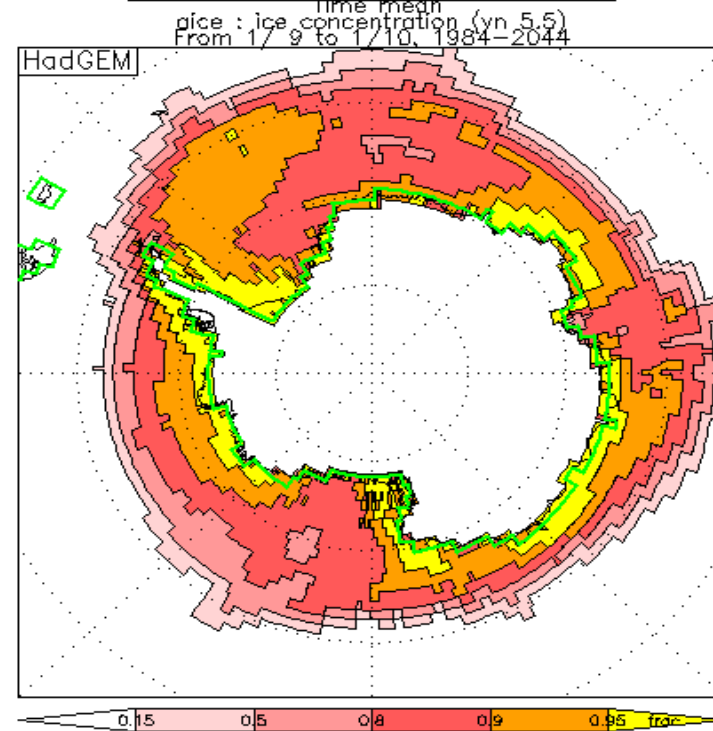
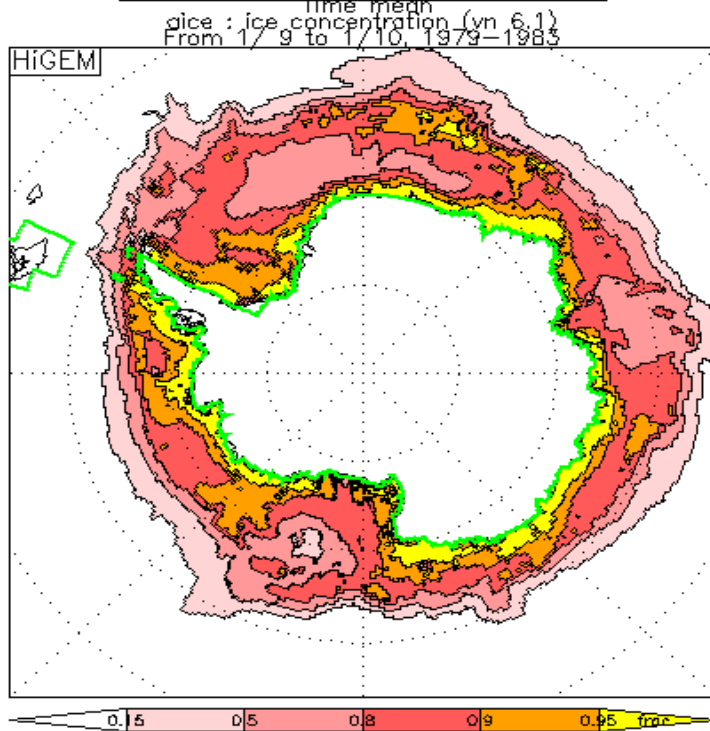
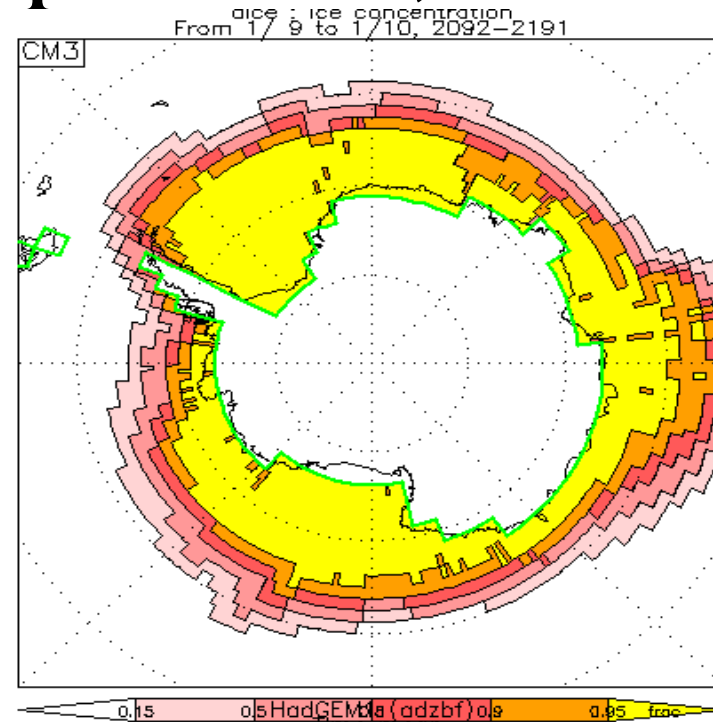
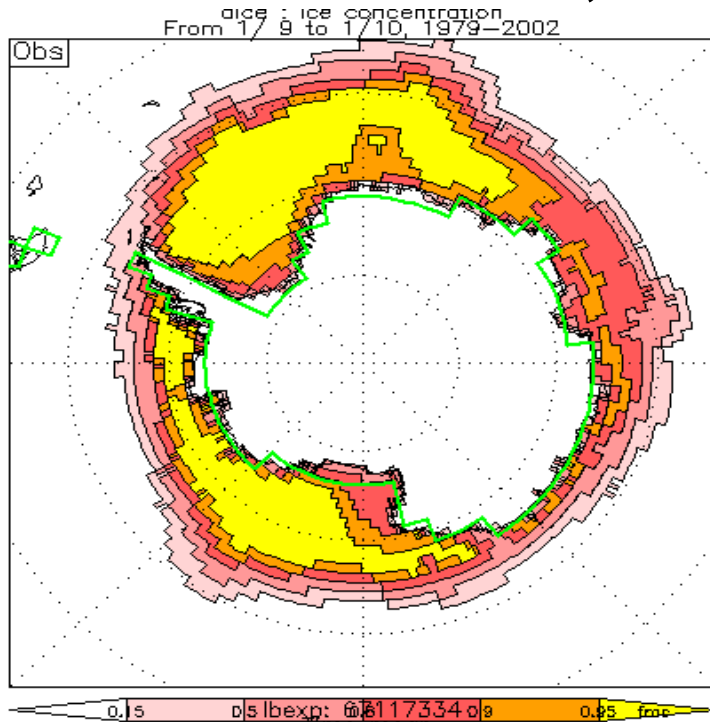


# Sea ice in HiGEM

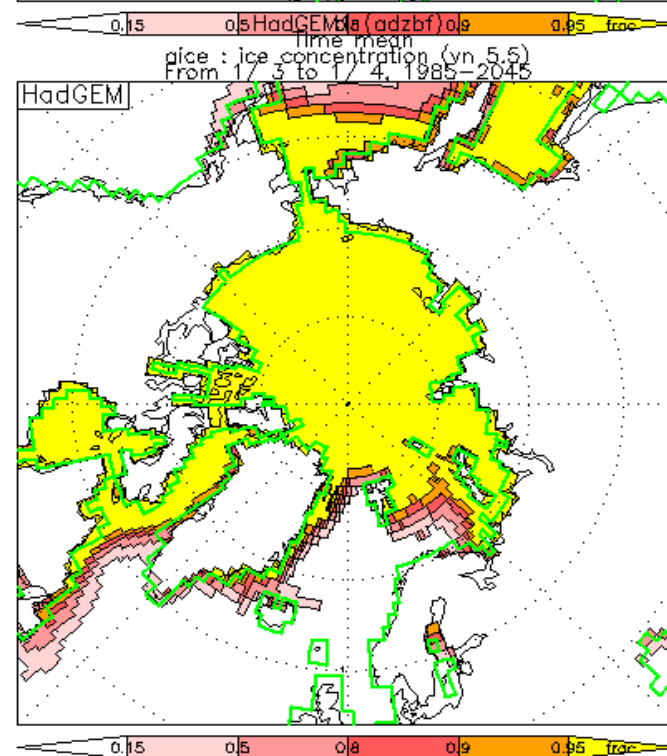
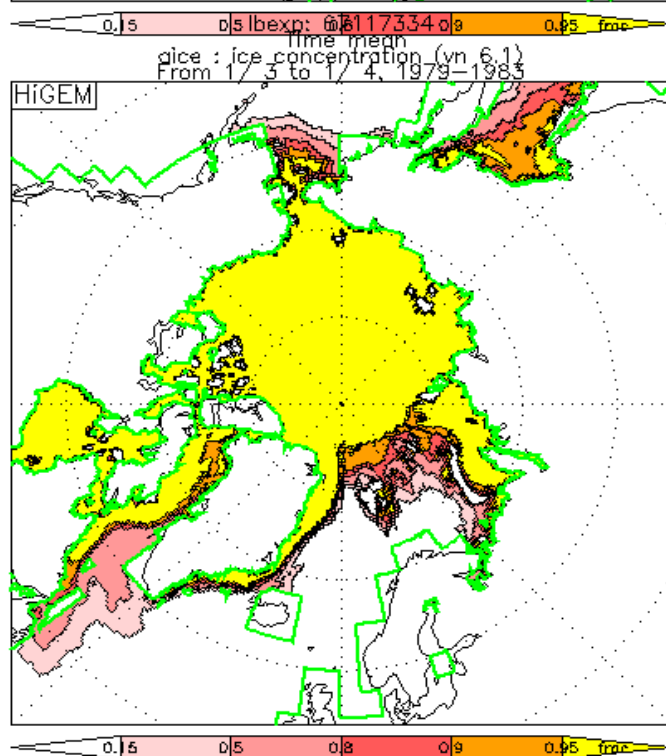
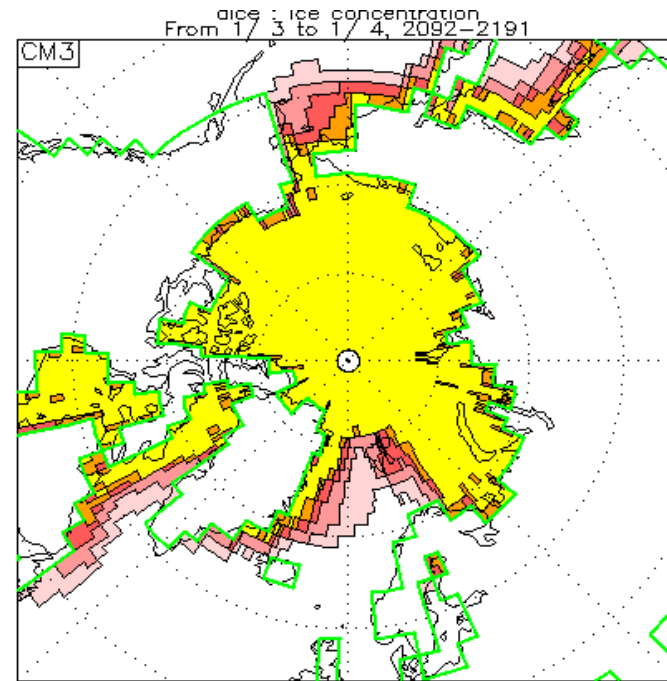
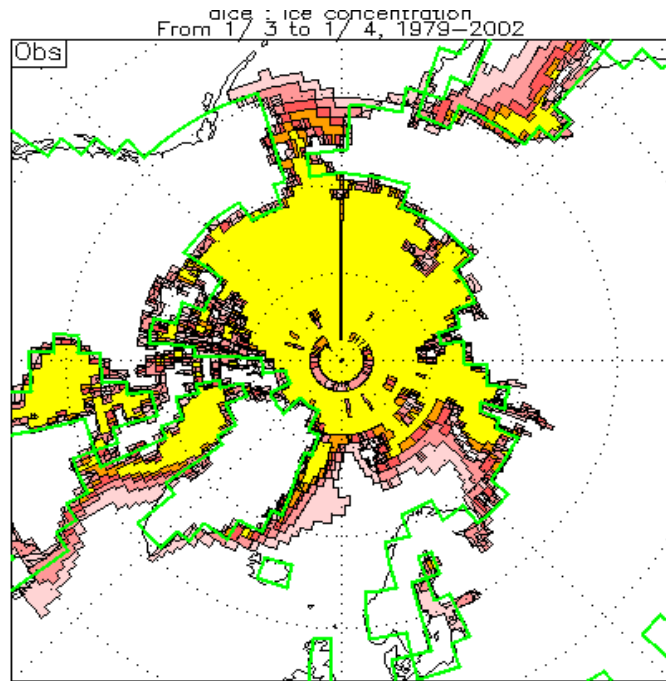
William Connolley and Anna Jrrar, BAS

- HiGEM is HadGEM at higher rez
- $1/3 \times 1/3$  ocean;  $5/4 \times 5/6$  atmos.
- Data is:
  - Obs (Comiso, Bootstrap; Fowler/Emery / Eis)
  - HadCM3 control (aaxzc run at the Hadley Centre)
  - HadGEM1 (adzbf)
  - HiGEM (eacew, Macolm Roberts, run on the Earth Simulator; and sometimes bxrb Warwick Norton, UK). Note that eacew is only 5 years (my data) though it has run 8.
- Thanks: Hadley Folk; HiGEM (esp MR)

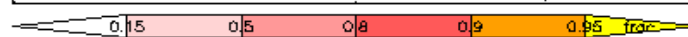
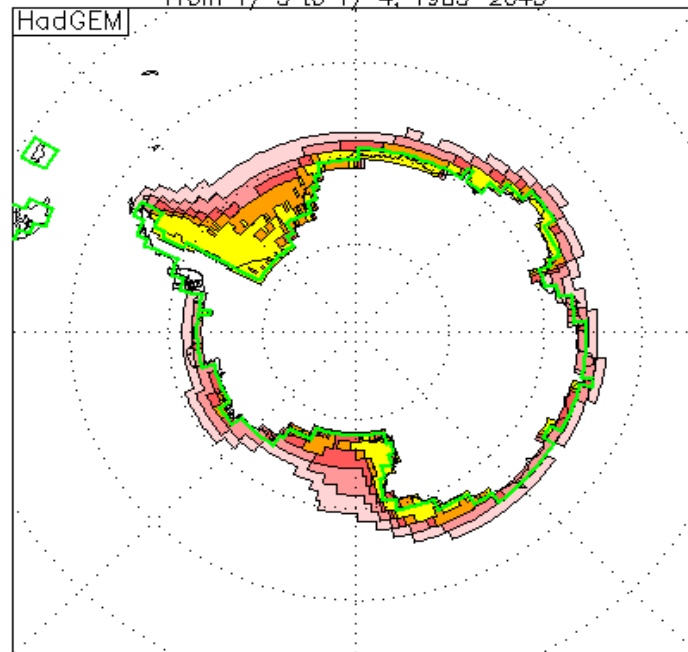
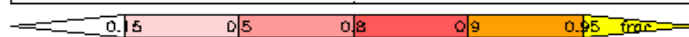
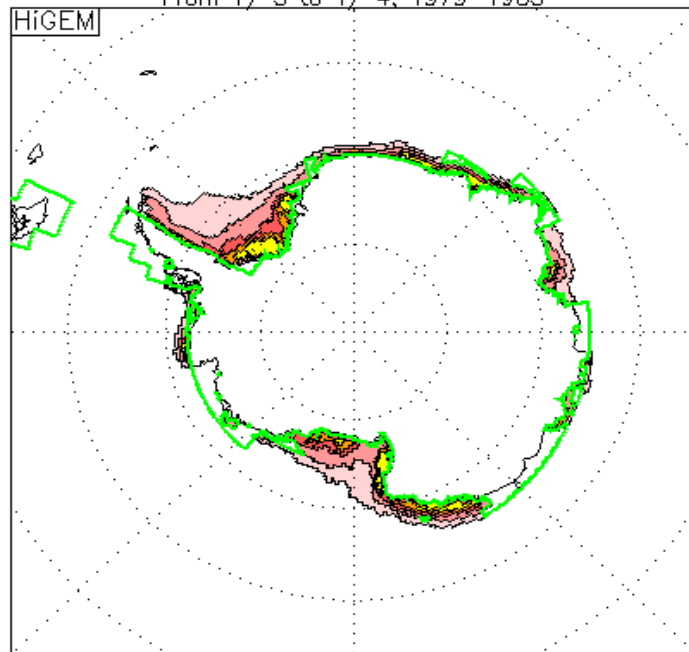
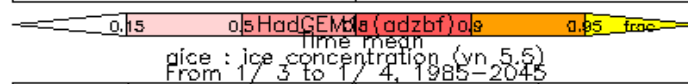
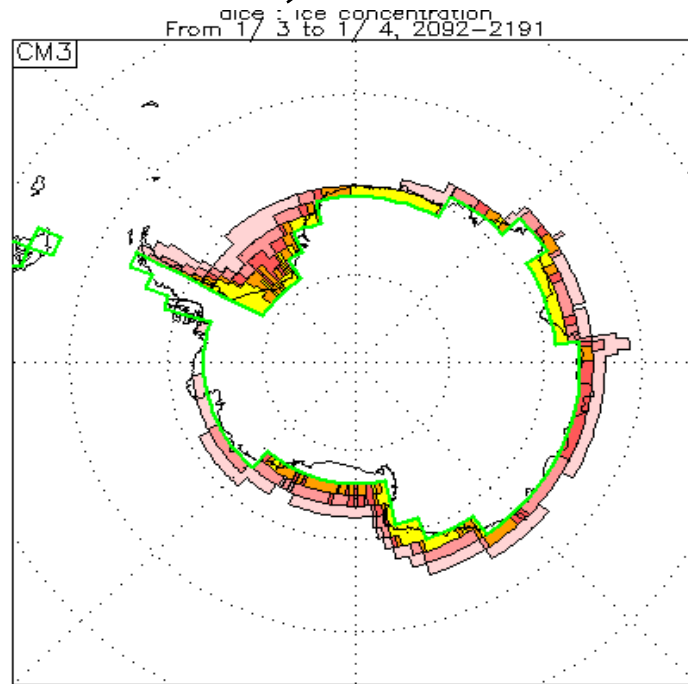
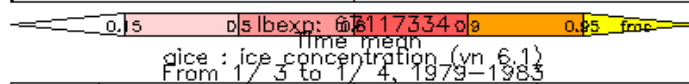
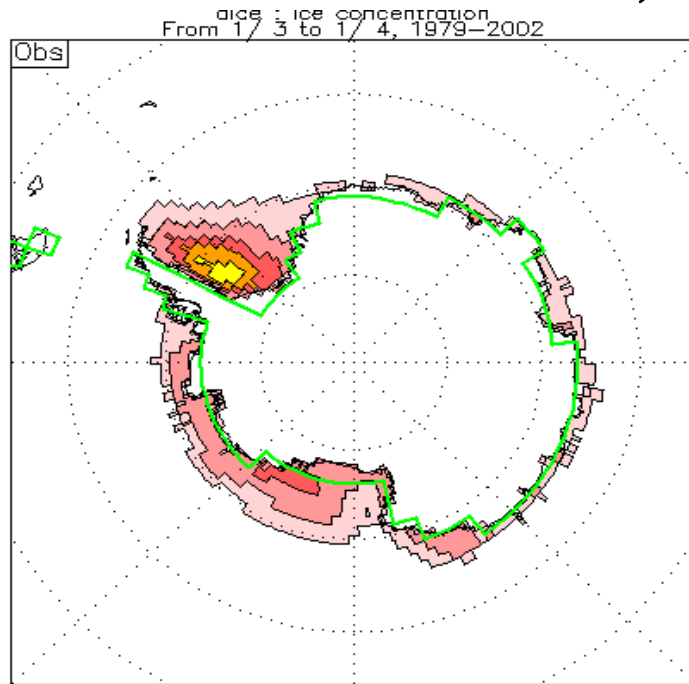
# Fraction, September, SH



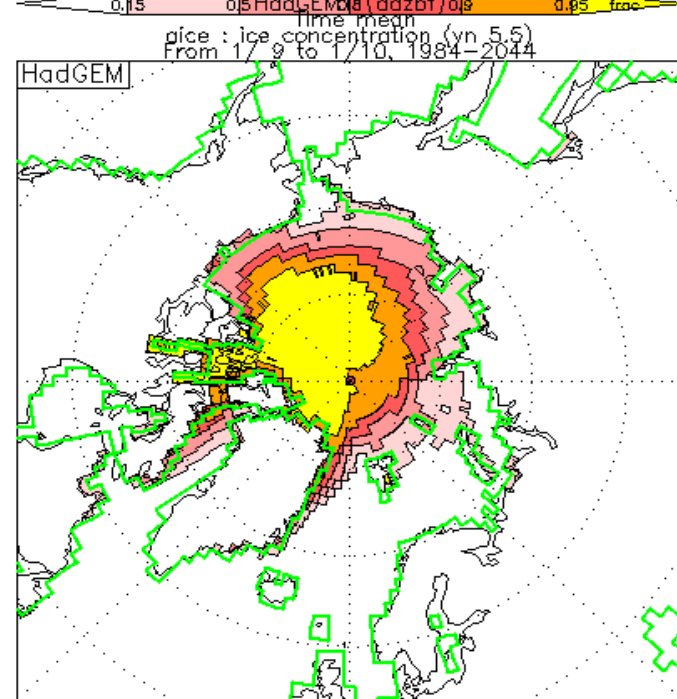
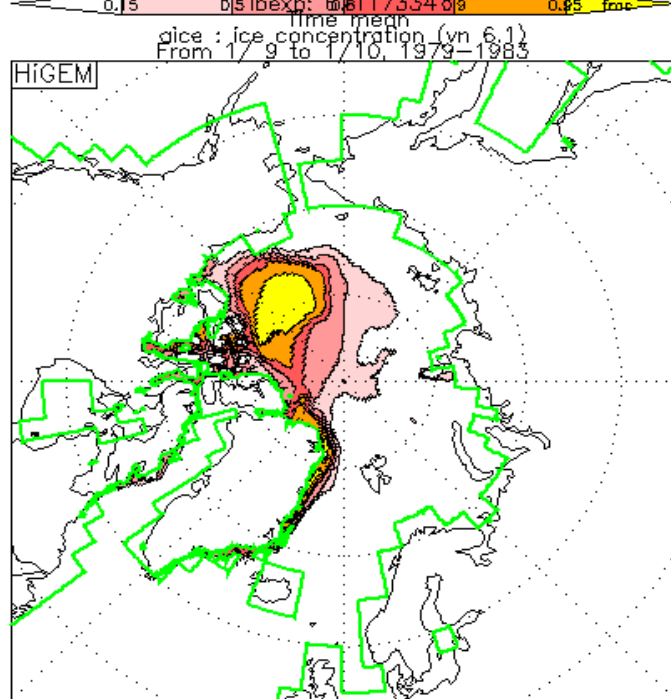
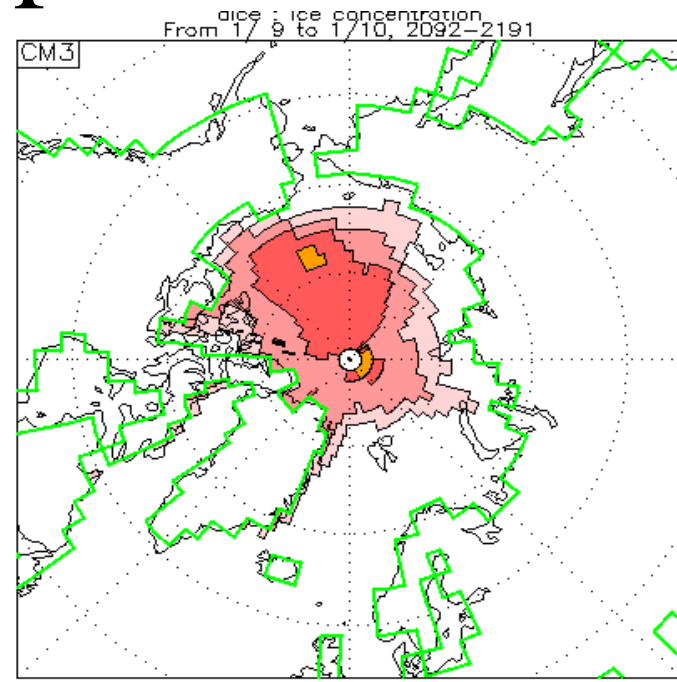
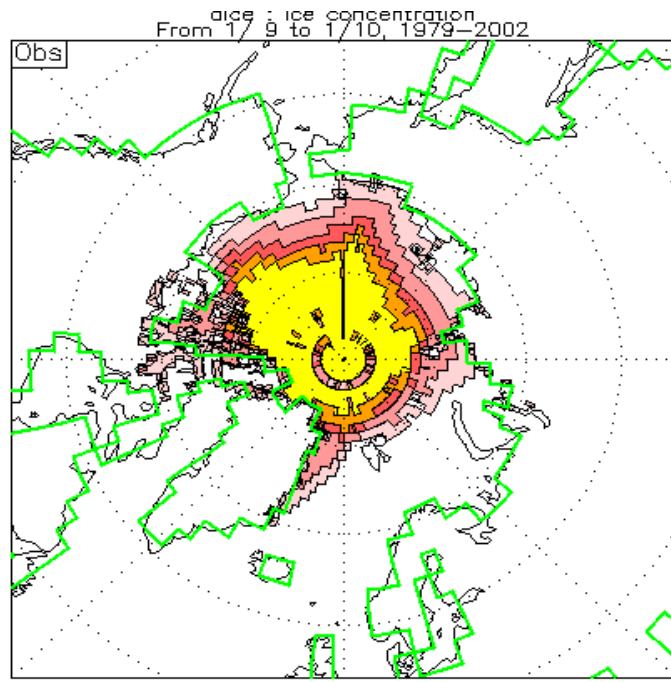
# Fraction, March, NH



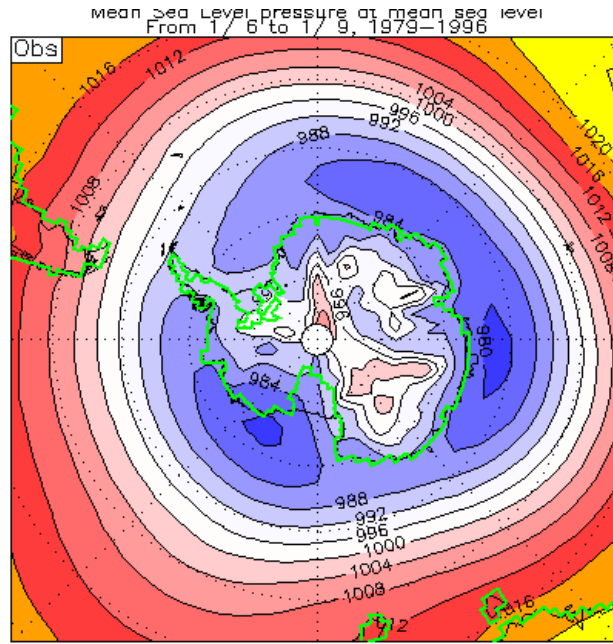
# Fraction, March, SH



# Fraction, September, NH



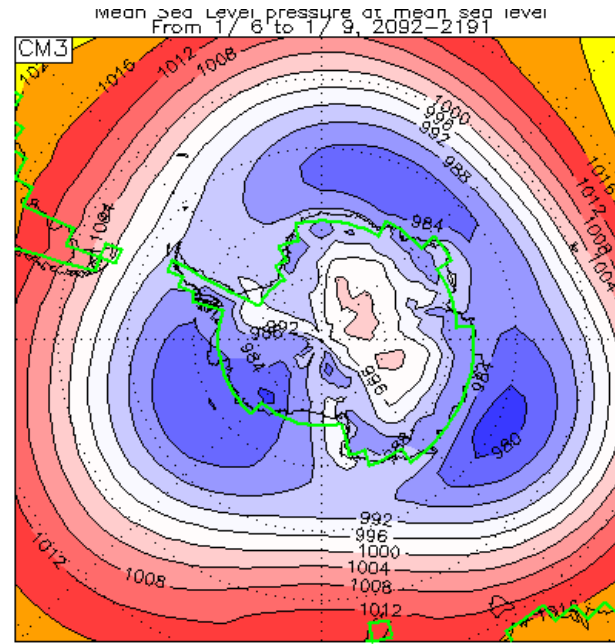
# MSLP, JJA



972 980 988 996 1004 1012 hPa

time mean

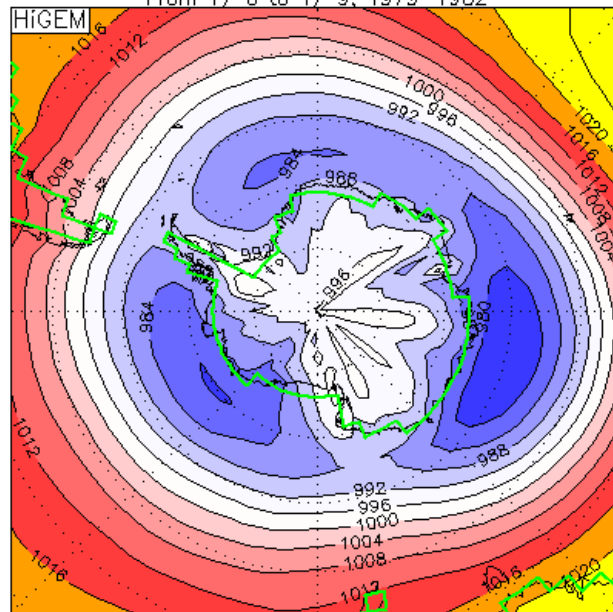
Mean Sea Level pressure at mean sea level (vn 5.5)  
From 1/6 to 1/9, 1979-1996



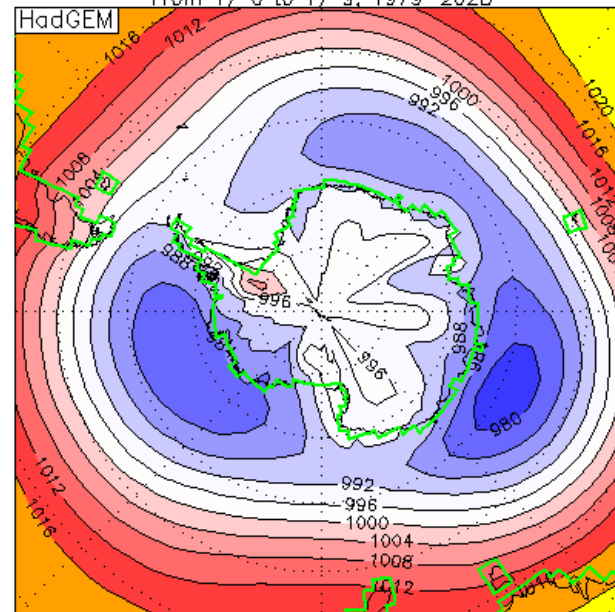
972 980 988 996 1004 1012 hPa

time mean

Mean Sea Level pressure at mean sea level (vn 5.5)  
From 1/6 to 1/9, 1979-2028



972 980 988 996 1004 1012 hPa

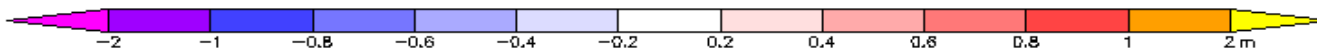
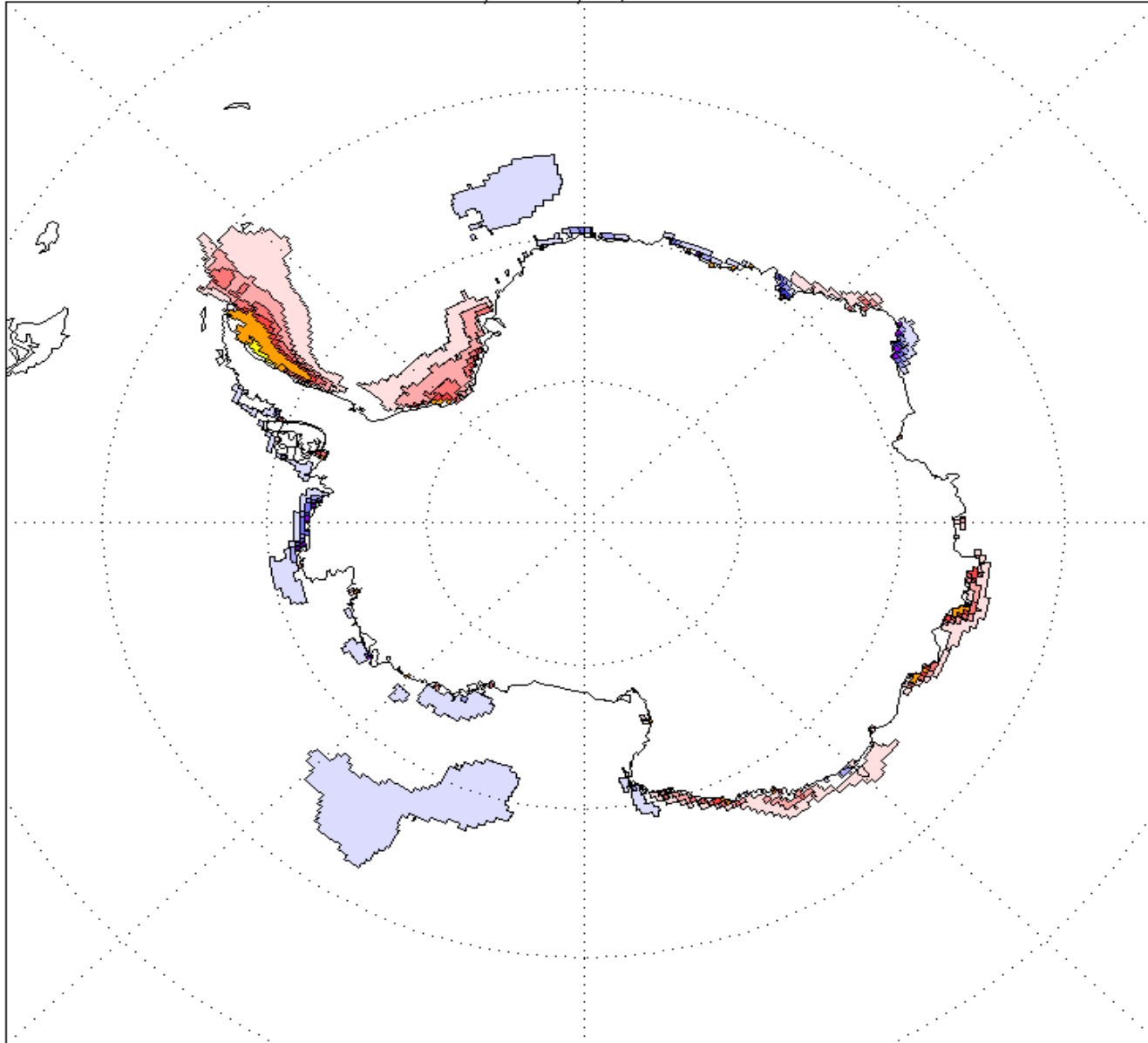


972 980 988 996 1004 1012 hPa

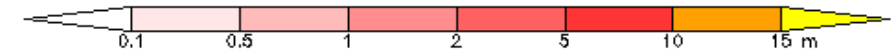
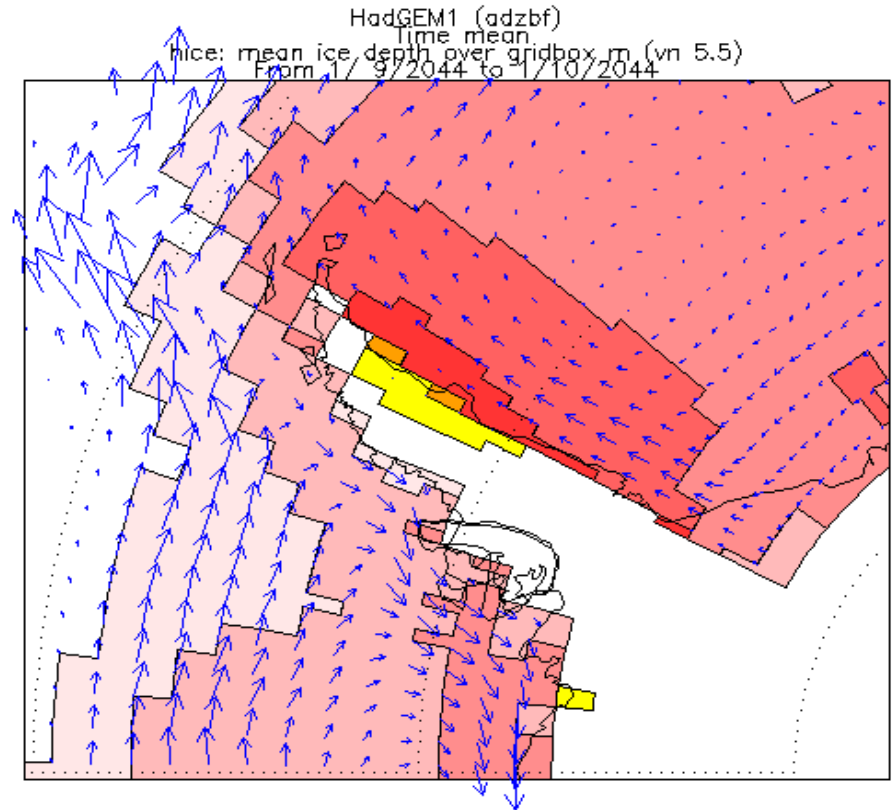
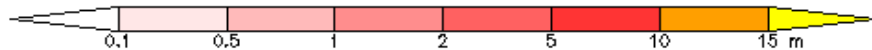
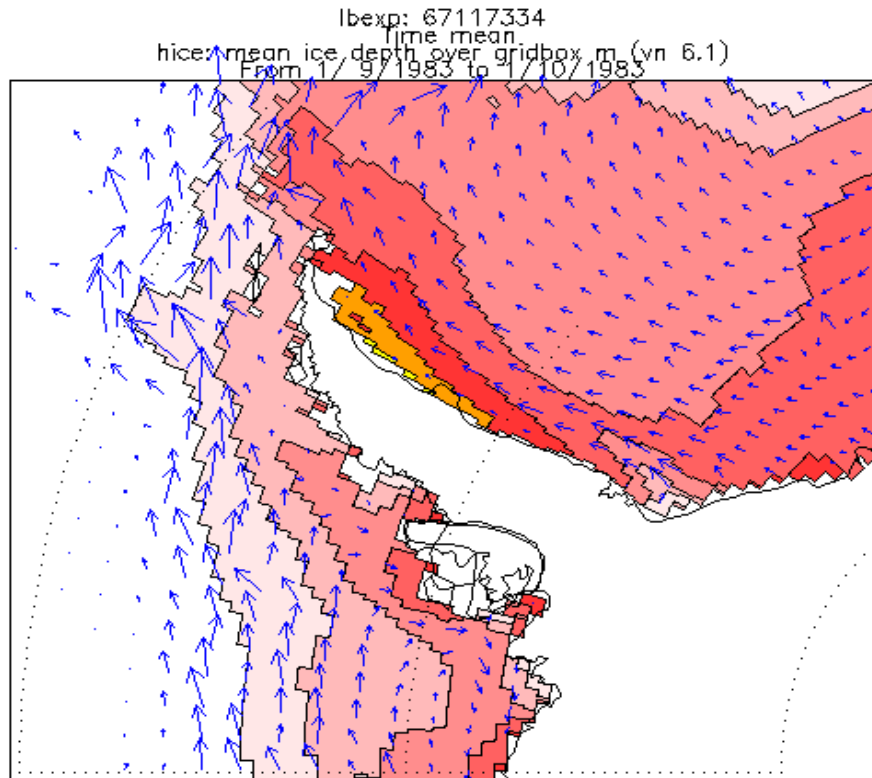
# Thickness trend, September

(Thanks: James Harle at NOC)

ibexp: 67117334  
Difference Time mean  
hice: mean ice depth over gridbox, m (vn 6.1)  
From 1/9 to 1/10, 1979-1983

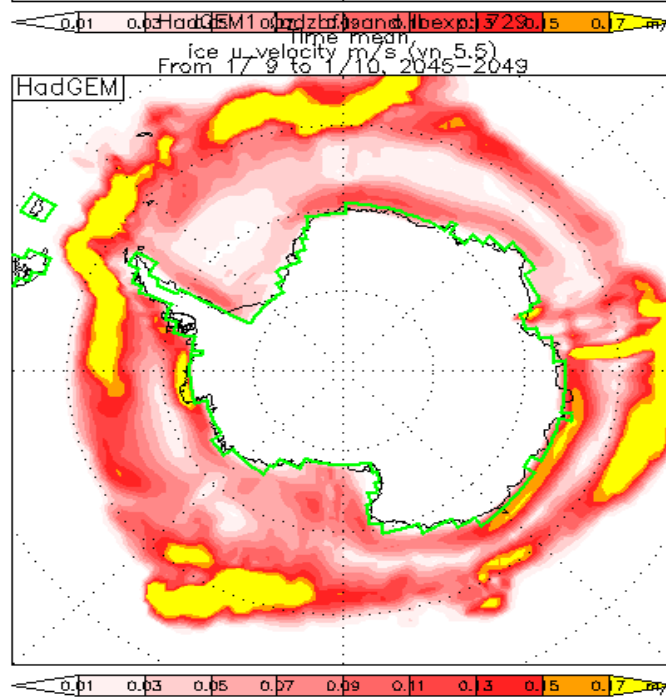
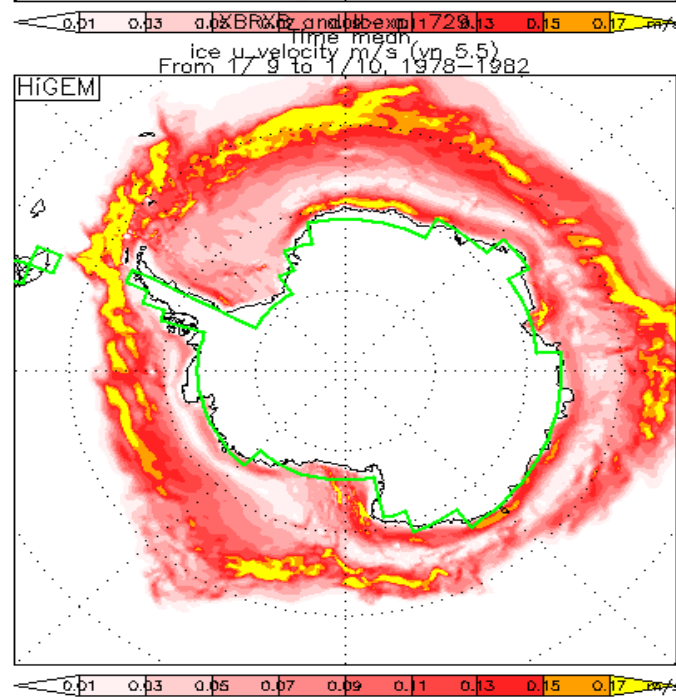
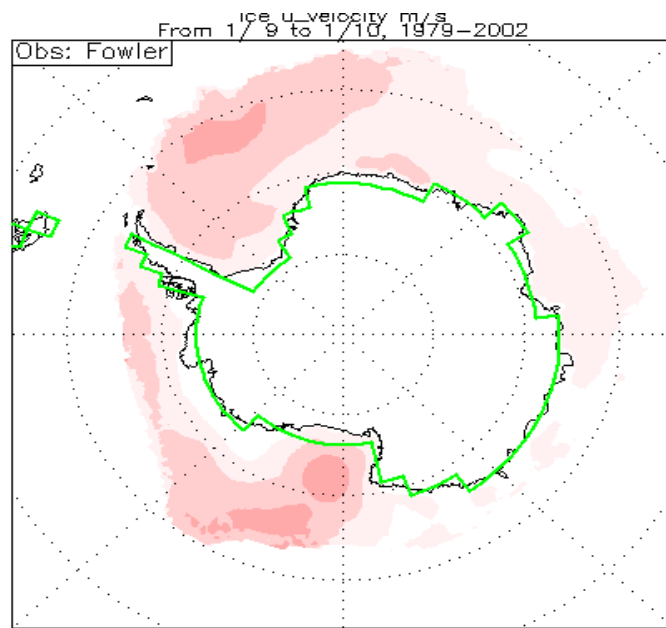
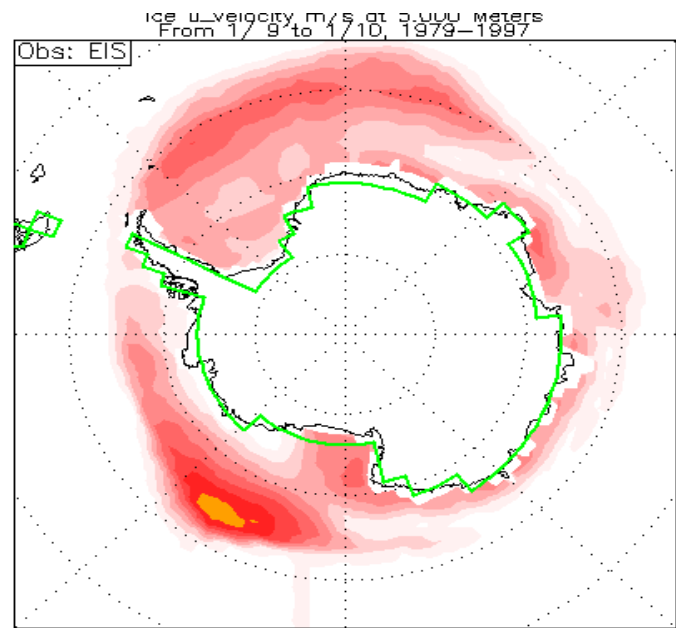


# Weddell thickness, Hi- & Had-GEM



- Similar, but HiGEM after 5y and HadGEM after 50

# Ice speed



- HiGEM similar to HadGEM
- Both faster than obs but major diffs in obs
- Nice detail in HiGEM

# Crashes in the sea ice code (MR)

- HiGEM has shown a tendency to crash in the sea ice code, especially around the north pole. The 8-y run is currently stopped because of this.
- Due to a combination of high speeds (30-40 cm/s) and small grid cells leading to CFL problems
- In the long term, getting rid of the polar singularity would be a good idea.
- Scientifically, finding the cause of the high ice speeds and reducing them would be sensible (perhaps just arbitrarily limit to 20 cm/s for the while).
- Computationally, adjusting the grid near the pole, or filtering, may be the answer.

# Conclusions

- HiGEM works
- It produces sea ice similar to HadGEM1
- Issues: crashes; NH summer; thickness trends
- To do: investigate issues; tuning (slow)
- To do: examine what we're getting with the hirez