BACKGROUND

- CCSM POP2 has been "frozen" over a year and various IPCC AR5 integrations are being carried out using CCSM4.
- It is now time to look forward and discuss what physical and numerical improvements, changes, etc. we would like to have in the next generation of our ocean model.
- Afternoon discussion: What we want in the next version of our ocean model; how we get there; when and where we start from; etc.

- Discussions started at the December 2008 OMWG Meeting
- Base code: POP2 vs. HyPOP
  - Current base code is POP2 (CCSMified)
  - LANL efforts have focused on trying to get HyPOP finished and ready to replace POP. This means that future POP developments need to benefit both models to justify LANL spending much time on them. Readiness of HyPOP has been a moving target.
- A preliminary "wish" list:
  - Eliminate Leap-Frog time stepping in favor of a two-time level method, (COMMITMENT)
  - The incremental remapping advection scheme, (COMMITMENT)
  - Changing the free surface formulation and moving towards using surface freshwater fluxes. (NO COMMITMENT)

- Small group meeting at the June 2009 CCSM Workshop in Breckenridge.
- Put together an "action list" for LANL:
  - Improve efficiency of HyPOP in Eulerian mode, report "overhead" relative to POP,
  - Report on equivalence of HyPOP in Eulerian mode and POP,
  - Present LANL choice of two-time level scheme.
- Items 1 and 2 above will provide us a basis from which to consider whether HyPOP is ready for use as the CESM ocean base code, even while still in the z-coordinate.

DISCUSSION QUESTIONS:

- What new physics and new numerical features do we wish to have in the next version of our ocean model?
- What type of OGCMs will the community need 5 years from now?
- How do we get there?
- When do we start?
- Where do we start from?
- What resolutions should be targeted?
- ????

VERY VERY ROUGH TIME LINE FROM THE IPCC PERSPECTIVE (IF there is an AR6):

Assuming that AR6 release date is sometime in 2019, then likely freeze date for the models is the end of 2014.

Physics Developments:

- New funded CPTs,
- Wave modeling and Langmuir mixing parameterization,
- Anisotropic GM,
- Surface freshwater fluxes and associated issues,
- Nested modeling,

Numerical Developments:

- Elimination of the linearization assumption in the surface height equation,
- Two-time level time stepping,
- New advection schemes,
- Revisit partial bottom cells.

BASE CODE CHOICES:

1. Continue with the POP2 base code:
   - already there (+)
   - requires NCAR resources (-)
2. Switch to HyPOP:
   - includes some of the numerical developments (+)
   - labor shared with LANL (+)
   - requires substantial work to make it CCSM compatible and get to where we are now with POP2 (-)
   - any new physics developments need to be brought in (-)
   - availability time line (?)
3. Other Options: