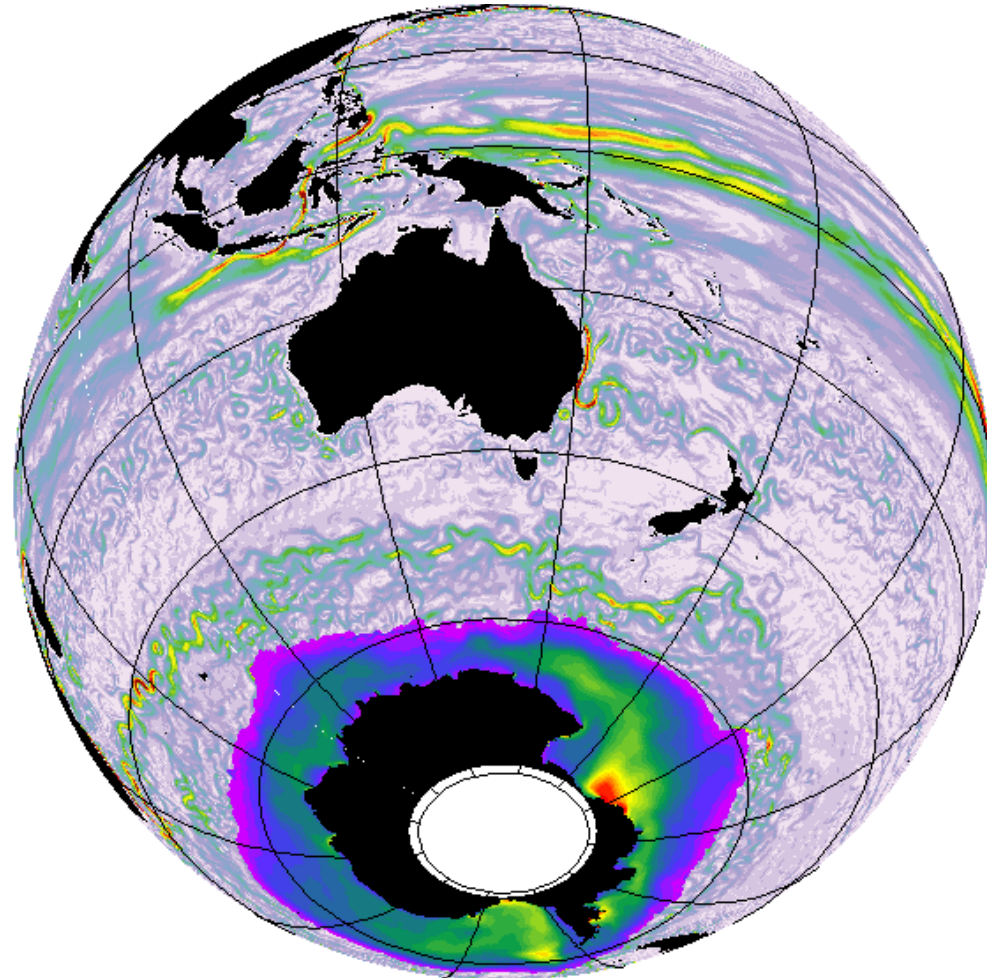


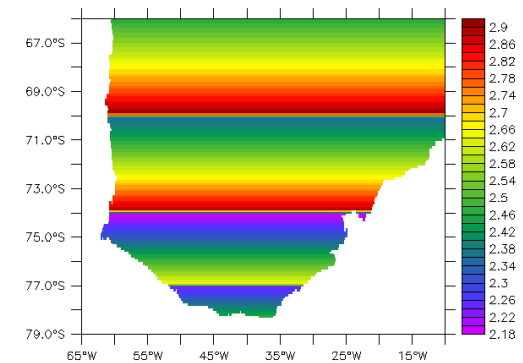
# Taking OFAM Global: extending the grid and enabling sea ice



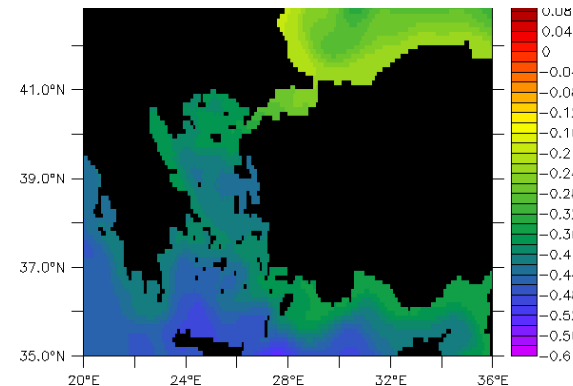
Matt Chamberlain, May 2016

# Grid Extensions

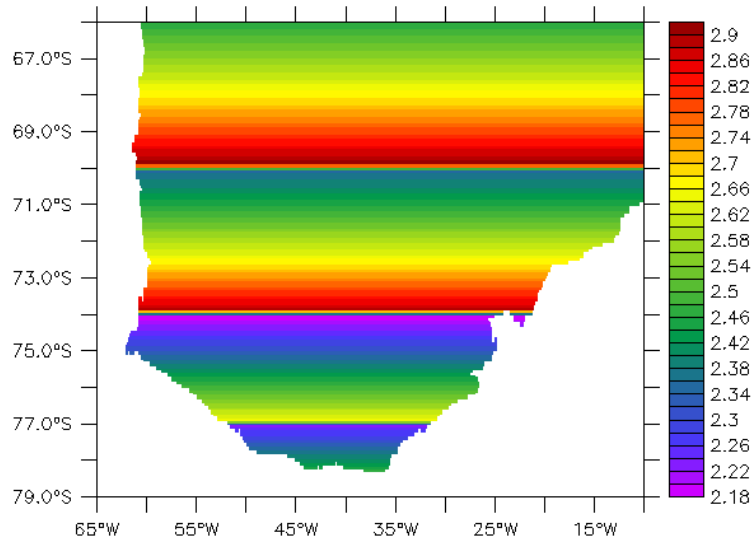
- Keep OFAM3 grid/bathymetry (75S to 75N) as much as possible: extend to 79° S and over Arctic (tripolar).
  - 0.1° lat. resolution over most of OFAM3 domain to maintain OFAM3 bathymetry; use gebco in extended regions.
  - Reduced latitude steps at high latitudes to avoid excessive ‘stretch.’
  - Horz. domain 3600x1840.
- Opened Dardanelle’s.
  - Better connection to Black Sea.
- Vertical resolution unchanged,
  - 51 levels, 5 m at surface, 5 levels between 2000m and 5000m.



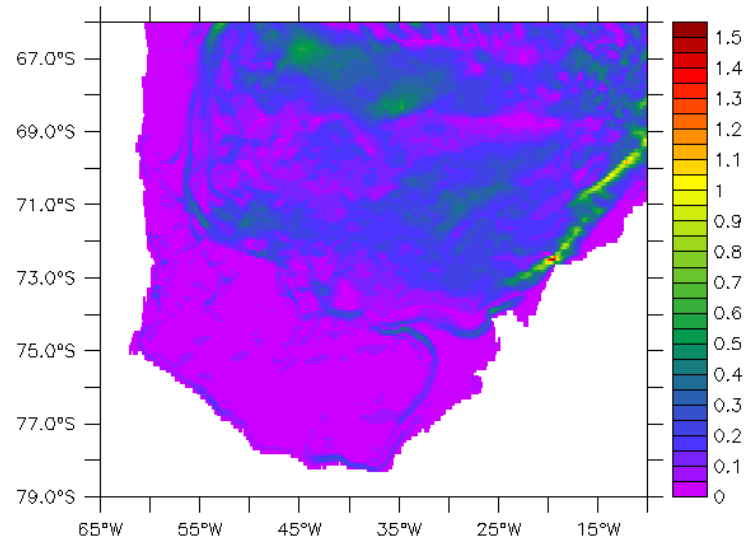
Aspect ratio



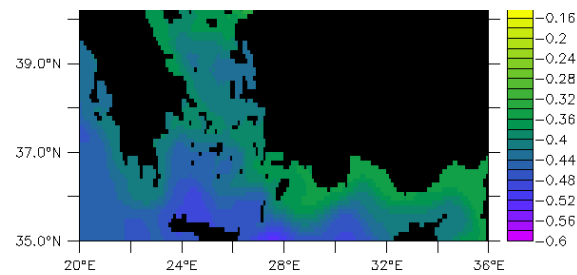
# Grid Extensions



Aspect ratio



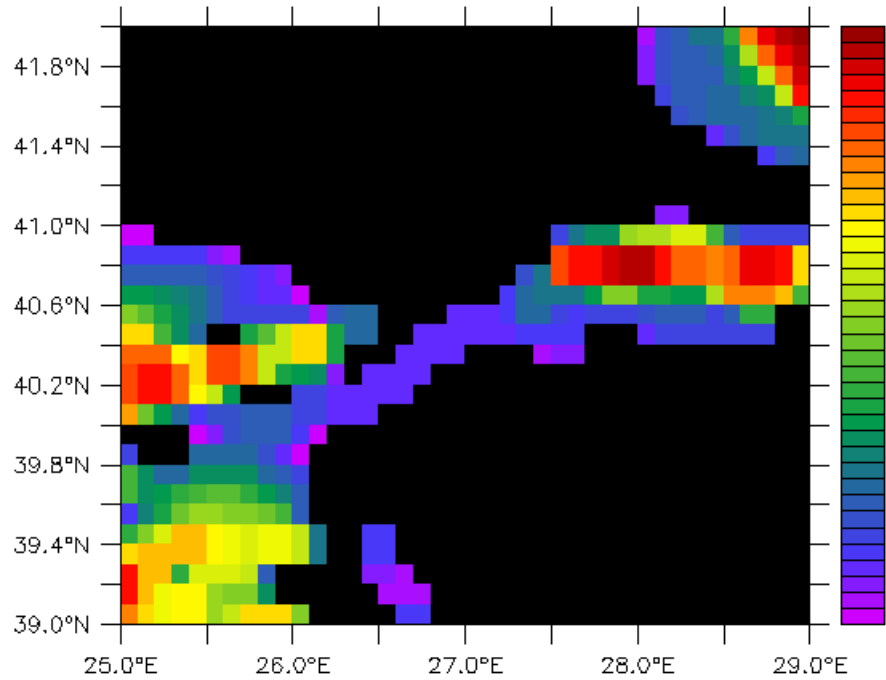
Integrated transport



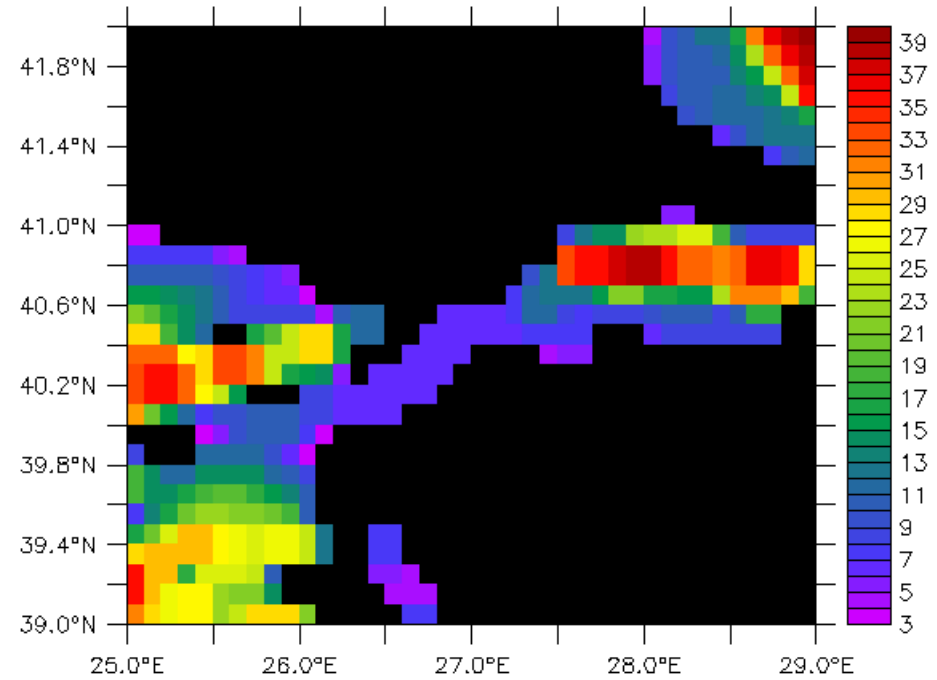
itic

//

# Grid Extensions

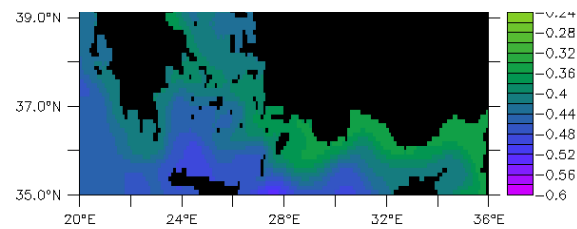


NumLevels - Before

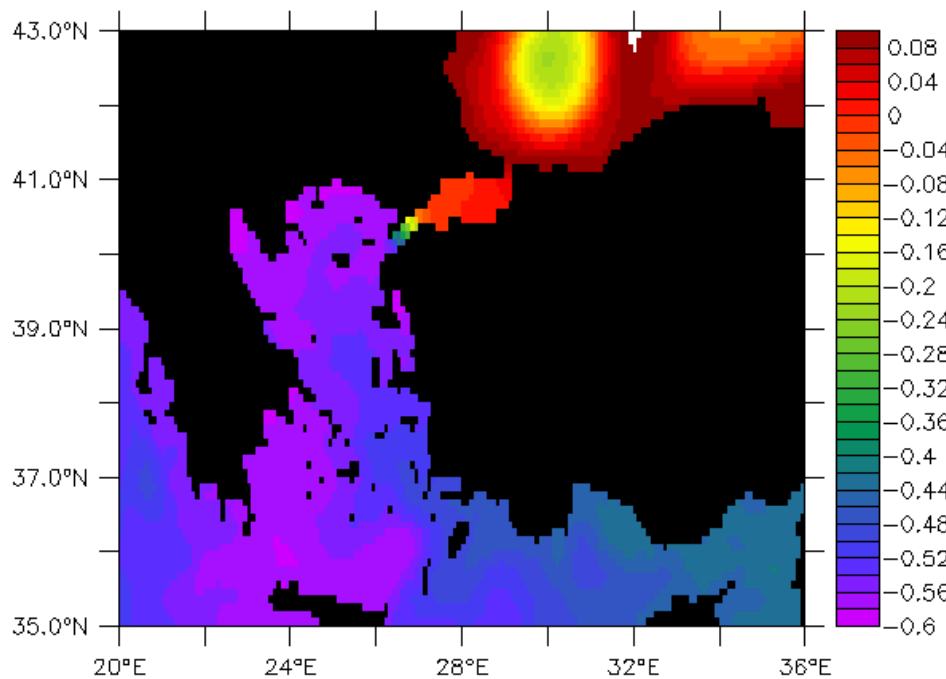
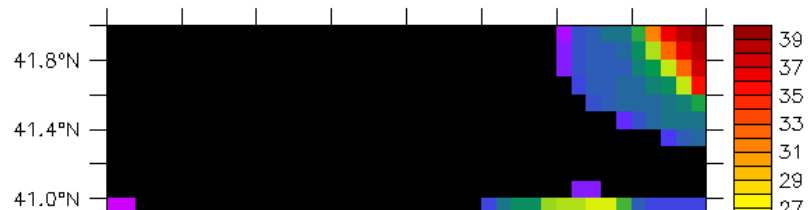


NumLevels - Modified

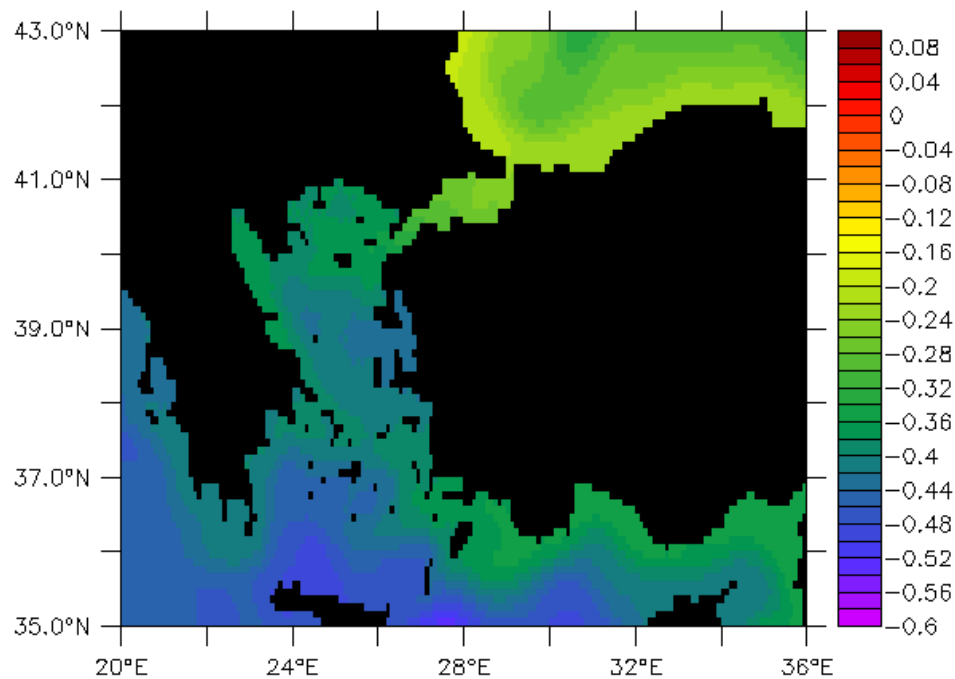
between 2000m and 5000m.



# Grid Extensions



SSH - Before



SSH - Modified

20°E 24°E 28°E 32°E 36°E

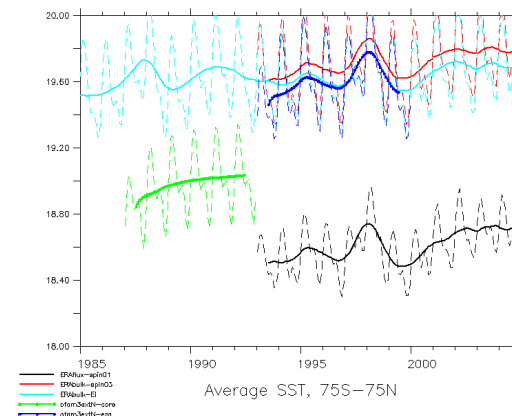
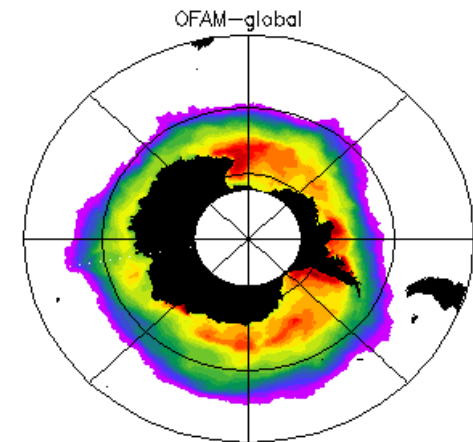
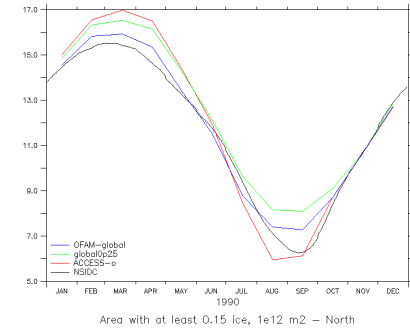


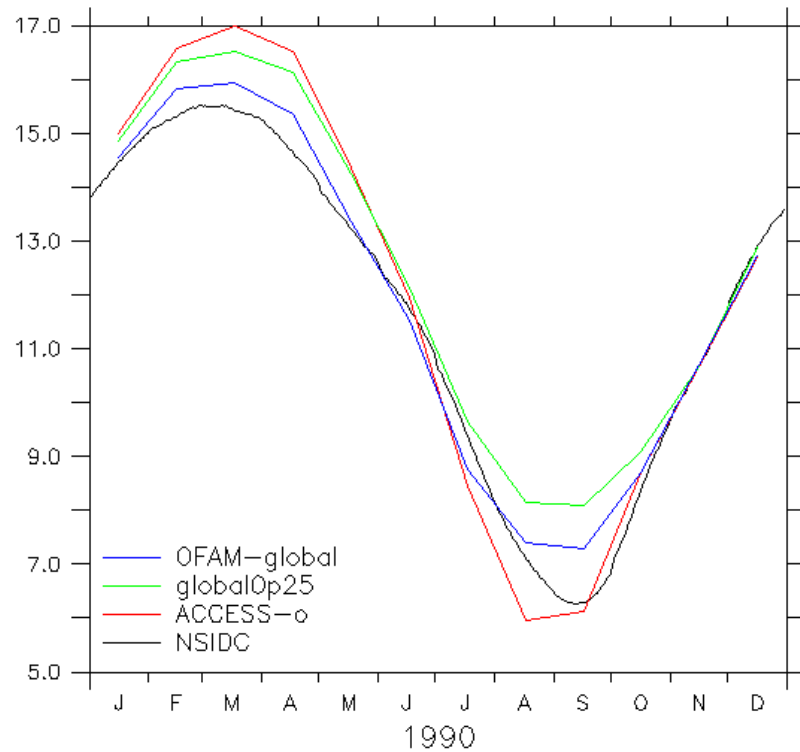
# Experiment Setup

- Parameters adopted from OFAM3,
  - Sea ice MOM-SIS parameters on.
  - Relative to “mom01”: mostly minor differences (e.g. shortwave, advection scheme, background values in kpp and friction), also, submesoscale off.
- Forcing:
  - CORE1-NY climatology, like experiments at other resolutions.
  - switch to ERA-interim starting 1993, like previous OFAM3 runs.
  - still using sponge for tracers > 2000m.
- Use 960 CPUs (50x23 layout, 200 masked), dt=720s, month ~100min.

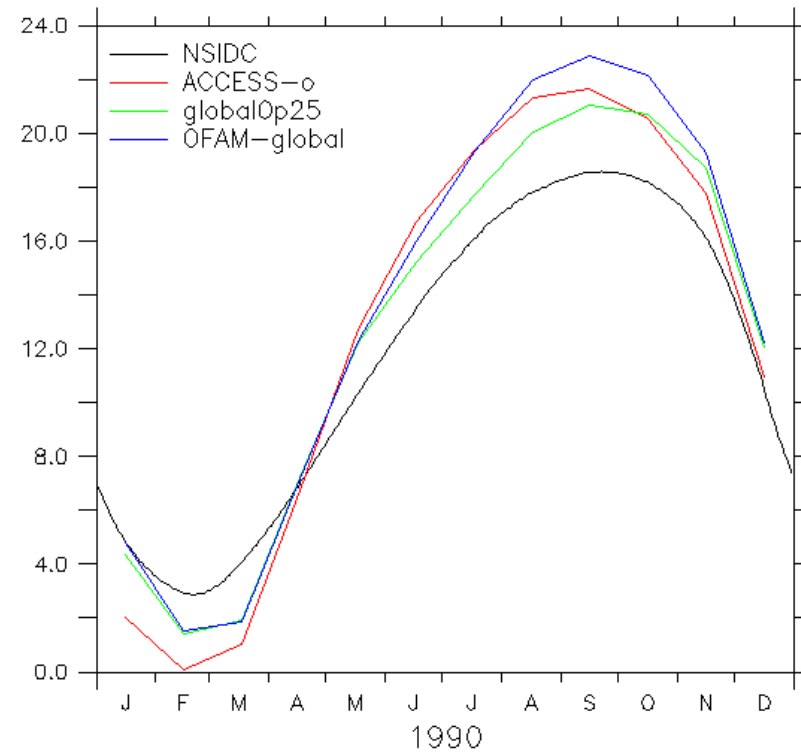
# Output

- Sea ice compared to other CORE1-NY experiments with different resolution.
  - time series of seasonal ice cover consistent with other experiments and obs.
  - maps of ice extent show OFAM and 0.25 experiments are similar.
- SST compared to other OFAM3 experiments
  - jump in SST with switch to ERA,
  - SST consistent with previous OFAM3 with bulk formula.



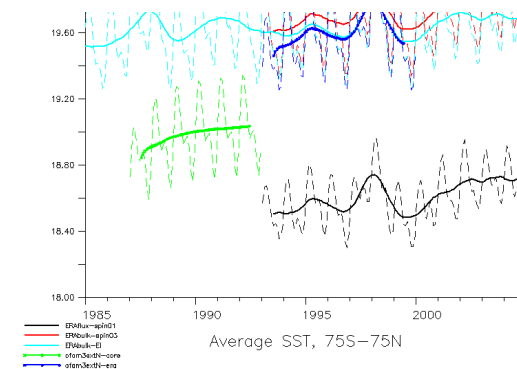


Area with at least 0.15 ice, 1e12 m2 – North

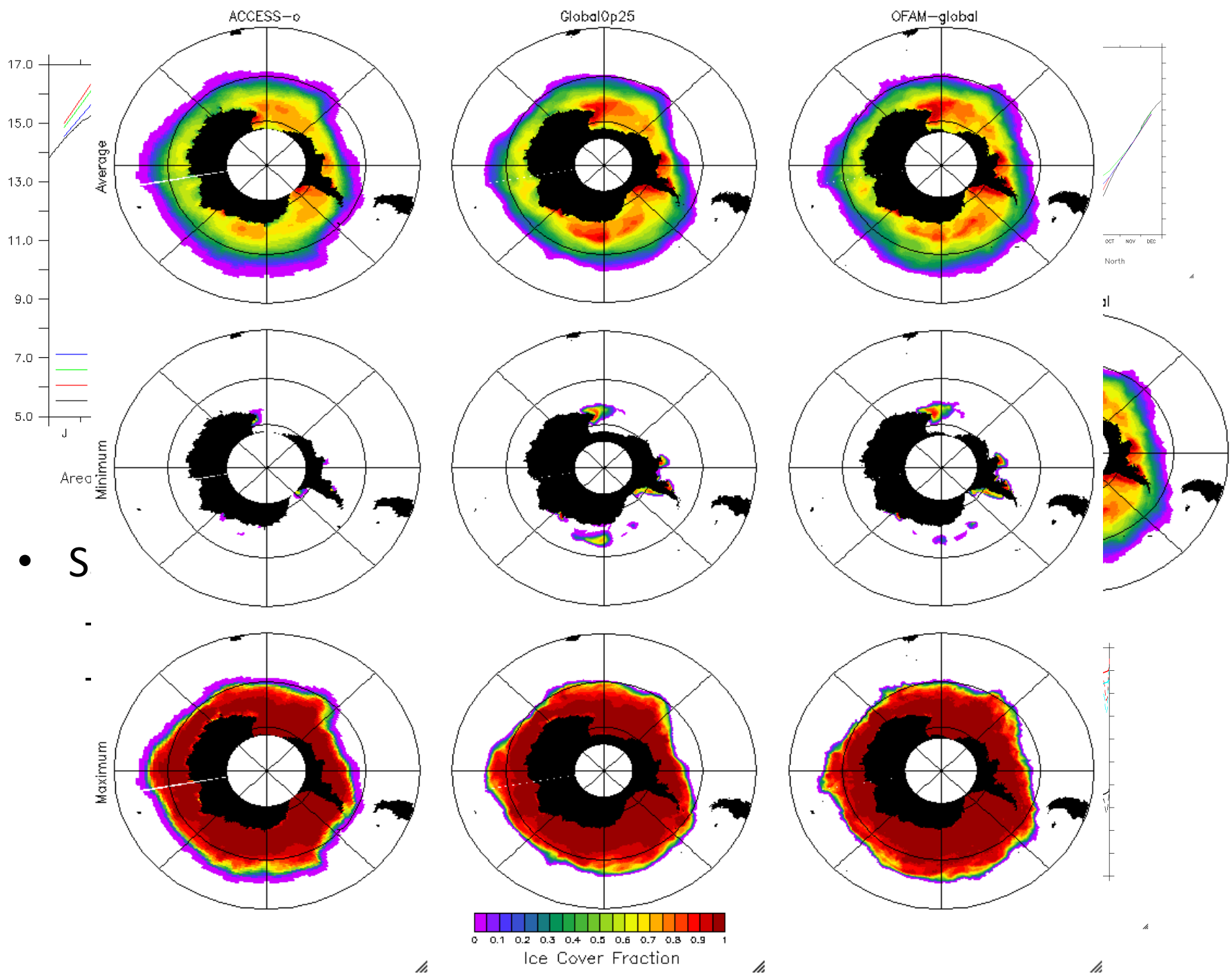


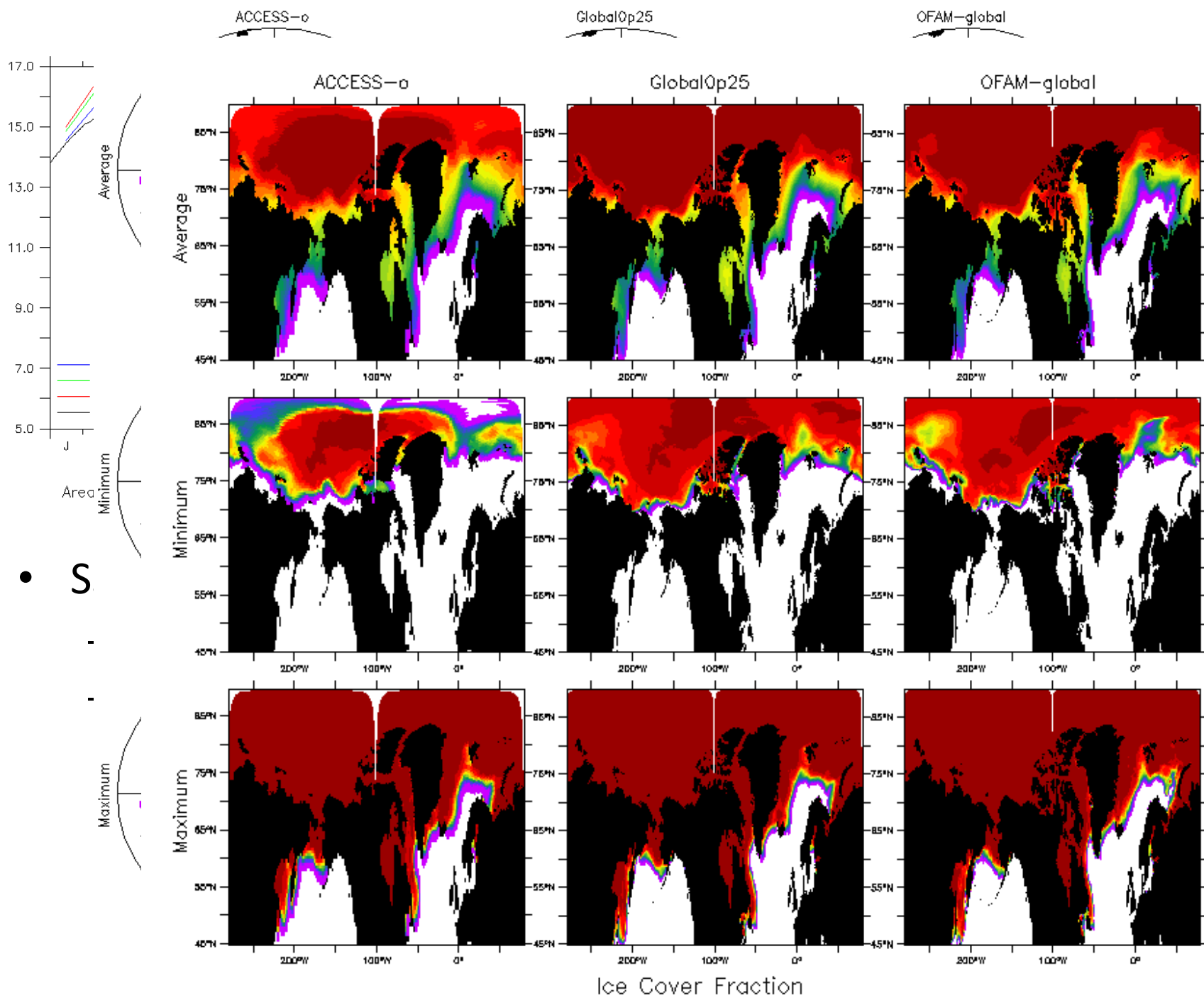
Area with at least 0.15 ice, 1e12 m2 – South

— SST consistent with previous OFAMS with bulk formula.



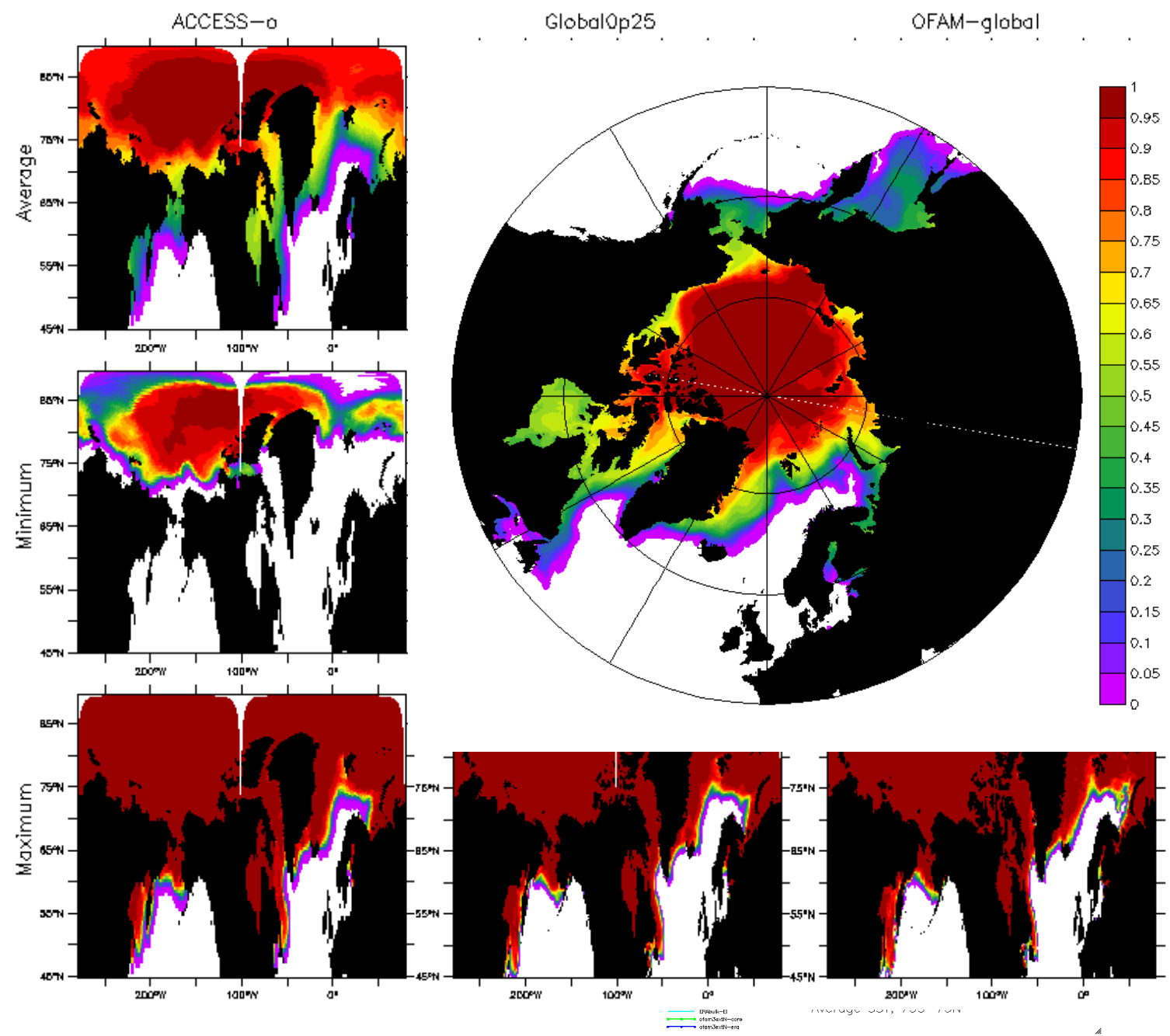






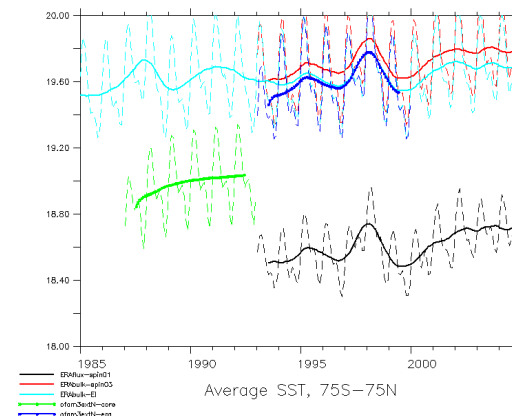
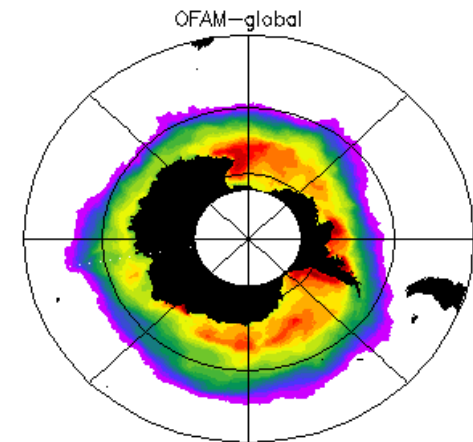
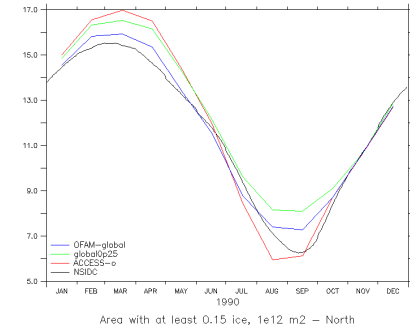
Ice Cover Fraction

- Sea ice extent
  - time
  - model
- SST
  - June
  - September

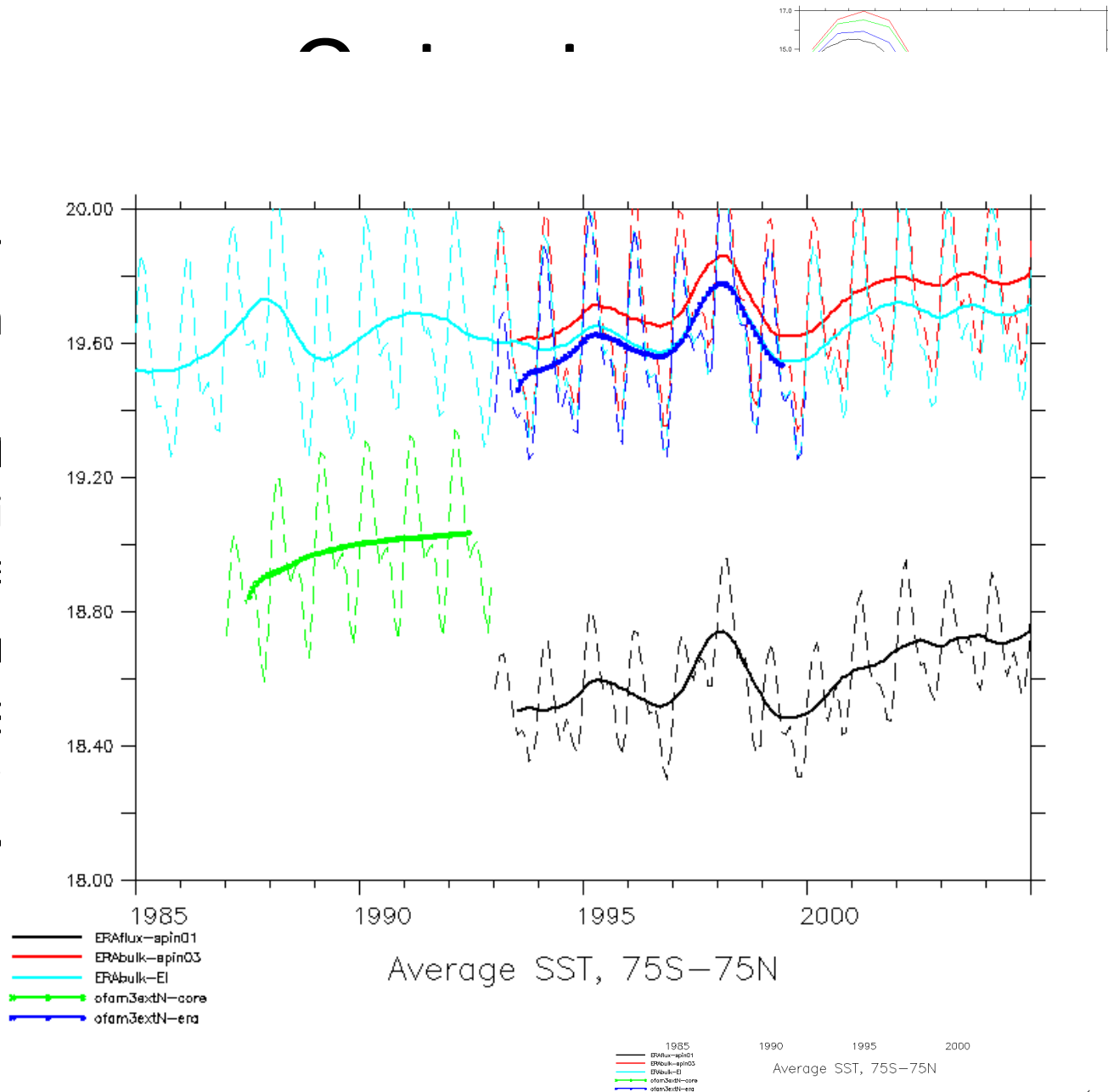


# Output

- Sea ice compared to other CORE1-NY experiments with different resolution.
  - time series of seasonal ice cover consistent with other experiments and obs.
  - maps of ice extent show OFAM and 0.25 experiments are similar.
- SST compared to other OFAM3 experiments
  - jump in SST with switch to ERA,
  - SST consistent with previous OFAM3 with bulk formula.



- Sea ice cor  
experimen
  - time seri  
other exp
  - maps of  
experime
- SST compa
  - jump in S
  - SST cons  
with bulk

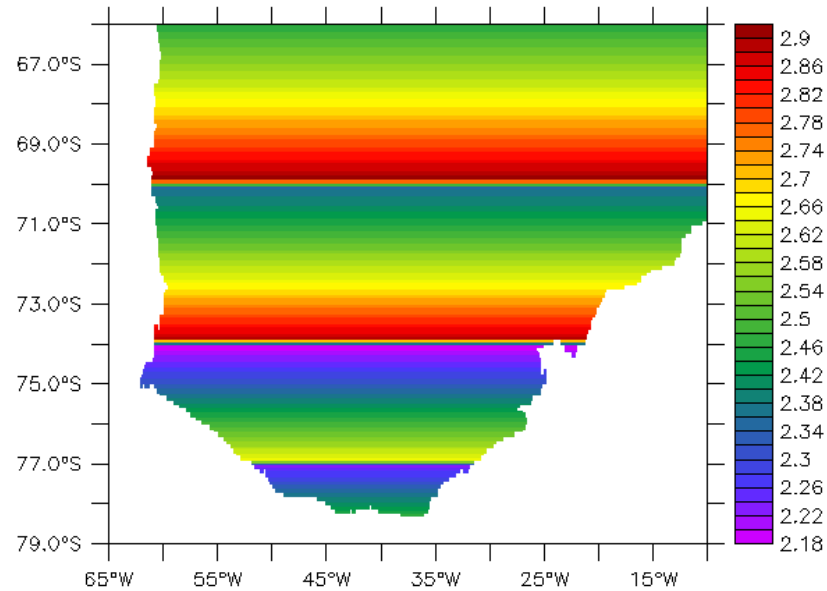


# Summary

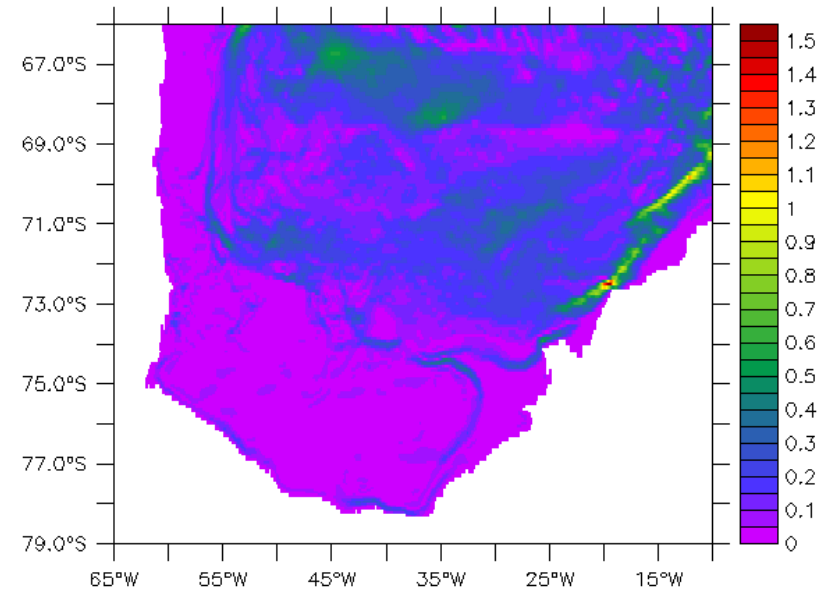
- OFAM has been extended north and south, with sea ice, and is working.
  - extend to south (include Antarctic Seas),
  - extend to north (tripolar grid over Arctic),
  - enabled MOM-SIS model,
  - no need to mask for sea ice in forcing fields,
  - no need for North Atlantic 'wall.'
- Reproducing previous OFAM3.
- Sea ice consistent with other models and observations. Can use 0.25 model to start any ice tuning.
  
- Is this a good time to add more vertical resolution?
- Any comments on biases? and/or fixes!?



# Grid and transport in Weddell Sea



Aspect ratio



Integrated transport



# Ice mass in south

