Sea Ice and Polar Climate in CESM1.5

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CESM-CICE5

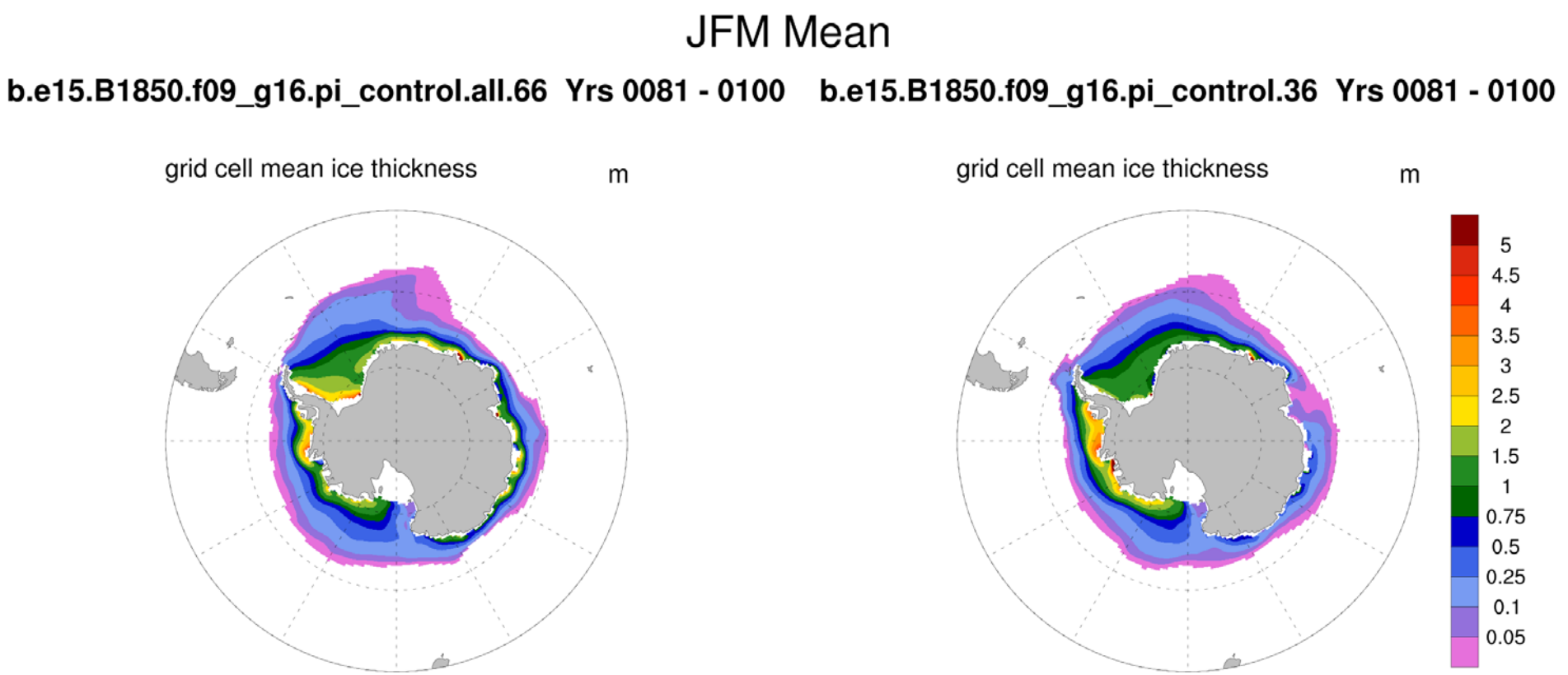
* Same infrastructure as CICE4
* New thermodynamics, dynamics, melt ponds, and BGC.
* Default thermo is now mushy-layer (Turner and Hunke 2015)
* Default ponds are level ponds (Hunke et al.)
* Mushy-layer freezing point.

Tf = SSS / (-18.48 + 0.01848*SSS) (Assur, 1958)

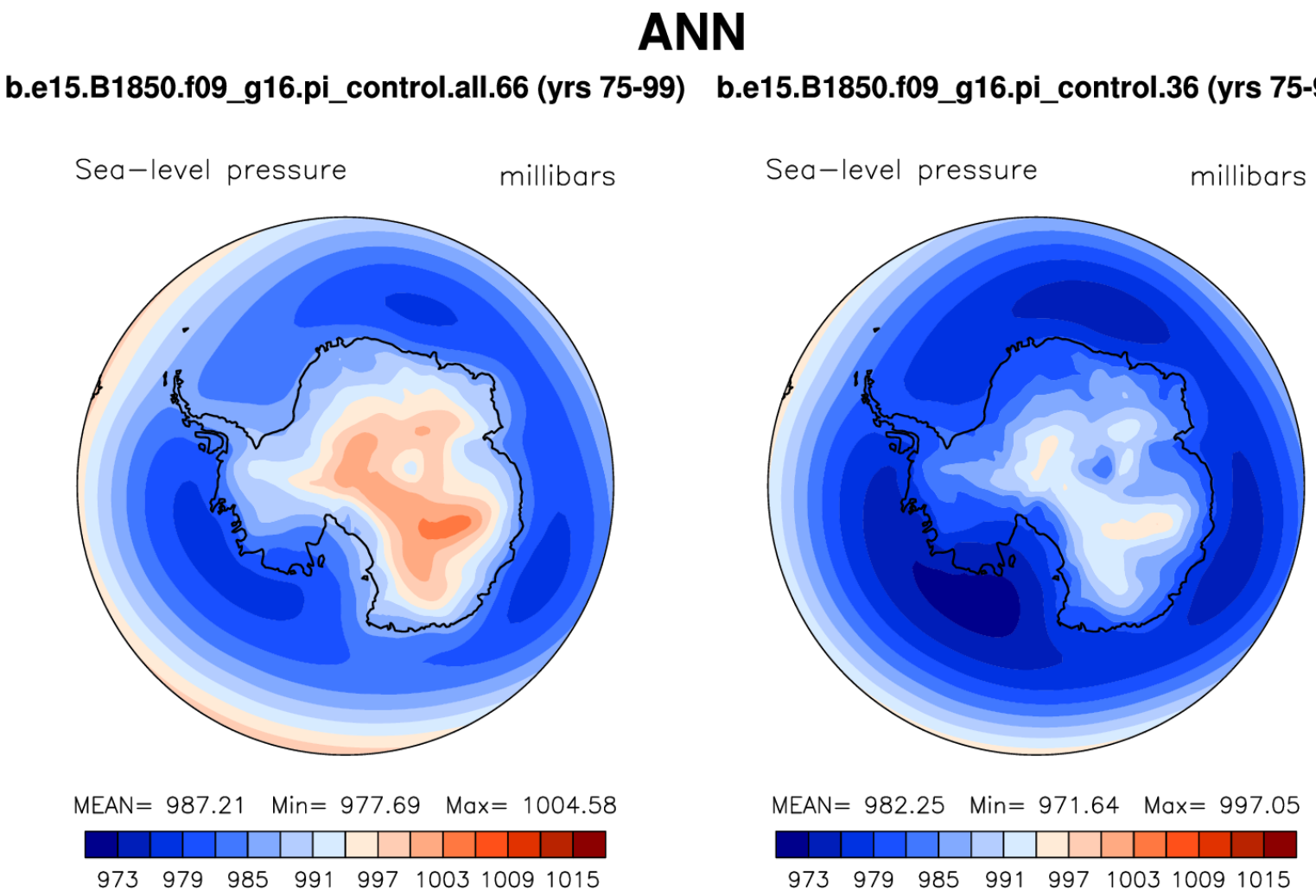
CESM2 Control Runs

* Many fully-coupled control runs including new physics in all components.
* Latest is number 90 in the series.
* Issue as of 66: one of the first “kitchen sink” runs.

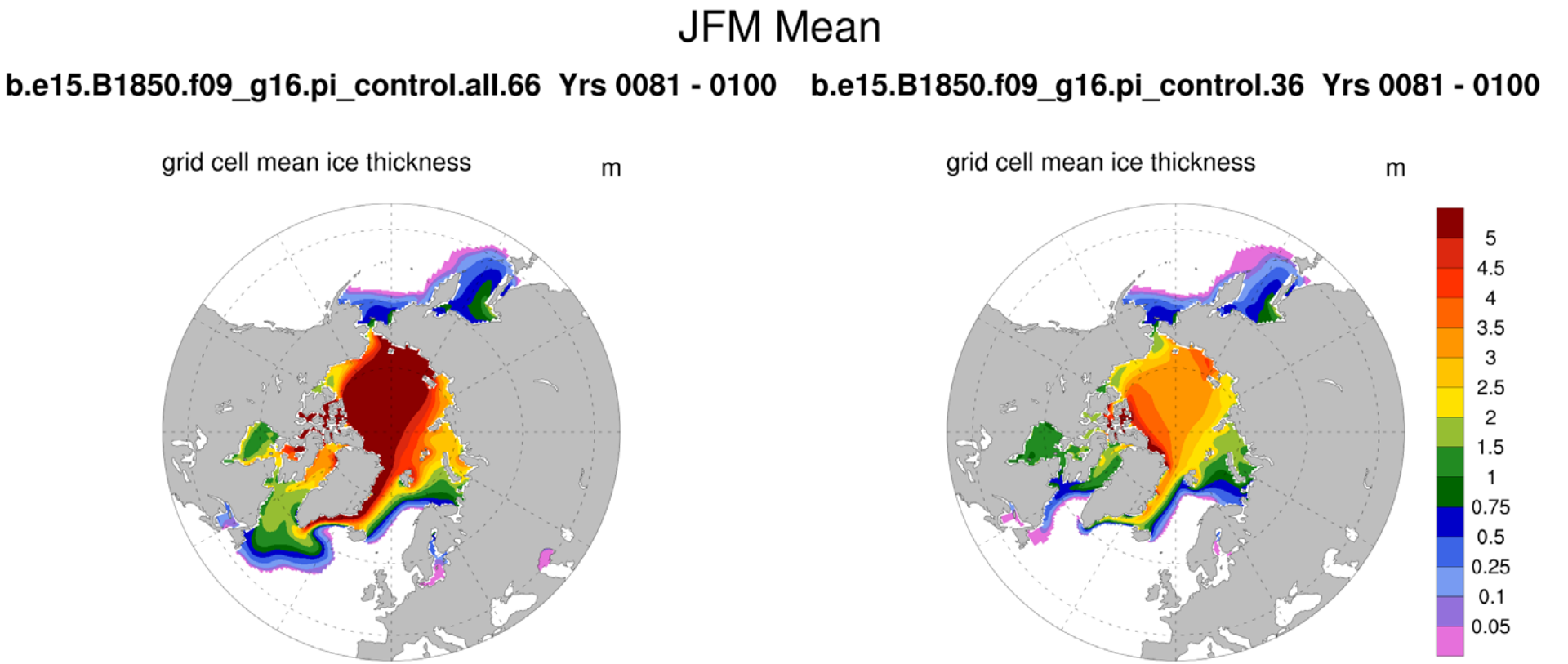
The Good News: No More TMS! ☺



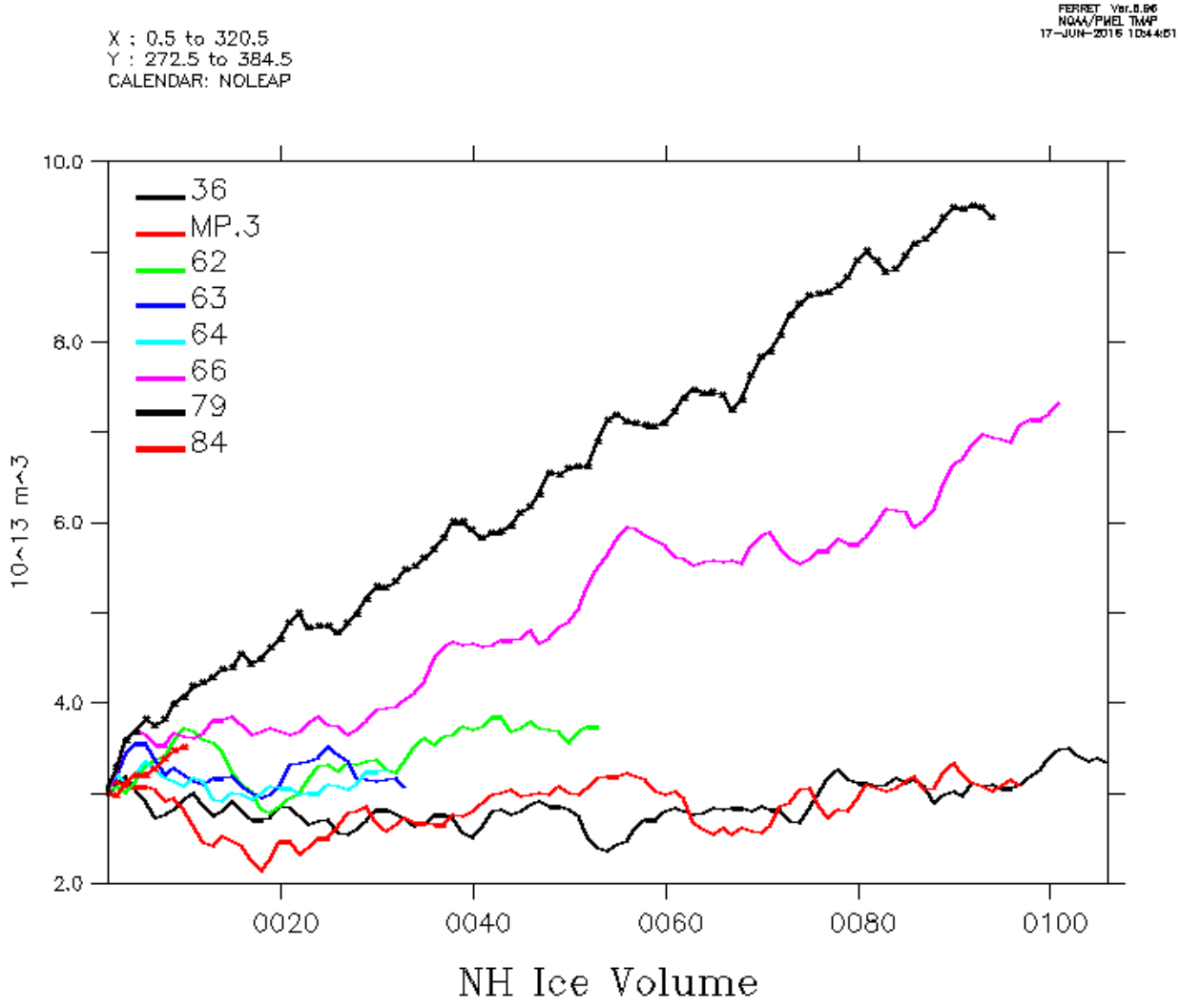
Sea Level Pressure



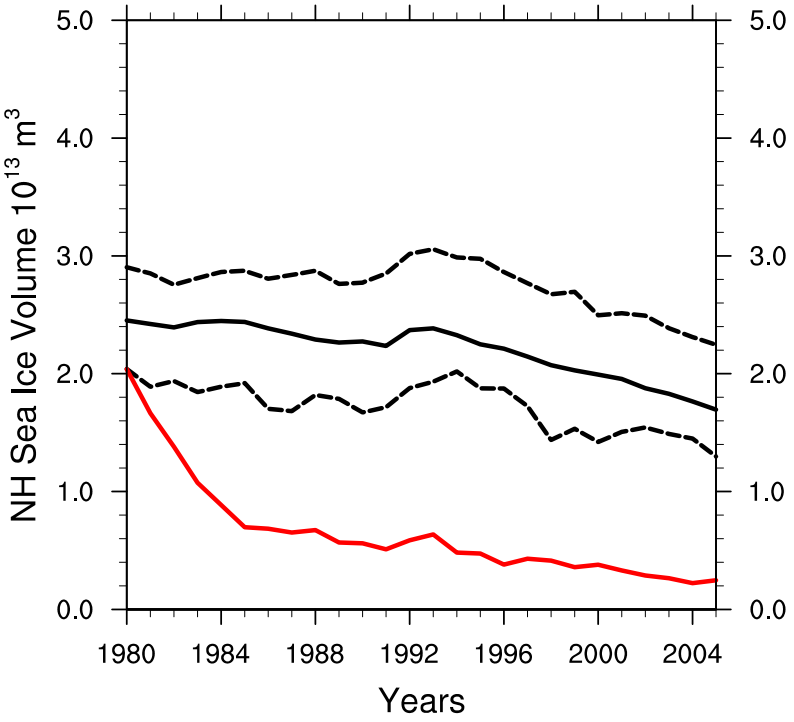
The Bad News: No More TMS? ☹



Arctic Ice Volume



The Good News: Tuning. ☺

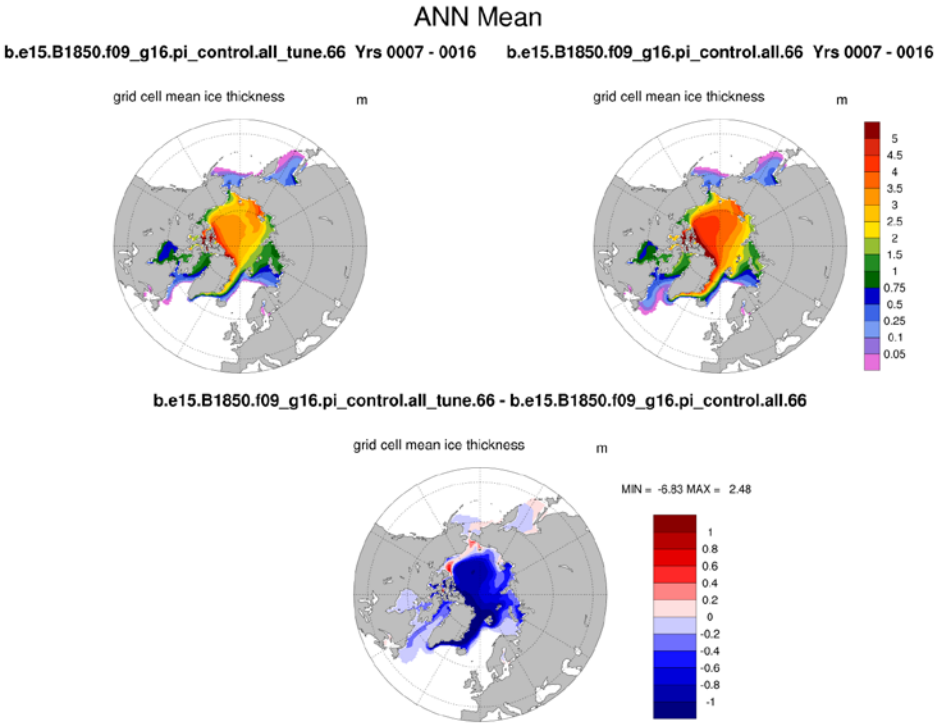


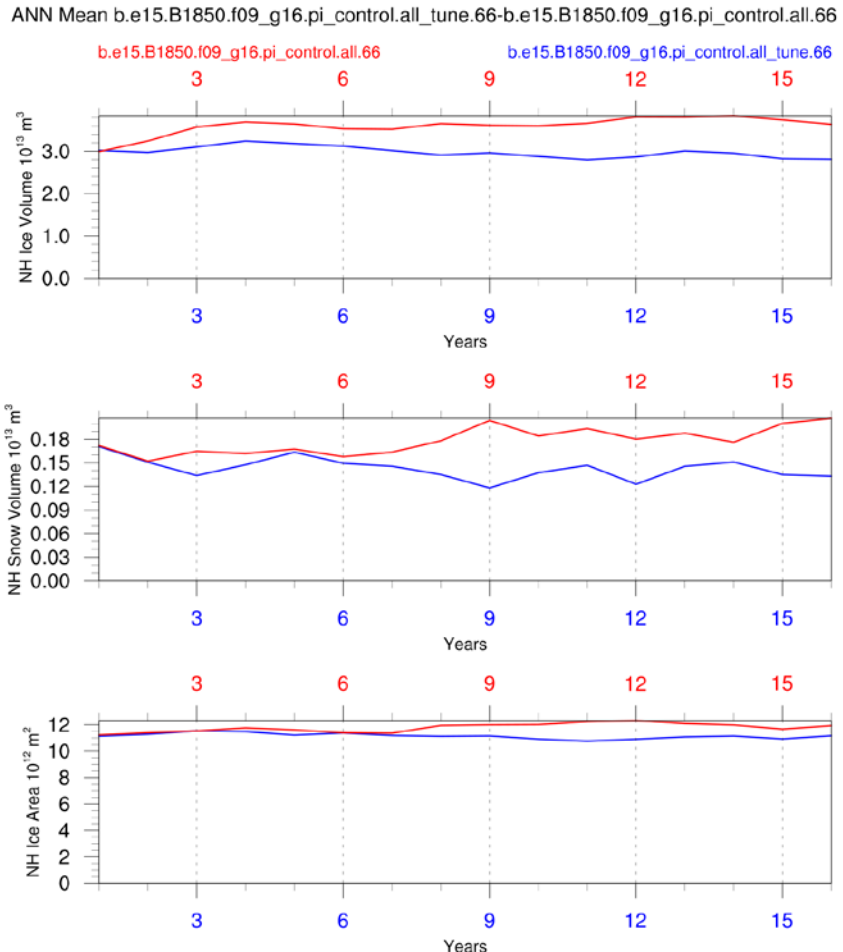
Rsnw_nm = Rsnw_nonmelt – R_snw*Rsnw_sig

R_snw = -1.5

Tuning with 66

R_snw = 1.5 (1.75)
dT_mlt = 1.5 (1.0)
rsnw_melt = 1500 (1000)





Summary

* Very close to expected CESM2 overall configuration
* Improvement in SH sea ice with removal of TMS, but degraded NH simulation for reasons to be determined.
* Tuning may help somewhat.
* Water isotopes ($H_2{}^{16}O$, $H_2{}^{18}O$, HDO).

CESM2 Timeline

July 1st: Science configurations "finalized".

Sep 1st: Science code freeze.

Sep to Nov: Tuning and bug fixes.

Dec 32nd: CESM2 Release

Questions?

Photo credit: Chris Polashenski