Ocean Model Working Group Update
CESM Annual Workshop
15 June 2020

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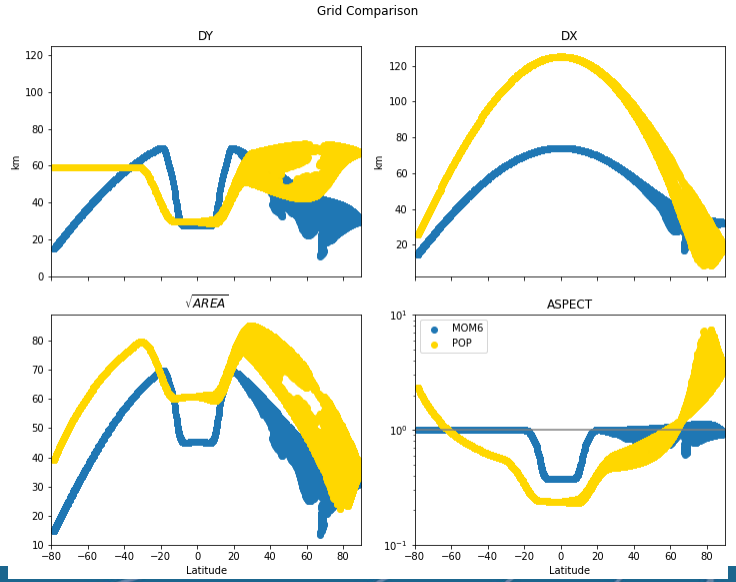
MOM6 in CESM3

- Tremendous support and assistance from GFDL
- Major transition in formulation and solution methods relative to POP
- CESM3 **eddy-parameterized** development prototype
  - Nominal **2/3º tripole** grid, with equatorial refinement
  - Currently vert. coord. is **z***, with 65 layers (2m at sfc).
  - Vertical mixing via **CVMIX-KPP**, similar to POP
  - GM and Redi mesoscale parameterization controlled via **MEKE+GEOMETRIC**
  - Submesoscale via **FFH**
  - Cost / grid point ~ 4x POP

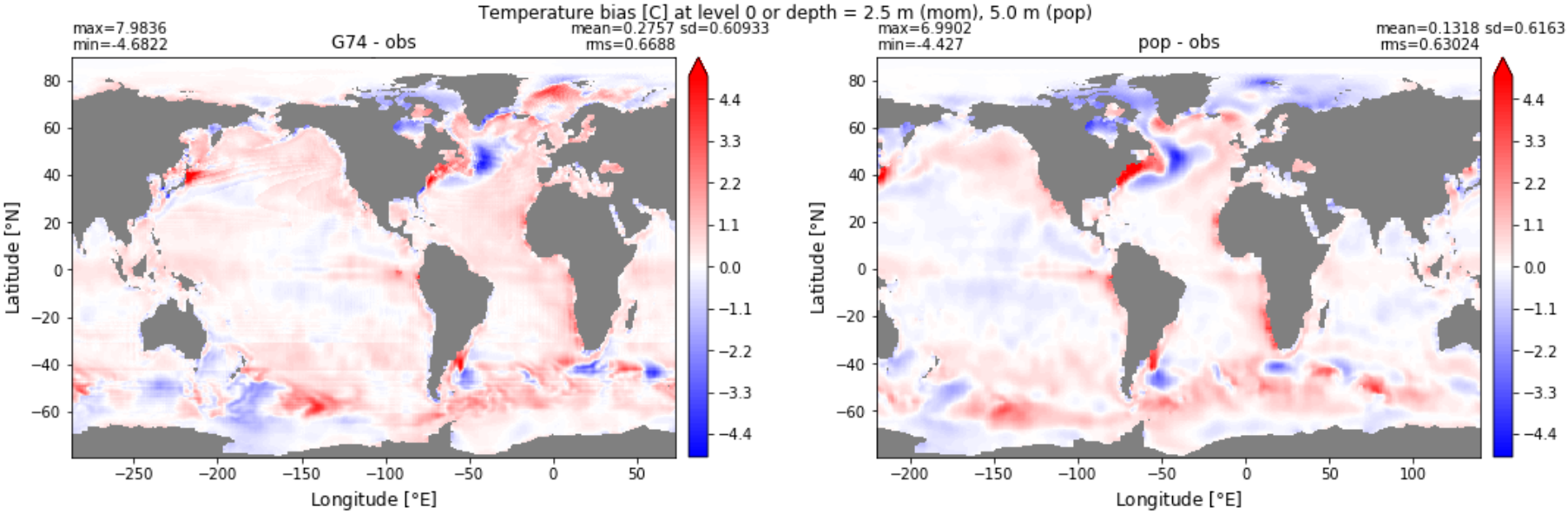


MOM6 Simulation Status

- Conducting extensive parameter sweeps in g-compset with periodic testing in b-compset, developing experience and intuition for model sensitivity
- SST biases in MOM6 and POP have many similarities in forced ocean-ice simulations.
- In recent experiments, MOM6 slightly warmer overall

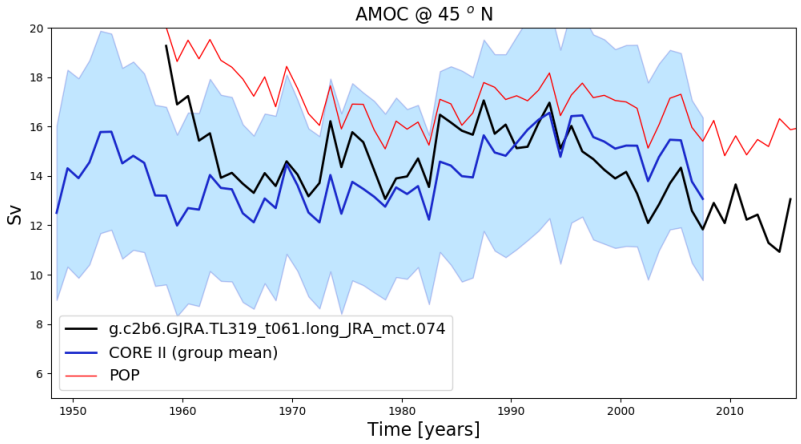
MOM6

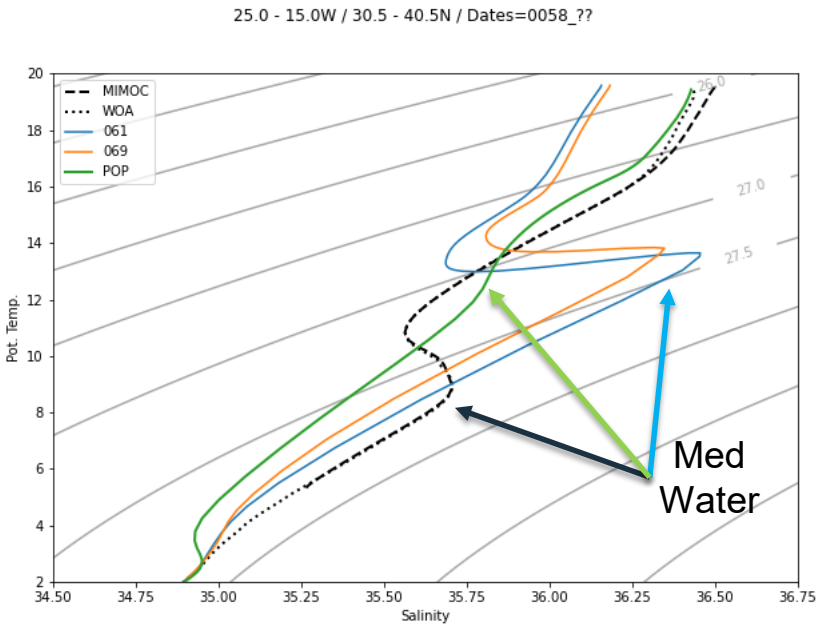
POP



MOM6 Simulation Status

- Subpolar AMOC weaker than POP
- Significant biases in water masses derived from overflows





MOM6 in CESM3:
Near Term (2020) Plans

- Early/friendly user functional release in CESM2.2 (August)
- Documentation and Training Opportunities
  - Biweekly Webinars: algorithms, practical, use cases
  - Latest docs @ mom6.readthedocs.io
  - Contributions from broader MOM6 user community
- Ongoing scientific assessment of CESM3 eddy-parameterized prototype
  - Exploring hybrid vertical coordinate
  - Begin testing wave-driven PBL schemes
  - Tuning and bias systematic mitigation
- Port of MARBL BGC underway
- Additional Resolutions
  - Higher resolution (eddy permitting, eddy resolving)
  - Lower resolution (?)

MOM6 in CESM3:
Intermediate Term (2021-) Plans

- Additional Configurations
  - Idealized/simplified-physics template (w/ Stony Brook Univ.)
    - Aqua-planet and ridge-planet examples w/ millennial timescale coupled integrations completed
  - Regional downscaling
    - Testing w/ eastern tropical Pacific example
- Require additional work to adapt or replace existing POP schemes
  - Estuary Box Model
  - Overflow entrainment
- Coordination with new ocean CPT
  - Energetics and mesoscale parameterization
- New developments in surface PBL and wind wave interactions
- More efficient, transparent, documented workflow and analysis tools

More Information & Questions

- OMWG Discussion Session: Tuesday 1:00pm
- CSEG talk by Alper Altuntas: Wednesday 1:25pm
- Webinars (recorded and future): http://www.cesm.ucar.edu/events/2020/MOM6/