

Proposal for GOV Data Assimilation Task Team

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Background

- In the GOV review it was noted that “GOV should consider a strategy around scientific activities that will address barriers to progress in ocean prediction...”
- A core component of the ocean forecasting systems which could be coordinated through GOV is the development and evaluation of data assimilation techniques.
- There is little time for detailed discussion of the assimilation techniques in the main GOVST meetings.
- It is difficult to see how this gap can be addressed in the existing TT structure (although some discussion does happen at TT meetings).
- We therefore propose a new Data Assimilation Task Team (DA-TT), as requested by the GOV co-chairs, for consideration of GOV-ST and Patrons.

Objectives

- To coordinate and improve the assimilation of **ocean** and **sea-ice** data into ocean, sea-ice and **coupled** models by:
 - providing a **forum for discussion** of DA algorithms and their development.
 - creating a **framework for inter-comparison** of aspects of data assimilation schemes, distinct from those studied in the Inter-comparison and Validation Task Team (IV-TT).
- To provide a focus for diagnosing and understanding model and observation biases through the use of data assimilation techniques, and discussing the results with model developers and observation specialists.

Scope of the DA-TT

- **Global** and **regional** scales, including **coastal** ocean data assimilation.
- Covering systems used for near-real time ocean **forecasting**, seasonal forecasting, **reanalysis**, and **research and development**.
- Physical **ocean and sea-ice**, **coupled** ocean/atmosphere DA systems, **biogeochemical** DA, but not surface waves.
- All aspects of the **data assimilation process** including: observation operators; error covariance estimation and representation; minimisation algorithms; observation and model bias correction; initialisation; ensemble generation.
- Both **theoretical** and **practical** implementation issues, including the efficiency and scalability of DA algorithms and codes on current and future high-performance computing architectures.
- Developing **metrics for assessment** of data assimilation schemes.
- Techniques for assimilating **new observation types** and development of observation impact techniques.

Links with other GOV TTs

- The proposed DA-TT will have overlaps with all the other GOV task teams in the following areas:
 - OSEVal-TT: techniques for assessing observation impacts and assimilation of new observation types.
 - IV-TT: techniques for inter-comparison of DA outputs.
 - MEP-TT: assimilation of biogeochemical variables, impact of physical DA on vertical velocities and therefore biogeochemistry.
 - SMRCP-TT: coupled DA.
 - COSS-TT: coastal and shelf-seas DA.
- > invite co-chairs and/or members of the relevant task teams to be members of the DA-TT.

Links with other external groups

- The WMO DA symposium series is the main international forum for discussing the scientific aspects of data assimilation and includes ocean, atmosphere, coupled and other DA.
 - AGU, EGU and similar scientific meetings also have DA sessions.
 - WGNE has a similar remit within the atmospheric community.
 - Meetings of the DA-TT are expected to be more focussed on ocean and sea-ice than those other meetings, and are expected to lead to collaborative projects which those meetings don't foster.
- > try to collocate any DA-TT meetings with other related meetings.

Membership of DA-TT

- DA experts from the national programmes of GOV.
- DA experts in universities and other research groups with an interest in ocean, sea-ice and coupled DA.
- Observation and modelling experts with an interest in the data assimilation process and its outputs.
- Proposed co-chairs of the DA-TT: Matt Martin and Andy Moore
- Propose to contact national reps of GOV to suggest members of DA-TT.

Draft outline of work plan

- Following on from the inter-comparison of increments done for the GOV DA paper in the JOO special issue, initiate further inter-comparisons. Two suggestions:
 1. use averaged assimilation increments from multiple models to assess where there are common model biases, where biases are significant but different, and to distinguish between model and surface flux errors. Feedback the information to model developers.
 2. compare background and observation error covariance information from various systems. Could be particularly interesting to inter-compare how variational and ensemble schemes represent certain covariance structures. This could be done by requesting each group performs single observation experiments.
- Organise a DA-TT meeting to:
 - discuss progress and results from the above inter-comparison ideas.
 - provide a forum for discussion of the latest developments in ocean data assimilation.

- Would like to ask endorsement from GOVST and patrons for new DA-TT.
- Invite feedback from GOVST on the objectives and scope of the proposed DA-TT.