



# DA-TT

## Summary of Activities

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\* Outgoing co-chairs

Currently 36 members

Members from 16 different countries

Representatives from all major operational centers

# Outline

- Main activities – workshop
- Links to Ocean Decade projects
- Links to other TTs and groups
- Projects
- Future plans & new members

# Workshop Overview

- CNR, Rome, 9-11 May, hosted by Andrea Storto
- > 30 participants
- 28 talks, 6 posters
- Workshop themes:
  - advances in DA
  - error covariance modeling
  - observing systems
  - DA infrastructure
  - coupled DA
  - applications and operational systems
- Three major discussion topics



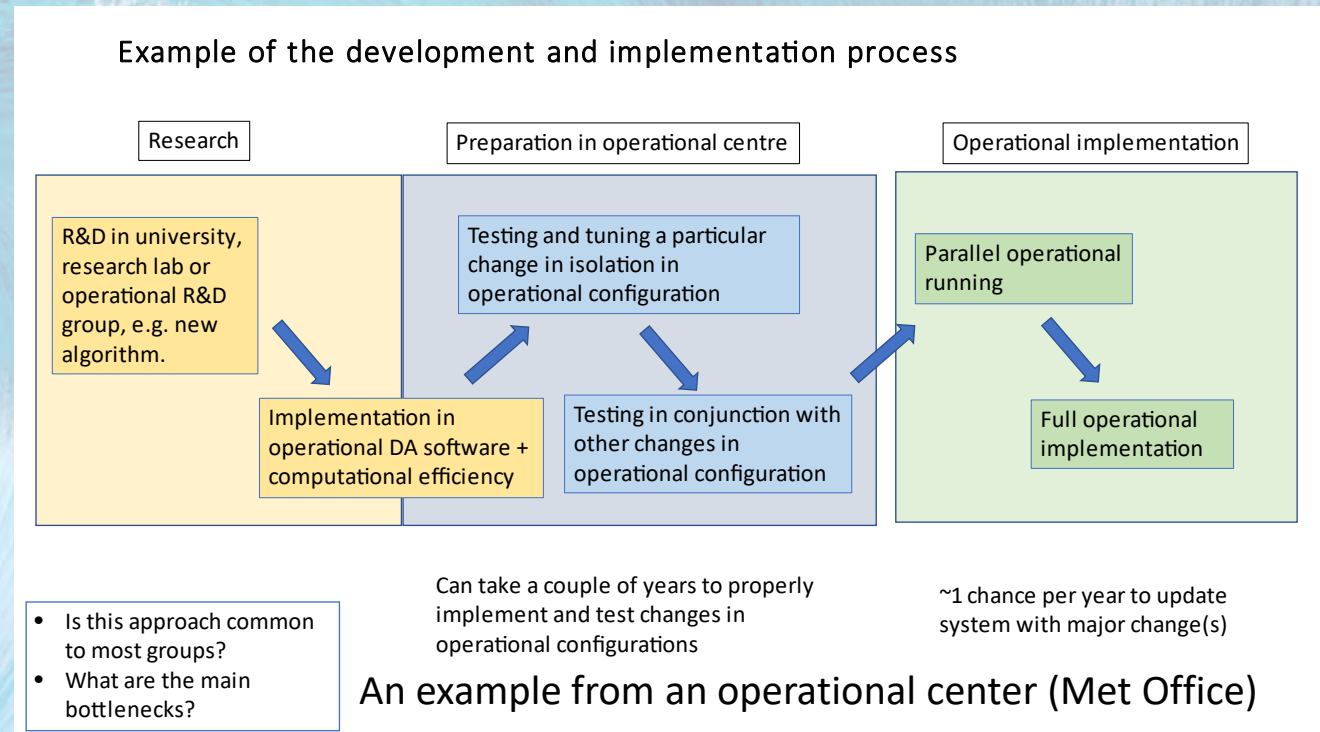
# Workshop Discussion Topic #1

## *Improving integration of ocean DA developments in operational forecasts and demonstrating impacts on ocean and coupled forecasts*

- Two general topics discussed:
  - The Development Process
  - Demonstrating the impact of DA on ocean and coupled forecasts

### The Development Process:

- There are some good examples of joint developments between operational centers and research groups (e.g. Met Office/U Reading; NOAA COMT & IOOS).
- Often a lag between operational methods and those used in research (3D vs 4DVar, particle filters)
- Software infrastructure (PDAF, DART, JEDI) and common source code repositories are viewed as a good thing, although training overhead can be high.
- Allocation of resources – resolution versus DA complexity versus model complexity



# Workshop Discussion Topic #1 (cont'd)

## Demonstrating the impact of DA on ocean and coupled forecasts:

- What metrics are used and useful?
  - assimilation system statistics (e.g. innovations, compatibility)
  - reliability measures from ensembles (skill vs spread)
  - forecasts compared to observations (limited by available observations)
  - impacts on unobserved EOVs (e.g. heat content, vertical velocities, stratification, transports)
- Impact assessments will depend on length of forecast and product:
  - short-range vs seasonal vs decadal (increasing timescale -> probabilistic assessment)
  - reanalysis and changes in the observing system over time
- Demonstrating impact of ocean DA in coupled models:
  - AGCMs tuned in uncoupled mode – ocean DA may degrade atmos state on short term
  - AGCMs are very well constrained by large volume of obs – longer forecasts may be needed to demonstrate benefits of ocean DA
  - ocean initialization issues for BGC

# Workshop Discussion Topic #2

## *How to contribute to the UN Decade for Ocean Science*

- DA-TT contributes indirectly to current Decade projects
- Probably not feasible for DA-TT develop its own Decade technical project
- There is enthusiasm for educational and outreach initiatives -> cuts across many projects
- Intellectual capacity building is a common thread (and issue) in all current activities:
  - in the spirit of DEI, DA-TT could develop and promote online training and classes available to all targeting the global BS, MS and PhD student communities
  - online class for credit hosted by one or more OP academic institutions
  - promotion of operational oceanography to attract more graduate students in DA
  - development of educational hands-on materials (e.g. ROMS tutorials and exercises)
  - all TT members and the broader operational ocean community could be engaged
  - could be done through and in collaboration with the DCC

# Workshop Discussion Topic #3

## *How to improve links between the DA-TT and the broader community*

- DA-TT is very much a technical WG which is one of its great strengths – the only forum for this in ocean DA. General consensus was that we don't want to dilute this aspect of the TT.
- Encourage participation by the observing community:
  - DA-TT should be better advocates for promoting importance of observing systems (e.g. BGC Argo)
  - advise on how observations are used (QC, data formats, correct use in RA)
  - those who make and serve observations sometimes do not consider ease of access and use in DA systems
- Engagement with the ML/DL/AI community:
  - interfacing emerging ideas in ML with current DA methodologies
  - several potential applications of ML in DA (e.g. error cov, balance operators)
  - ML for analysing very large reanalysis data sets (e.g. emulators)
- More engagement with JEDI – Travis Sluka from the JEDI developers group will join DA-TT
- Continued engagement with WMO WGs as per member participation & in light of new implementation plans (e.g. WWRP)

# Links to Ocean Decade Projects

- Several TT members are directly involved in some of the Decade projects.
- Specific links:
  - SynObs -> operational center members
  - DA-TT (and member) contributions to SynObs *Frontiers* special issue
  - DCC Survey on Ocean Forecast Systems
  - DITTO ?



# Links to Other TTs and Groups

- Some TT members belong to other TTs.
- OPOS – TT has representatives from all major operational centers
- Next workshop in conjunction with CP-TT – Boulder, 2025
- WMO WWRP Data Assimilation & Observation Systems (DAOS) WG
  - survey of ocean initialization for coupled models -> WCRP Earth System Modeling & Observations (ESMO) with link to CMIP community (WGNE and OMDP also)
- WMO WCRP Explaining and Predicting Earth System Change (EPESC)
- TT members are participating the WMO Observation Impacts workshop May 2024
- OP24 – Ann Kristin is a member of the organizing committee

# Projects & Future Plans

- TT members involved in ESA A-TSCV assimilation of total surface currents
- Survey of ocean model initialization of coupled models
- Training, education and outreach in DA
- New co-chairs: Ann Kristin Sperrevik (Met Norway), Sergey Frolov (NOAA ERL)