Database of Observations: Ocean/Marine perspectives

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As time permits, effort must be made to gather inputs from other JCSDA - JEDI stakeholders
Observation Network

★ In Situ
★ Satellite
- Radiiances are handled by atmospheric obs network- via coupling
- Derived (retrievals)
- along-track (L2P)
- gridded (L3/L4)
★ Coverage (sampling) and observation type vary over decades (reanalysis)

Considerations

★ Support all the observations types (in situ, satellite)- past, present and future…
  ☐ Readers/converters for different types (csv, nc4, bufr, etc)
  ☐ Flexibility to choose different types (add new types, exclude certain types, *single-obs or simulated obs*)
★ Used in assimilation, off-line model diagnostics (call observer), obs-impact studies
  ☐ Information for QC (details follow)
★ Be able to write innovations (assimilation output) in the “same” format (e.g., ERA-5)
★ Ability to write to disk (preferably nc4- NASA format requirements, be able to trace: metadata, external partnerships, …)

☐ Questions:
  ➡ Contents of the database?
  ➡ How are they organized?
  ➡ How many files/day?

Not in this talk!
Contents of the database

Generic to all observation types (fill UNDEF if not available)

- **Position** (lat, lon, depth/pressure), **Time** (yyyymmddhhss or offset from a ref)
- **Variable**, Error estimate \( \sigma_{i,i}^0 \) - think of cross correlations (future SWOT Mission)
- **WMO ID** (station ID; satellite ID for satellite derived data), **instrument ID** (e.g., barometer, thermometer, …)
- **Bottom pressure** (if not available or otherwise distance from bottom)
- **Difference from climatological values** (every center may prefer a different clim(s) )
- **Distance from coastline or nearest land-point** (every center may prefer a different topography/bathymetry)
Contents of the database

Specific to **satellite derived data** (fill UNDEF if not available)

- Ascending/ Descending
- Distance from center of track
- Local Time (or solar zenith angle)
- Altimeter (Sea Level Anomaly/Dynamic Topography)
  - Include geoid height, cross-calibration bias (correction due to atmosphere), tide info; this may expand in future
- Radiometer, Laser Altimeter, etc (Sea ice concentration/thickness/freeboard)
  - Include water temperature and salinity, meteorology *should* be handled by other (atmosphere) database(s)- collocation should be thought of…
• How is the database organized in memory?
• If stored on disk - how many files/day? Naming convention (variables, file names, …)
• Efficiency (memory footprint, ease of access, …)
• Connections with other observations (atmosphere, land- run off, land-ice, waves, bio, chem, …)
• Operational requirements (NOAA, NAVY, … other JCSDA - JEDI partners)
• Converters to handle data from GTS (real-time ARGO, drifters, …)
• Software to derive error estimate