

SUMMARY OF NCAR OCEAN MODELING ACTIVITIES

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- We have recently finalized the version of our ocean model to be used in the next generation of the Community Climate System Model, i.e., CCSM4. This will also be the model version that will be utilized in most of the simulations for NCAR's contributions to the IPCC AR5. Some of the major developments that are included in this ocean model since its CCSM3 version are:
 - A new base code (POP2) allowing for both micro- and macro-tasking and including many infra-structure changes,
 - Modified land-ocean mask and new vertical (60-level) grid with many bottom topography changes – horizontal resolution is still nominally 1° ,
 - Ferrari et al. (2008) near-surface eddy flux parameterization as implemented by Danabasoglu et al. (2008) (CPT),
 - Upper-ocean enhancement and deep-ocean reduction of both isopycnal and thickness diffusivity coefficients as detailed in Danabasoglu and Marshall (2007) (CPT),
 - Fox-Kemper et al. (2008a) submesoscale mixing parameterization (Fox-Kemper et al. 2008b) (CPT),
 - A parameterization for deep channel and shelf overflows (Danabasoglu et al. 2009 and Briegleb et al. 2009, both in preparation) (CPT),
 - Simmons et al. (2004) tidal mixing scheme (Jayne 2009),
 - Reformulation of anisotropic horizontal viscosities (Jochum et al. 2008),
 - Horizontally-varying internal wave breaking, i.e., background, vertical diffusivity and viscosity (Jochum 2009),
 - Zenith angle dependent diurnal cycle of solar forcing,
 - Passive tracer infrastructure and prognostic ecosystem model,
 - Many additional diagnostics.
- We have continued to participate in the two ocean Climate Process Team (CPT) ac-

tivities. The resulting parameterizations that have been already implemented in the ocean model are denoted by the CPT acronym in the above list. In particular, we have developed a new overflow parameterization for deep channel and shelf overflows, i.e., open-ocean overflows, to represent exchanges through narrow straits / channels, associated entrainment and intrusion of overflow product water into the open ocean. Currently, this parameterization is used for the Denmark Strait, Faroe Bank Channel, Ross Sea, and Weddell Sea overflows.

- The CORE version 2 Normal Year and Inter-Annual data sets have been finalized and released through the GFDL web site.
- We have been continuing with our investigations of decadal variability and associated predictability in various coupled simulations with CCSM3, CCSM3.5, and CCSM4. In particular, our focus has been the multi-decadal variability in the North Atlantic as depicted by the Atlantic Meridional Overturning Circulation (AMOC). We have been collaborating with colleagues at the GFDL in these activities.
- A set of ocean-only, ocean-sea-ice coupled, and fully-coupled integrations have been completed with a global $1/10^\circ$ eddy-permitting / resolving ocean model. Analysis of the results is ongoing.

References

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