POSTERS………..

Ocean – MPAS will be considered / evaluated for the next + 1 version of the CESM ocean model.

Ocean – MPAS in CESM framework is covered under the Climate Science for a Sustainable Energy Future (CSSEF) proposal – partial funding for FY11, uncertain for FY12-15.

NEW SCIENCE INVESTIGATIONS AND REQUIRED MODEL DEVELOPMENTS OVER THE NEXT 3–5 YEARS
(maintaining and improving POP as the next CESM ocean model version)

- Bias reductions in present solutions,

- Extend the range of investigations that can be done.

- New capabilities and new physics,

- Improving / re-examining existing physics.

STRONGLY FUNDING DRIVEN (see talk by Bill Large at the OMWG December 2010 meeting in Santa Fe)

Climate Process Teams (CPTs):

• CPT on internal wave mixing,

•CPT on ocean mixing processes associated with high spatial heterogeneity in sea-ice.

Surface waves and Langmuir circulation

ROMS in POP

Decadal and Regional Climate Prediction Using Earth System Models (EaSM) Proposals

- Type I: Topographic / boundary control of Gulf Stream

    - influence of resolved topography,

    - subgrid scale generation of stresses by topography and parameterization development.

- Type II: Modeling ocean variability and biogeochemical cycles (MOBY)

    - considers physics and BGC together,

    - interaction of ecosystems with fully resolved mesoscale turbulence,

    - new / improved mesoscale parameterizations,

    - brings the MITgcm and the self-assembling Darwin model into the CESM framework with both embedded in the CESM ocean model.

Scientific Discovery through Advanced Computing Program (SciDAC) proposal (pending)

•Improve the representation of the exchange of freshwater and carbon between the ocean and other climate system components and the effect of this exchange on tracers by replacing the "virtual salt flux" boundary condition formulation in CESM with the correct "natural boundary condition".

•Reformulate the model dynamics in a mass based vertical coordinate system, thereby circumventing the limitations of the Boussinesq approximation.

•Revisit the formulation and algorithm for the elliptic barotropic equation by exploring alternative approaches and solvers, thereby improving the accuracy and scalability of the solver.

SOME OTHER SCIENCE AND DEVELOPMENT AREAS

- Improving submeso and mesoscale eddy closures,

- Southern Ocean ventilation,

- Atlantic layer in the Arctic Ocean,

- Time stepping, coupling frequency, and preserving tracer budgets,

- Ocean – atmosphere interaction over fronts and eddies that are not resolved in climate models,

- Coastal processes,

- Interaction of the ocean with floating ice shelves: processes and parameterizations,

- Desire for better advection schemes.

WHAT ELSE SHOULD WE CONSIDER?

AVENUES FOR FURTHER COLLABORATIONS WITH MEMBERS OF THE OMWG TO GET THINGS DONE IN A TIMELY MANNER.

OTHER COMMUNITY NEEDS......