Summary of Ocean1–4_COM_POP2x Results

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1 Model Details

- Model and version: Parallel Ocean Program v. 2x (POP2x)
- Repository: not publicly available.
- Vertical coordinate: z level with partial top and bottom cells.
- Horizontal mixing: harmonic (del2) along geopotentials.
- Vertical mixing: del2 with COM constant viscosity and diffusivity.
- Advection schemes: momentum: centered, tracers: flux limited Lax-Wendroff.
- Equation of state: linear with ISOMIP+ coefficients.
- Convection parameterization: enhanced vertical mixing (ISOMIP+ values of ν_{unstab} and κ_{unstab})
- Melt parameterization: T_w and S_w are computed by averaging T and S with 20 m of the ice draft. u_w is averaged over 4 "horizontal" neighbors (at the ice–ocean interface) from the velocity to the tracer grid but is not averaged vertically.
- Modifications to Topography: Interpolated to 2-km grid with conservative interpolation scheme, smoothed with a Gaussian filter with half-width of 2 km. A minimum thickness of 2 grid cells (40 m) was maintained by deepening bathymetry near the grounding line. Partial top cells thinner than 5 m are either thickened or removed. Ice draft and bathymetry are automatically adjusted to ensure required connectivity between neighboring cells (e.g.removing or horizontally expanding cells with no horizontal neighbors).
- Maintaining sea level: Using virtual salt fluxes, so sea-level change is negligible.
- Moving boundaries (Ocean3–4): Topography data was interpolated to monthly snapshots, calving criterion was applied. After updating topography, T and S were progressively extrapolated first horizontally, then vertically into new ocean cells. Barotropic transport was maintained by re-distributing barotropic velocity across the expanded or contracted water column. Velocities are initially zero in new ocean columns. T, S and v are simply zeroed in cells removed from the ocean.
- Deviations from COM: none.

- Parameter values:

Γ_T	0.0465085
Γ_S	$1.32881428 \times 10^{-3}$
$C_{D,\text{top}}$	2.5×10^{-3}