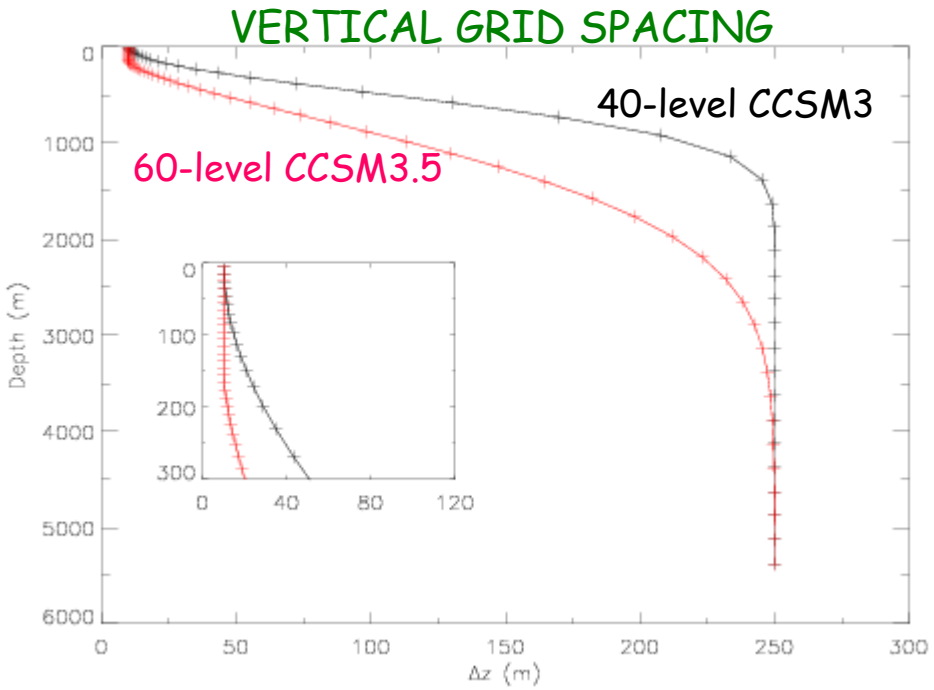
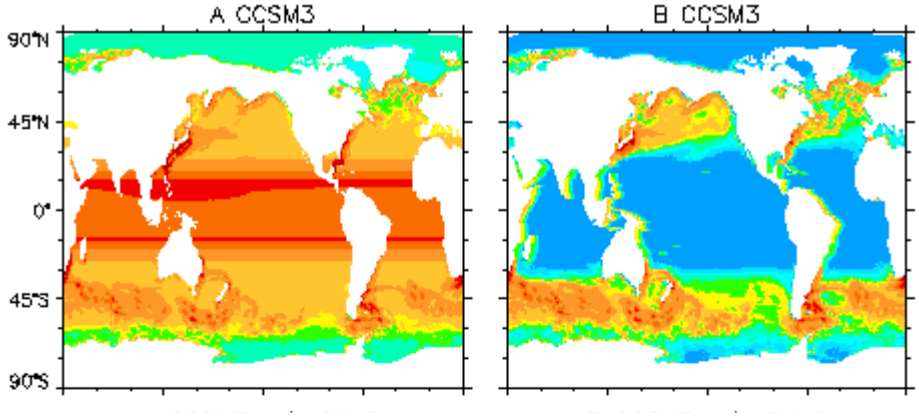
CCSM3.5 OCEAN MODEL: WHAT IS NEW?

1. POP2 base code

2. Vertical resolution and topography changes



VISCOSITIES AT 100 m DEPTH



3. Modified anisotropic horizontal viscosity

$$\partial_t u + \ldots = \partial_x (A \partial_x u) + \partial_y (B \partial_y u)$$

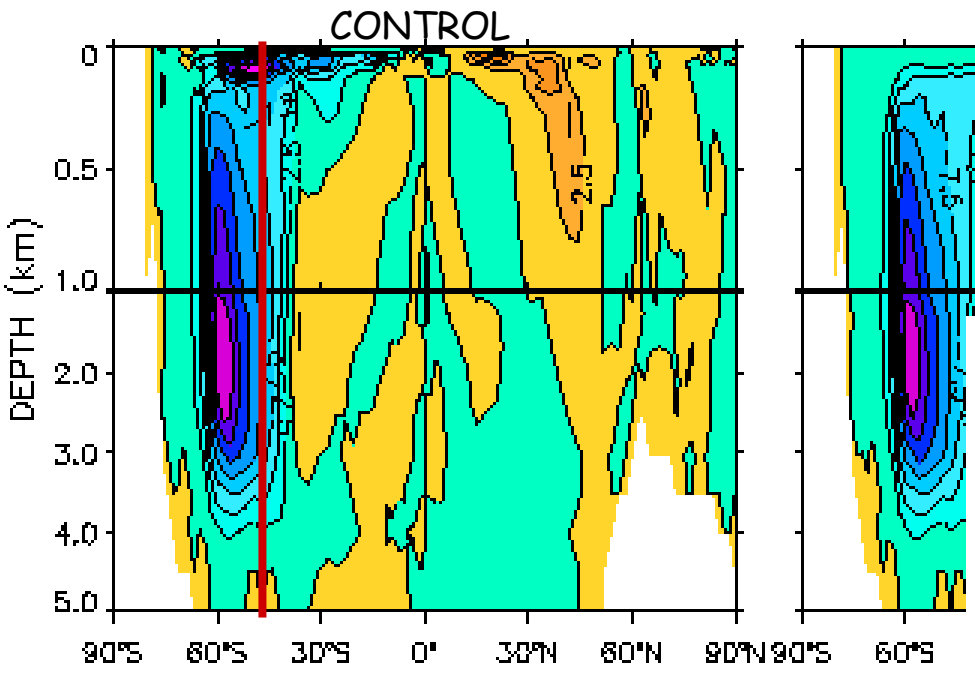
$$\partial_t v + \ldots = \partial_x (B \partial_x v) + \partial_y (A \partial_y v)$$

- Eliminated the dependencies of A and B on the local deformation rate, i.e., no Smagorinsky formulation
- Eliminated the dependency of A on the grid Reynolds number
- Reduced background values

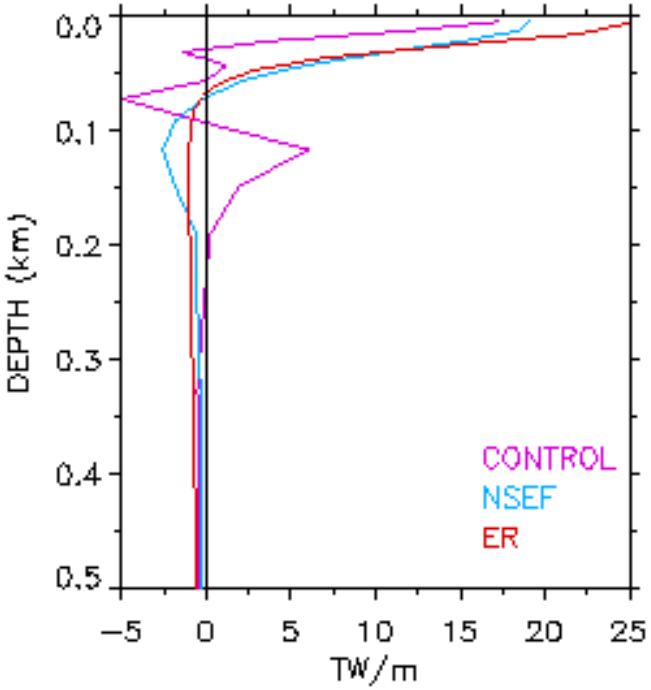
4. Near-surface eddy flux (NSEF) scheme (Ferrari & McWilliams, 2007)

NSEF replaces the usual approach of applying near-surface taper functions for the isopycnal and thickness diffusivities.

EDDY-INDUCED MERIDIONAL OVERTURNING (GLOBAL)



Vertical profile of zonally-integrated total advective heat flux at 49°S



5. Tidally driven mixing scheme (Simmons et al., 2004)

The energy flux associated with the dissipation of internal tides is related to a profile of turbulent dissipation which is then converted to diffusion. It replaces the Bryan & Lewis (1979) type profile used in earlier versions.

The scheme has little impact on the ocean circulation. However, it is preferred because it is energetically consistent and is more physically correct.

SUMMARY OF WHAT IS NEW IN CCSM3.5

- POP2 base code,
- Vertical resolution and topography changes,
- Modified anisotropic horizontal viscosity,
- Near-surface eddy flux parameterization,
- Tidal driven mixing parameterization,
- Passive tracer infrastructure and ecosystem codes are operational.

SST BIASES IN *CCSM3.5*