI/CD practices)
- for marine DA: steal what has been done for the atmosphere
Specific model interfaces have a large toolbox of generic components provided by JEDI.
**SOCA: Sea-ice, Ocean, and Coupled Assimilation**

**purpose:** develop menu of DA methods, with initial evaluation and demonstration. Facilitate moving common marine DA components into JEDI

- ocean
- ocean biogeochemistry
- sea ice
- air-sea interactions
- wave
Operational Global DA

- slated for ¼ deg ice/ocean DA in NOAA GFSv17 / GEFSv13
- use in next NASA GEOS
- collaboration with UK MetOffice

Regional DA

- NOAA 1/12 deg HAFS

… Continually improving common marine components of JEDI (variable changes, obs operators, ..)
Marine JEDI - plans

Full menu of DA options
(technical development and thorough testing with regional domain. Directly applicable to global domain)

- **3DVAR ✓**
  with continuing static B developments through 2023
- **3DFGAT ✓**
- ensemble methods (LETKF / EDA) In progress
- hybrid-EnVAR (3D and 4D) by end of 2023
- **4DVAR**
  several options: ROMS ADJ, new MOM6 ADJ from NASA, LETLM, AI

supported partially by DRSA-HURR3
Coupled DA - ongoing work

- coupled hofx between various components
e.g. FV3/MOM6

- surface sensitive radiance DA
infrared (AVHRR), microwave (GMI), visible
(PACE), in collaboration with NASA

- strongly coupled DA
with ocean / biogeochemistry (EnVAR)
to be expanded to other marine components
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We need resources here!