SUMMARY OF NCAR OCEAN MODELING ACTIVITIES

Gokhan Danabasoglu (Representing NCAR)

Our major activities during the past year and a half include the following:

- Model development: We have recently switched to a POP2 base code that allows for both micro- and macro-tasking. This is expected to improve computational efficiency particularly at higher, i.e., eddy-resolving/permitting, resolutions. The incorporated developments in this new base code include

  - new horizontal (still nominal 1°) and vertical (60-level) grid,

  - Simmons et al. (2006) tidal mixing scheme,

  - Ferrari et al. (2007) near-surface eddy flux parameterization,

  - upper-ocean enhancement of eddy diffusivities,

  - reformulation of anisotropic horizontal viscosities,

  - passive tracer infrastructure and prognostic ecosystem model,

  - improved elliptic solver for better scalability,

  - revisiting tracer advection schemes,

  - additional diagnostics.

  This version of the ocean model is included in an intermediate version of the CCSM denoted as CCSM3.5. We plan to consider a few additions for the version to be used in the IPCC AR5.

- We continue to actively participate in the two ocean Climate Process Team (CPT) activities. The near-surface eddy flux parameterization and upper-ocean enhancement

of eddy diffusivities listed above are direct results of our CPT collaborations on eddy-mixed layer interactions. As for the CPT on gravity current overflows, we have implemented an overflow parameterization for the Mediterranean overflow and documented its climate impacts in a recent paper in Ocean Modelling. Currently, we are extending this parameterization to the Denmark Strait and Faroe Bank Channel overflows.

- The CORE version 2 Normal Year and Inter-Annual data sets are being finalized.
- We have been continuing with further analysis of the ocean-only and coupled simulations of our existing CCSM3 simulations as well as the newer integrations with CCSM3.5. These include analysis of the overturning circulation and its multi-decadal variability in the present-day simulations, and water mass formation changes in the South Atlantic in the 21st Century integrations.
- We are collaborating with GFDL in our decadal predictability activities.
- We have been developing a global, $1/10^{\circ}$ eddy-permitting/resolving model to be used in climate simulations.