

Sea Ice Results from CESM High Resolution Simulations

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CESM Configuration

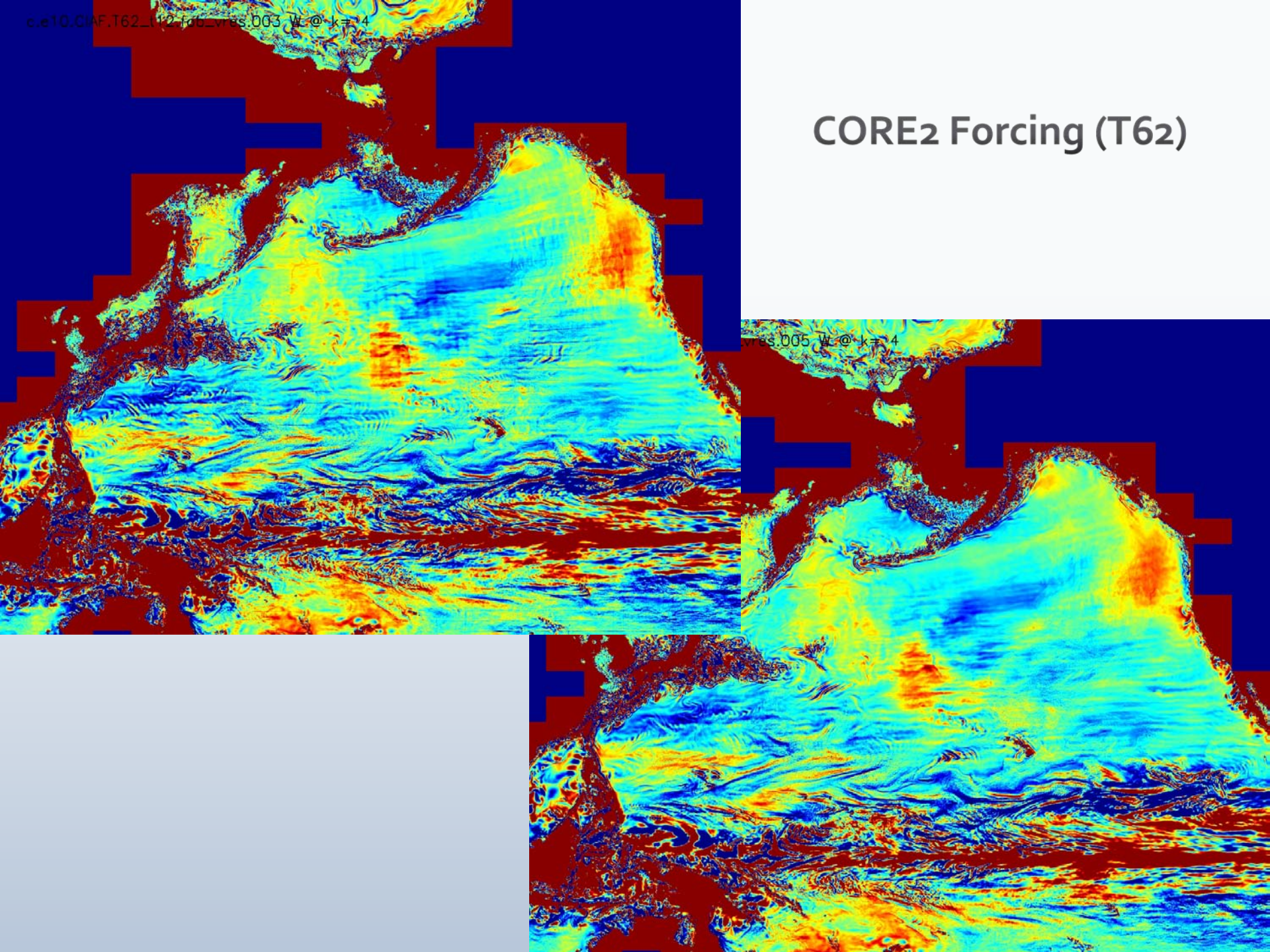
- CAM5 Spectral Element Dynamical Core and CLM at ne120 (approx 0.25 degree) resolution.
- Fully-coupled and CORE2 (T62) forced ice-ocean simulations.
- CICE/POP at 0.1-degree on tripole grid.
- All POP sub-gridscale parameterizations turned off with biharmonic viscosity on.

High Resolution Issues

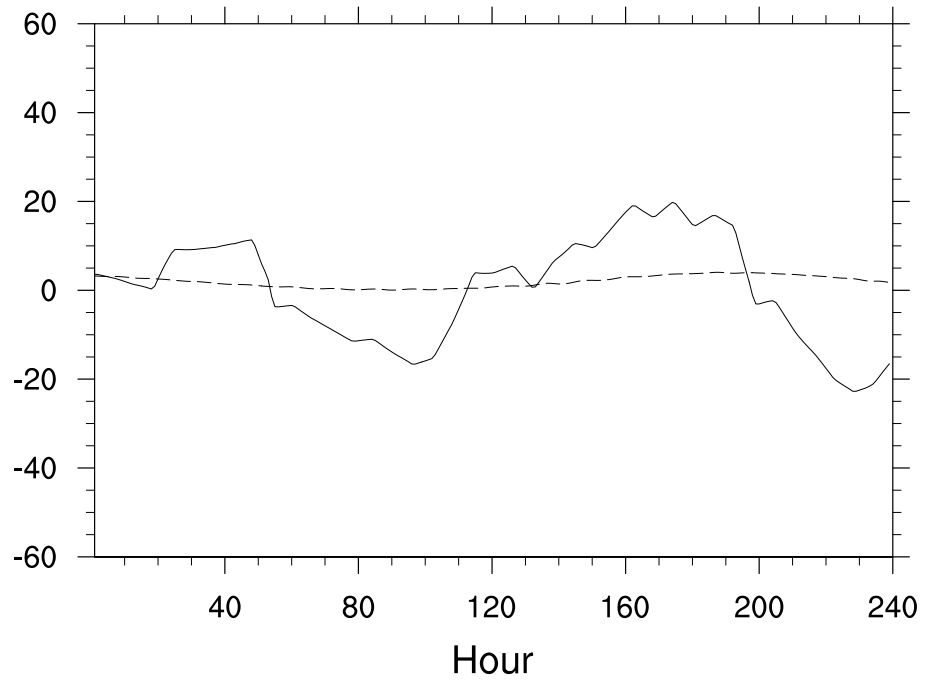
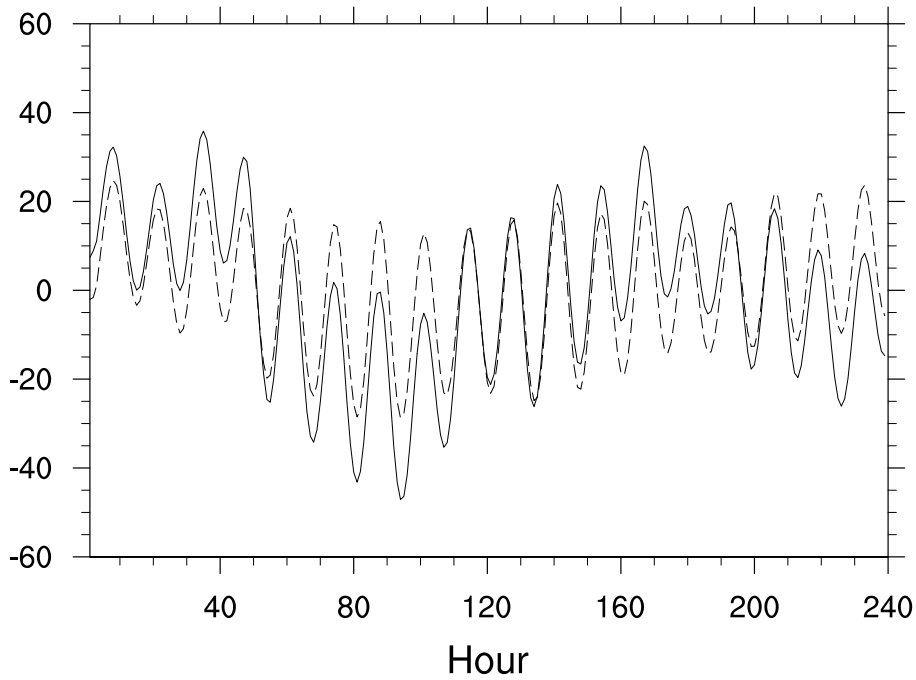
- Sea ice initialization.
- Internal ocean instabilities: Topography, centered differencing, viscosity.
- Marginal Ice Zone.
- CORE2 high-latitude biases and forcing resolution.
- Ice-ocean coupled instability: Inertial period, frequent coupling.

o.e10.CIAF.T62_t12-fdu_vres.003_W@k=4

CORE2 Forcing (T62)



Inertial Oscillations

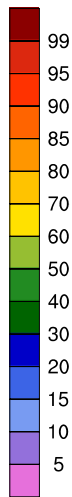
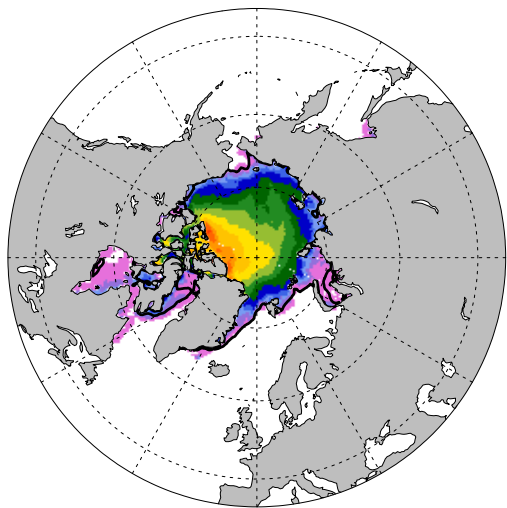


— U_{ice} (cm/s)
- - - U_{oce} (cm/s)

04_BC5_ne120_t12_pop62
JAS Mean Years 0015-0024

ice area (aggregate)

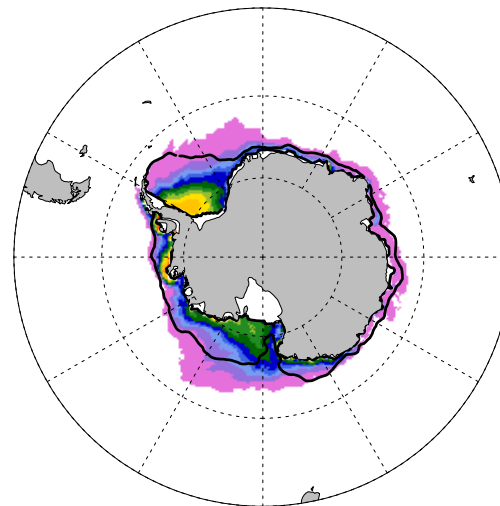
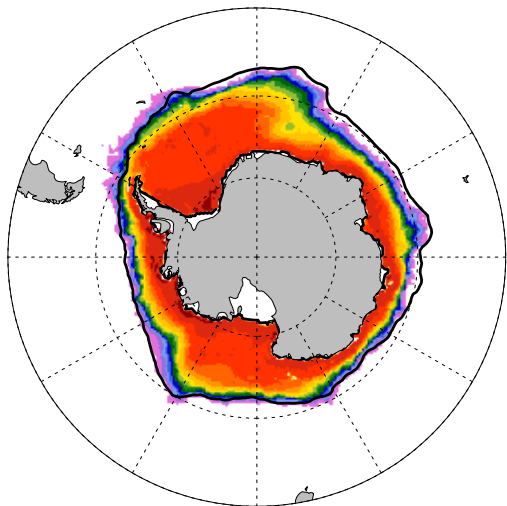
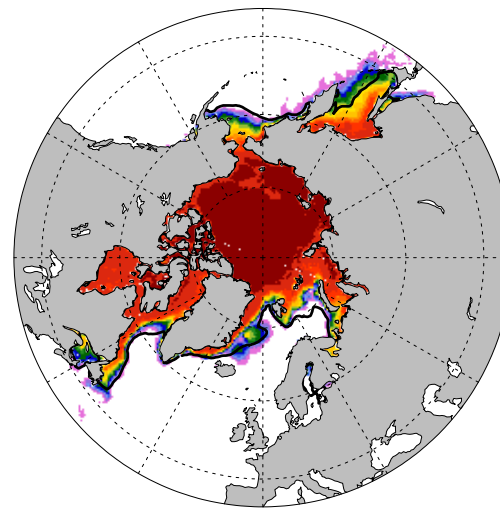
%



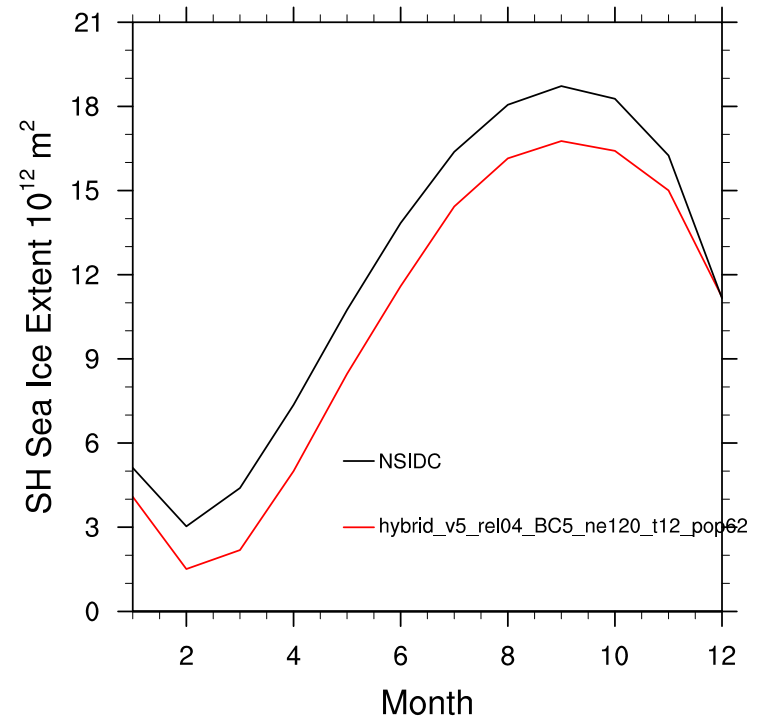
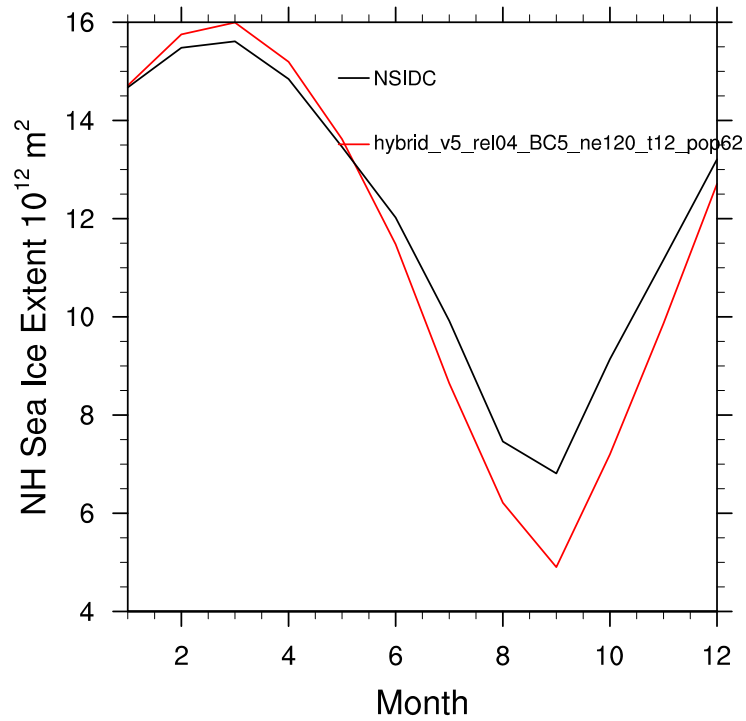
ybrid_v5_rel04_BC5_ne120_t12_pop62
JFM Mean Years 0015-0024

ice area (aggregate)

%



Climatological Extent



Summary

- Smoothed ocean bottom topography (McClean).
- Ocean and sea ice initialization issues.
- CORE2 biases and T62 to 0.1-degree patch mapping.
- Geostrophic currents in ice-ocean drag calculation.

Next steps:

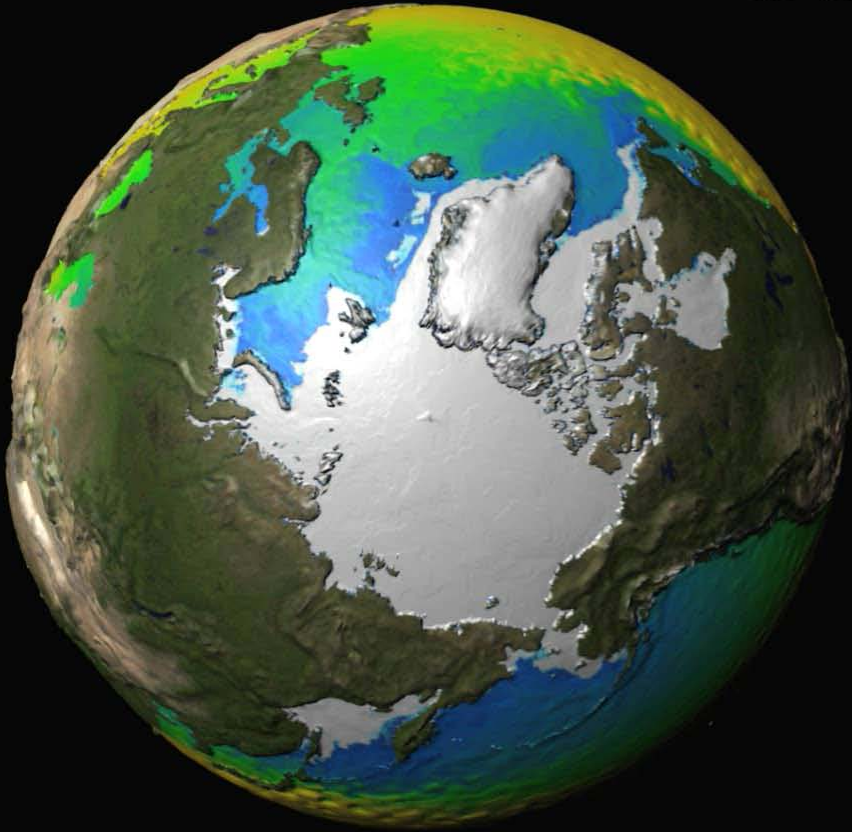
- Lower viscosity in ocean.
- Atmospheric tuning.
- Time-lag instability.
- Ice-ocean drag formulation.

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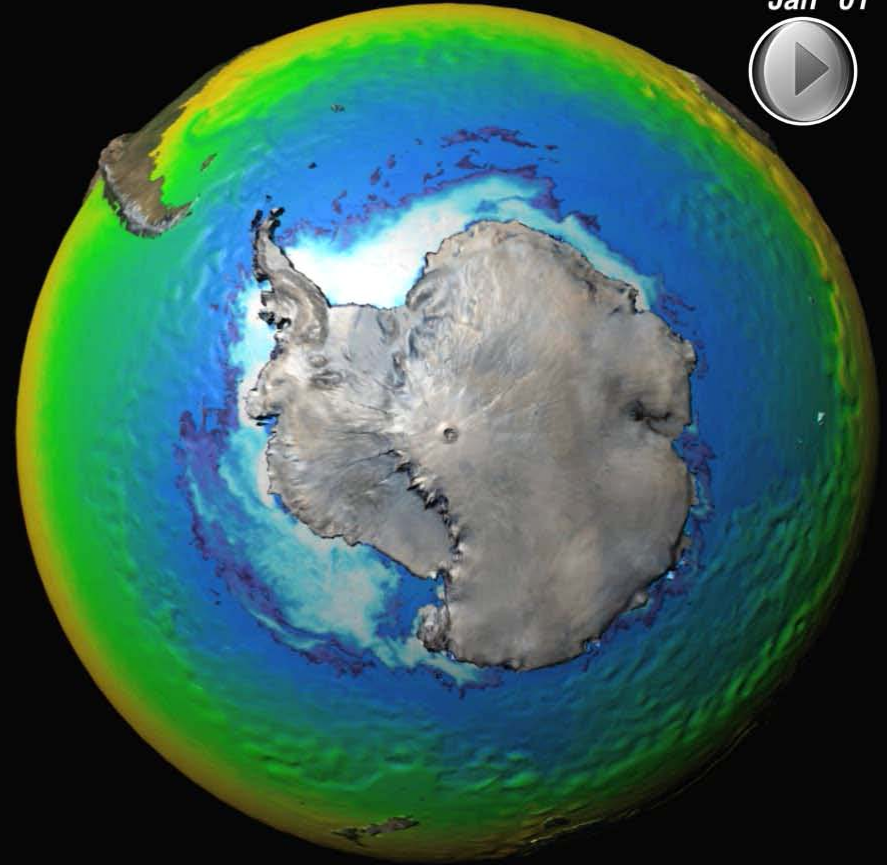
Sea Ice Diagnostic Package

- Swift (parallelized) enabled version available on geyser/caldera.
- Tweaks for high-resolution.
- More qualitative comparisons to observations (ASPeCt, IceSat, NSIDC climatological extent).
- Regional time series based on passive microwave definitions (Parkinson).

Jan 01

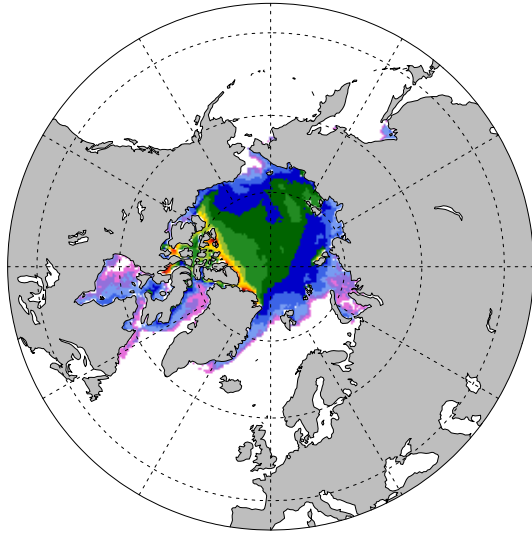


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Animations courtesy of Tim Scheitlin, NCAR.

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