

Impacts of Physical
Parameterizations in Global UW
Hybrid Model Simulations

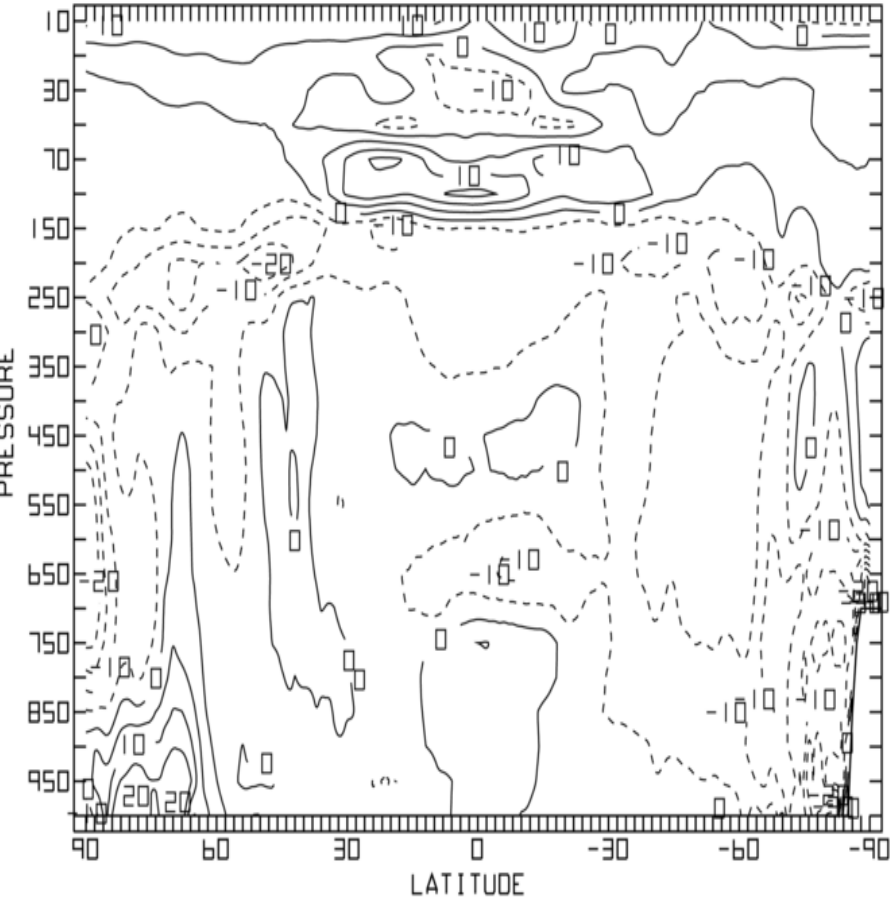
Allen Lenzen

Space Science and Engr Center

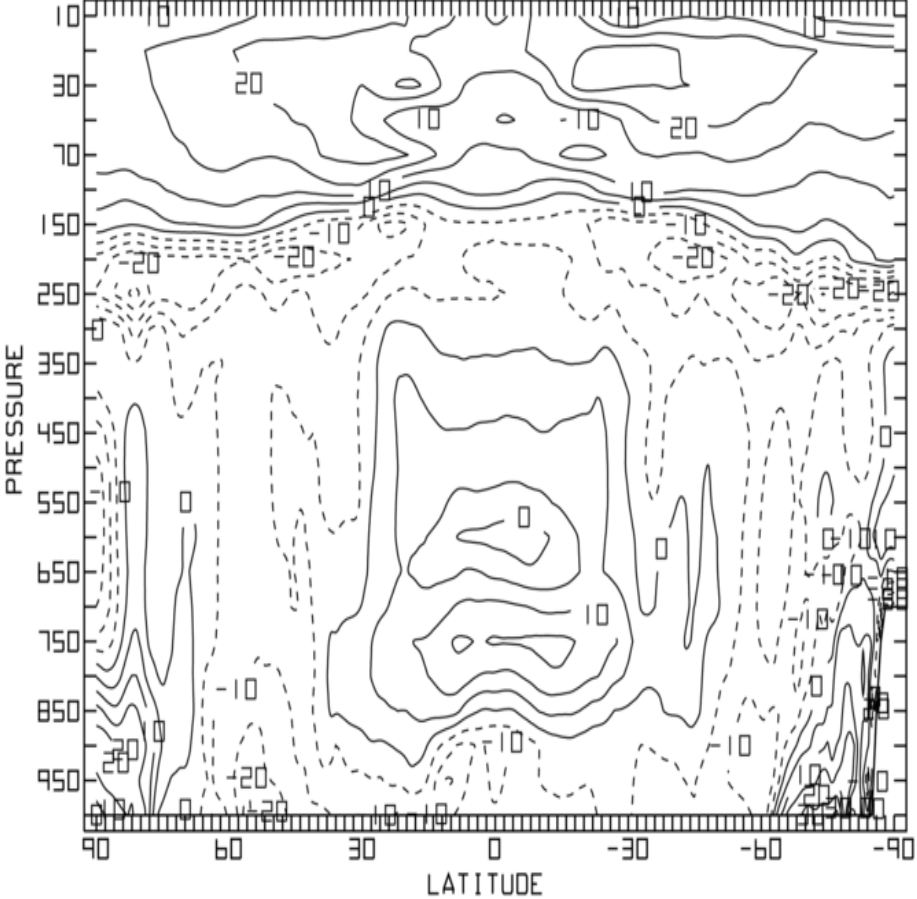
University of Wisconsin - Madison

- Forecast for April 2008
- 1x1 horizontal resolution
- 24 isentropic layers, 24 eta layers
- Isentropic 339 K to 3300 K
- Start dates 01 00z, 06 06z, 11 12z, 16 18z
- 21 00z, 26 06z, 30 12z
- 3 Model physics used in UW hybrid model
- GFS (May 1 2007 version), CAM3, CCM3
- Look at day 5 forecast
- Forecast – Observation averaged over 7 cases

Forecast – Observation Temperature (.5K)



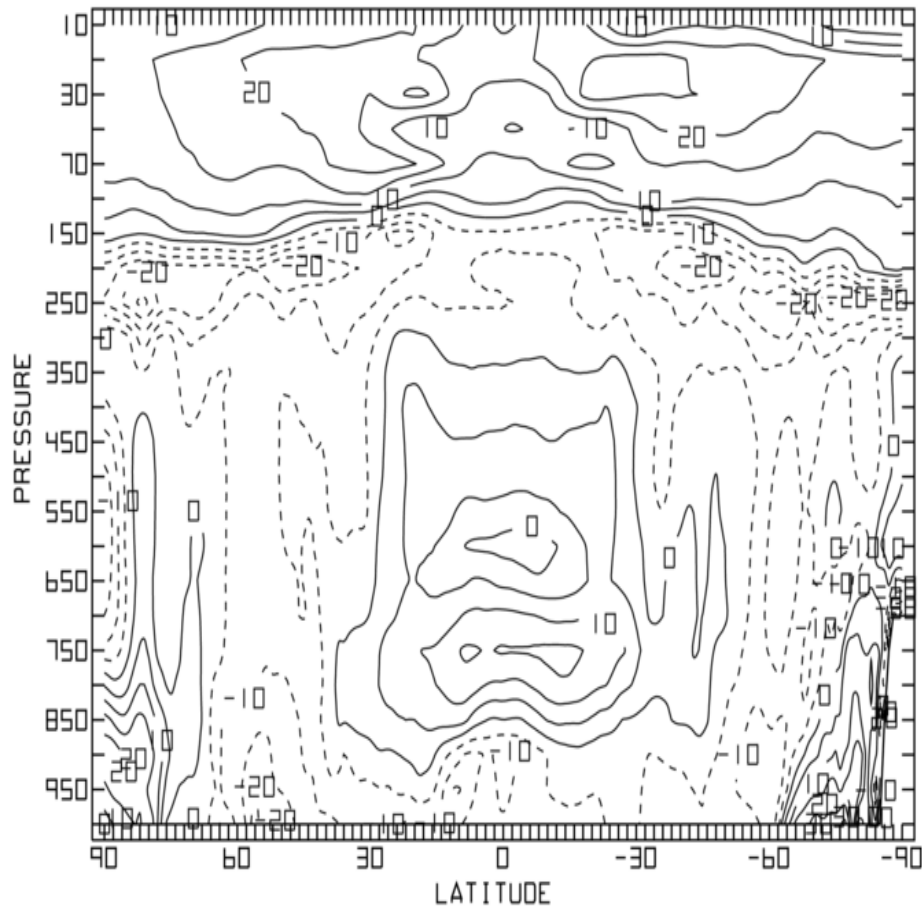
GFS Physics



CAM3 Physics

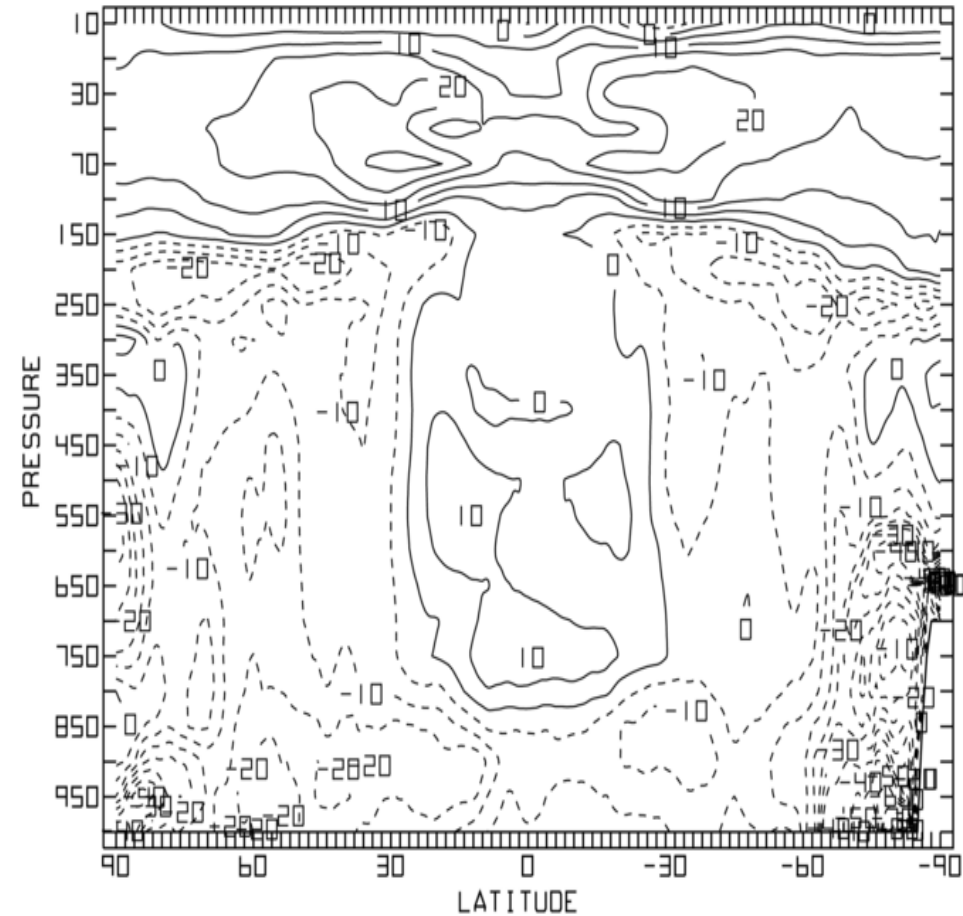
Day 5

Forecast – Observation Temperature (.5K)



CAM3 Physics

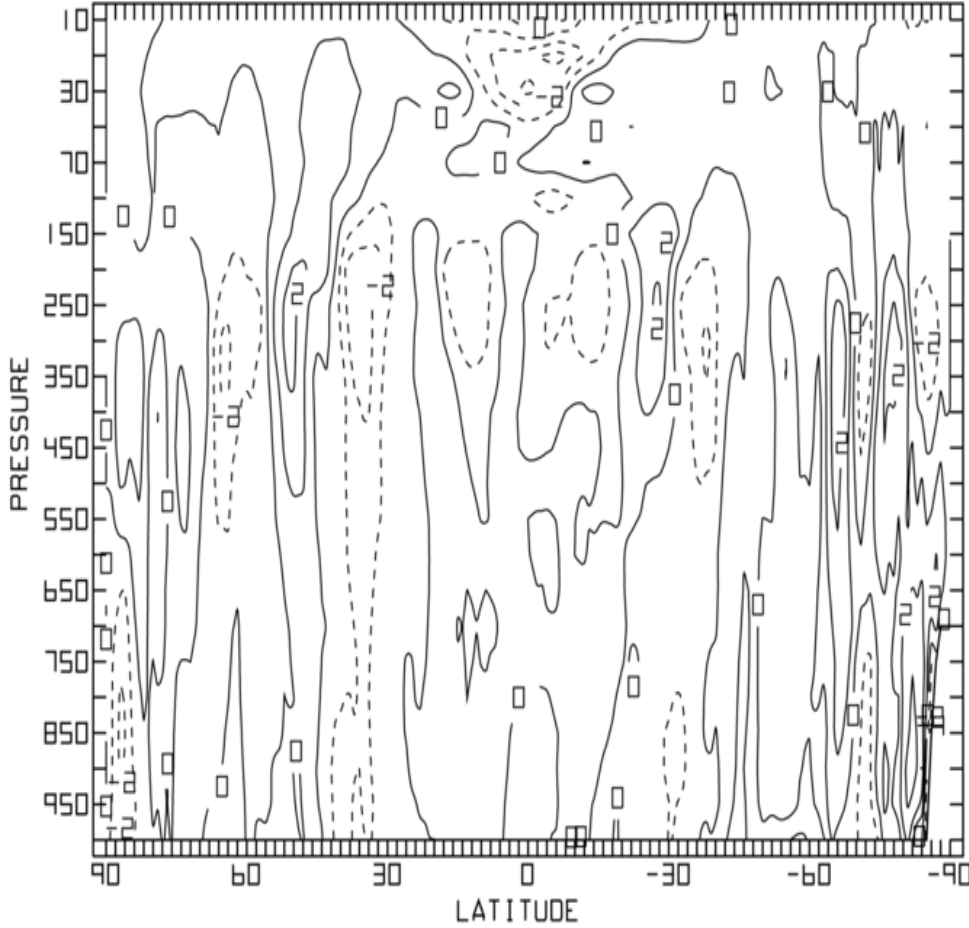
Day 5



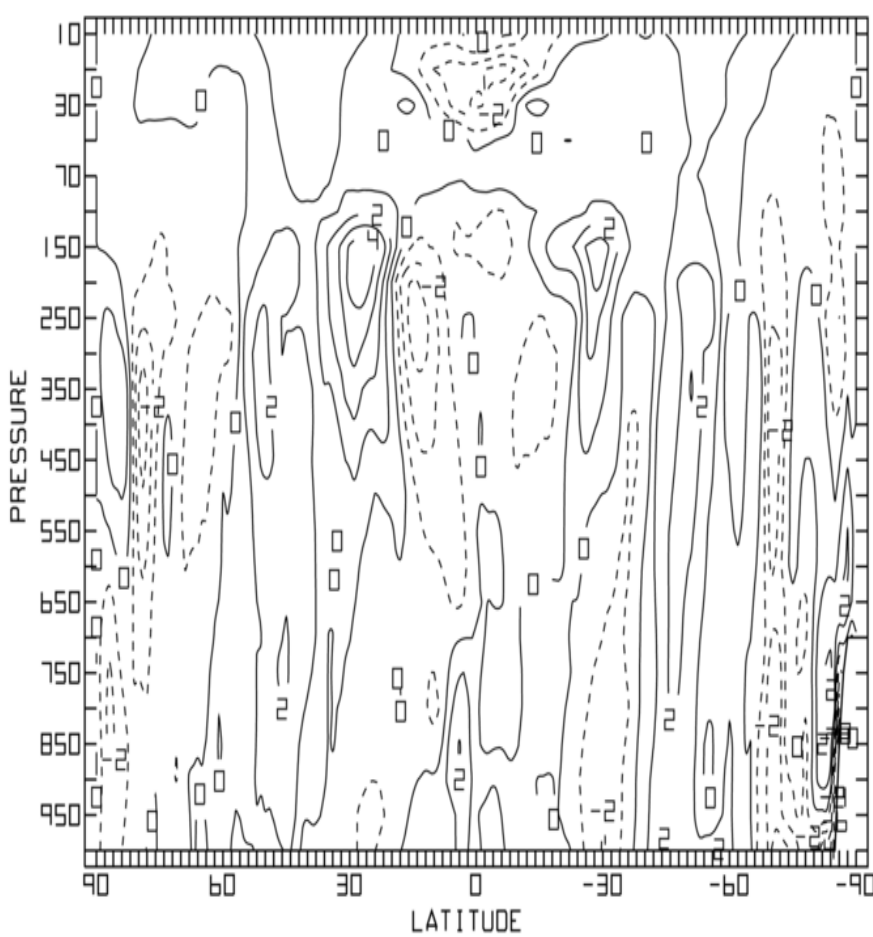
CCM3 Physics

Note warmer polar temperatures. CCM3 can have only seaice or ocean
While CAM3 can have both.

Forecast – Observation U-WIND (m/sec)



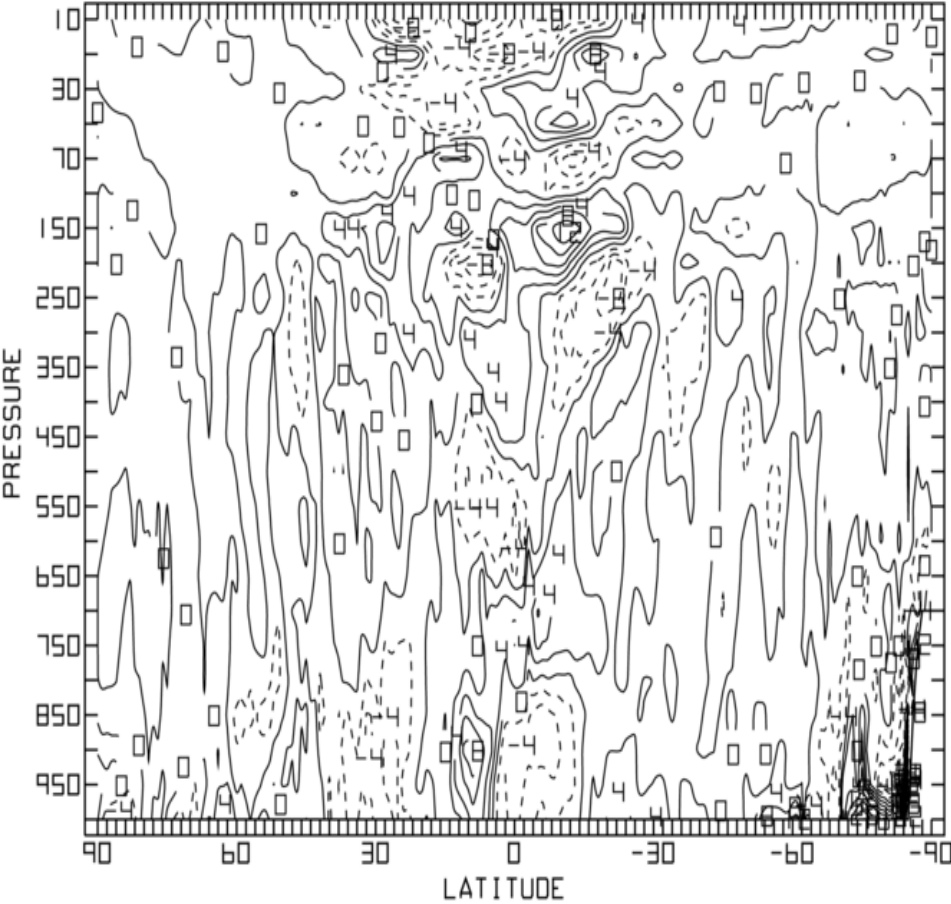
GFS Physics



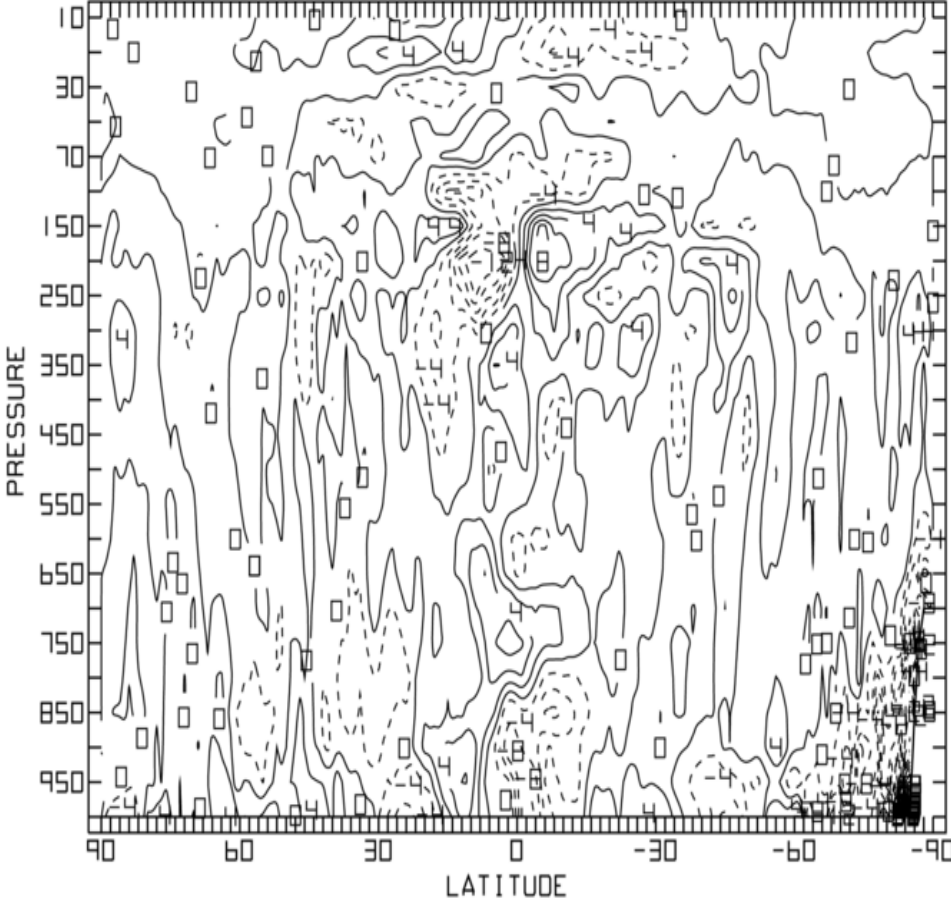
CAM3 Physics

Day 5

Forecast – Observation V-WIND (m/sec)



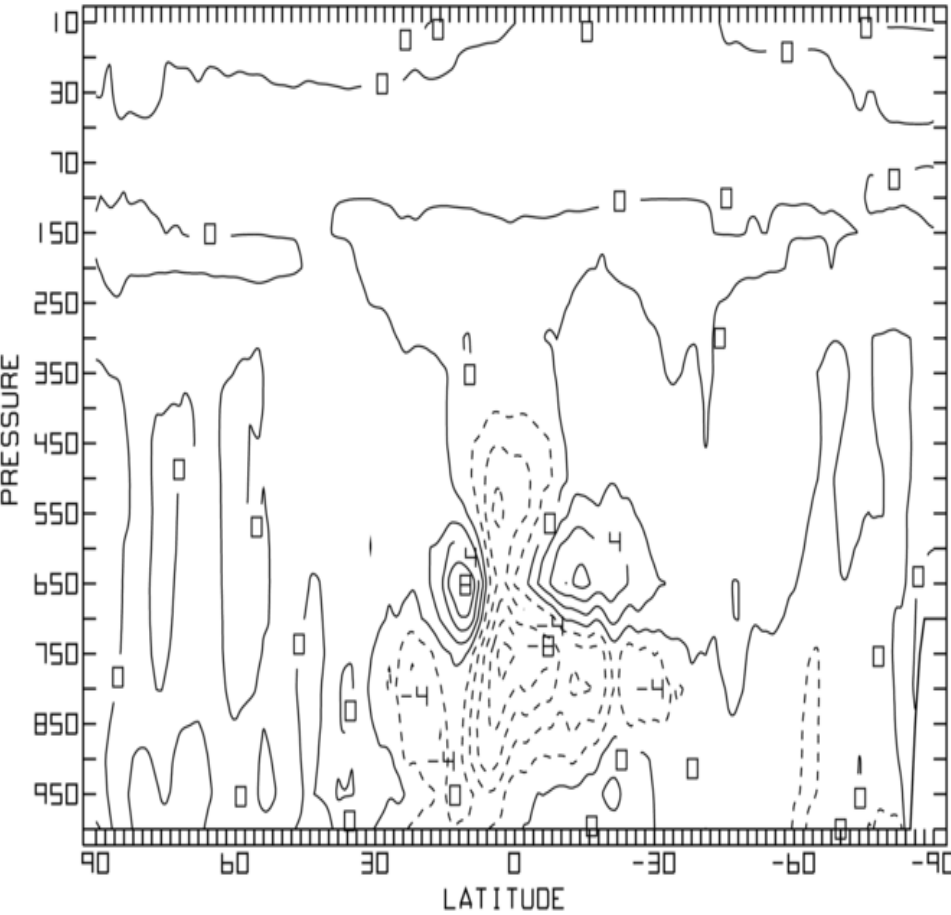
GFS Physics



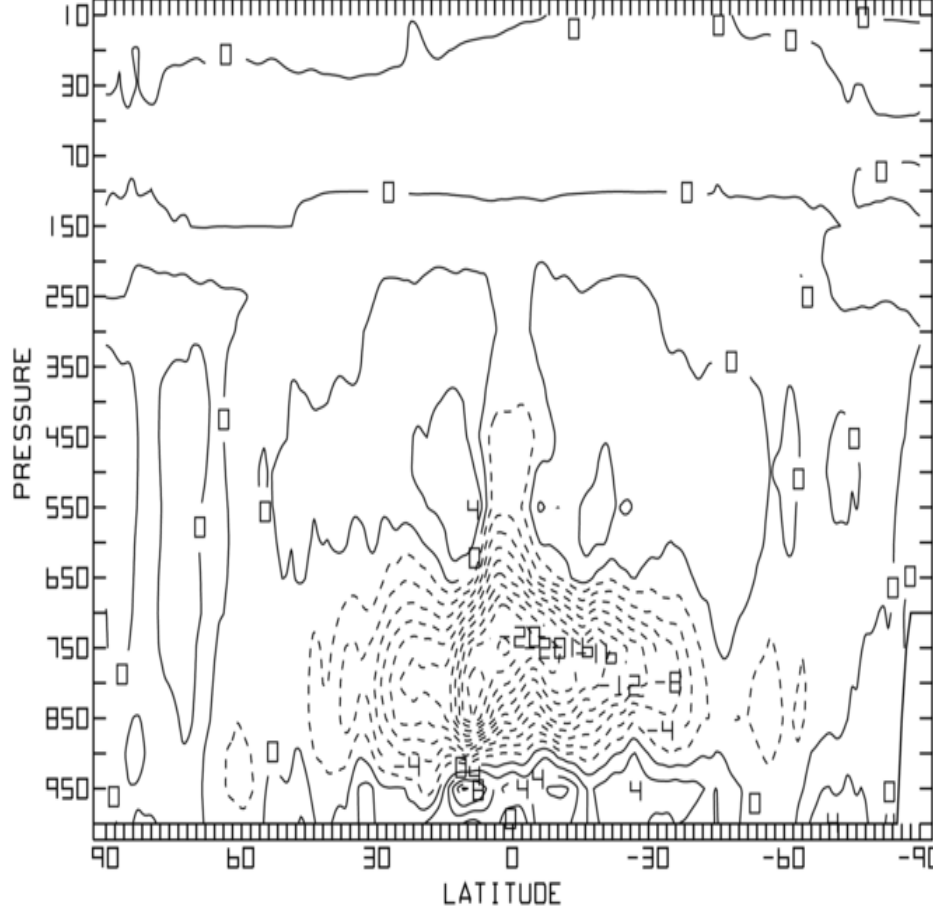
CAM3 Physics

Day 5

Forecast – Observation Q ($1.e-4$ Kg/Kg)



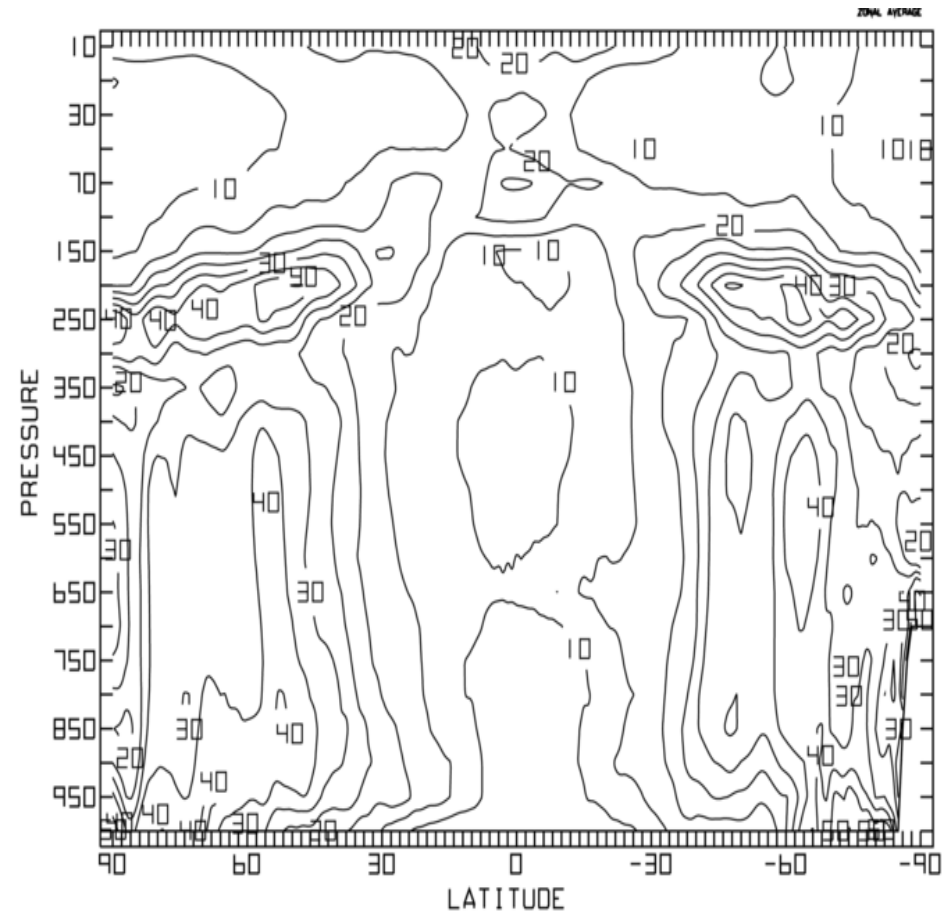
GFS Physics



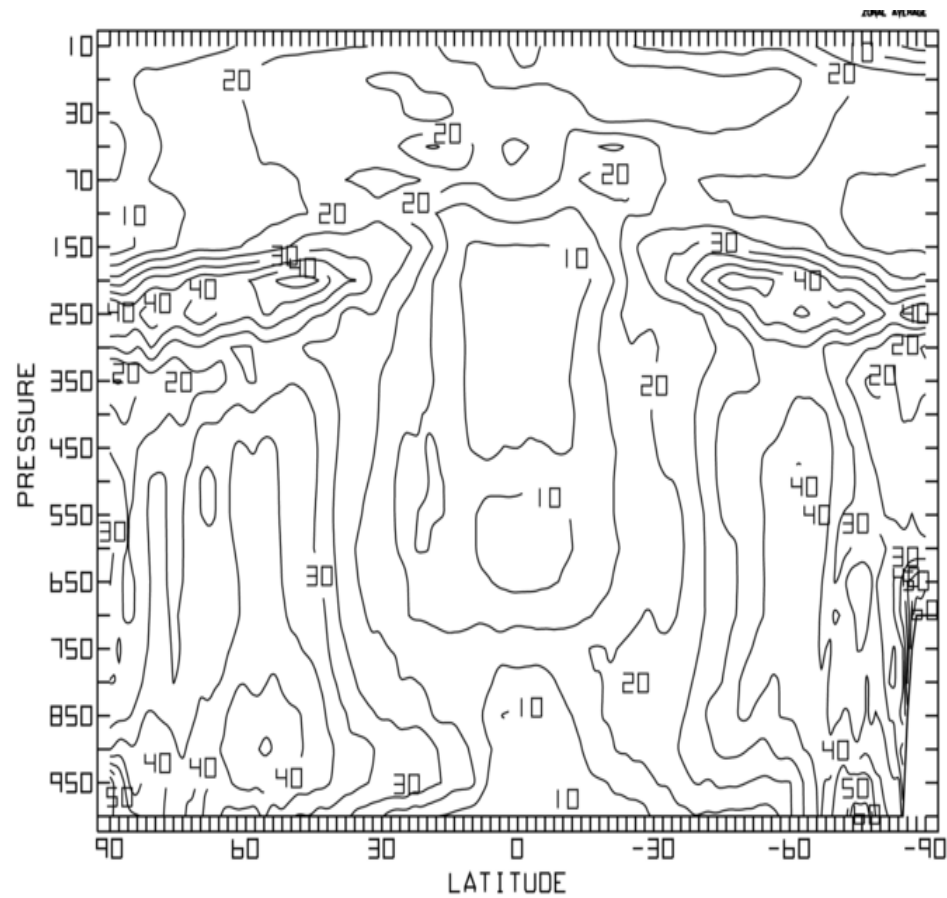
CAM3 Physics

Day 5

Zonal average root mean square (F-O) Temperature



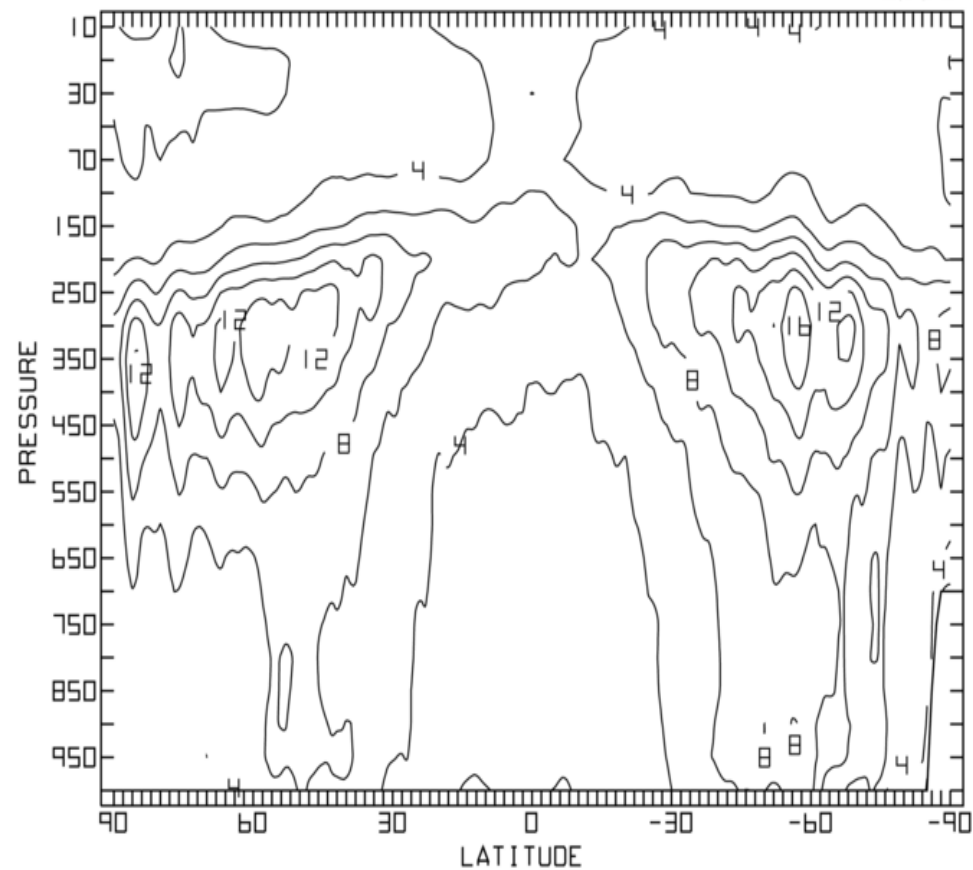
GFS Physics



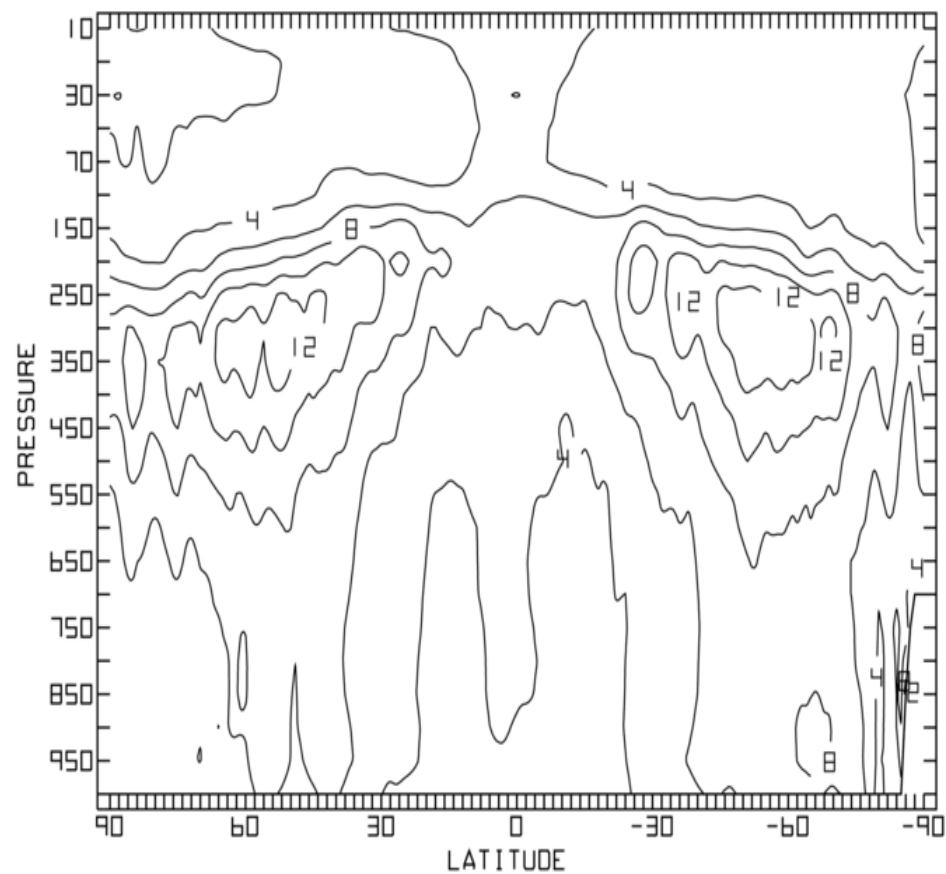
CAM3 Physics

Day 5

Zonal average root mean square (F-O) U Wind



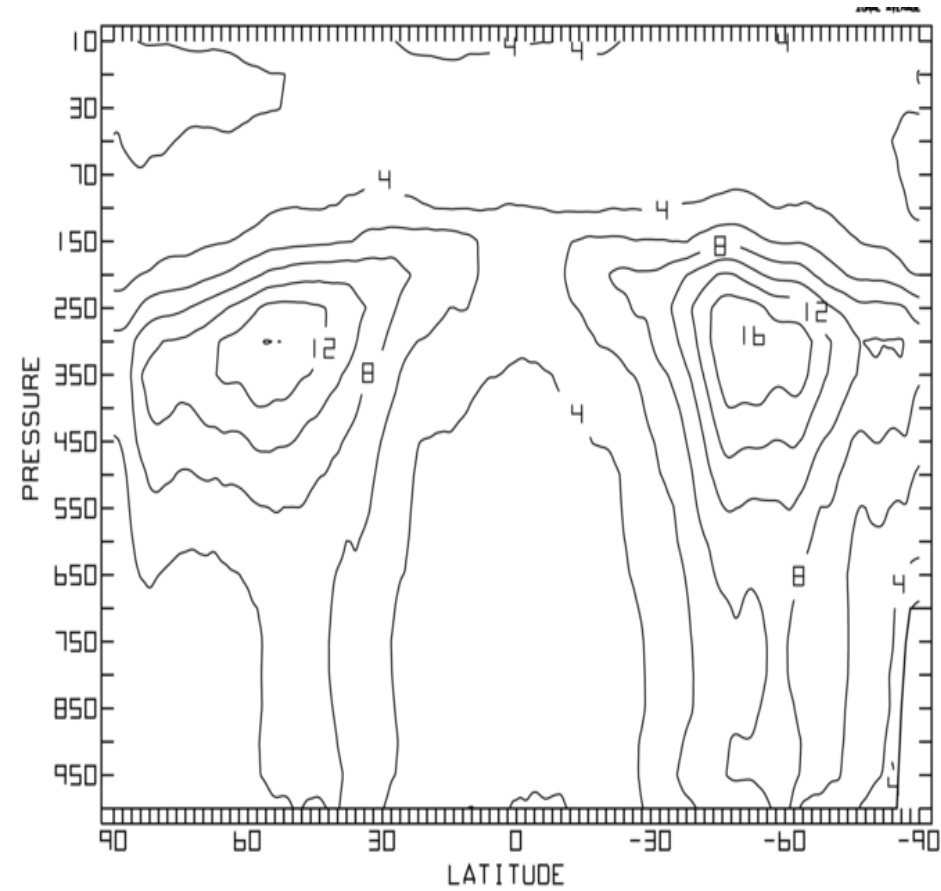
GFS Physics



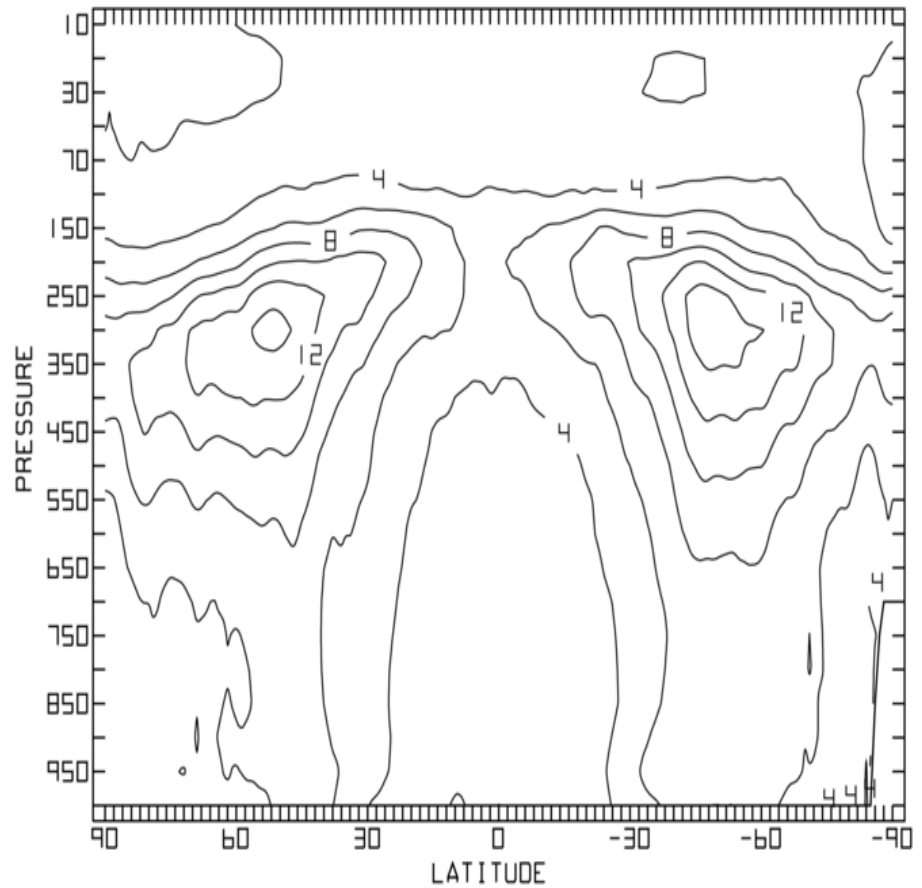
CAM3 Physics

Day 5

Zonal average root mean square (F-O) V Wind



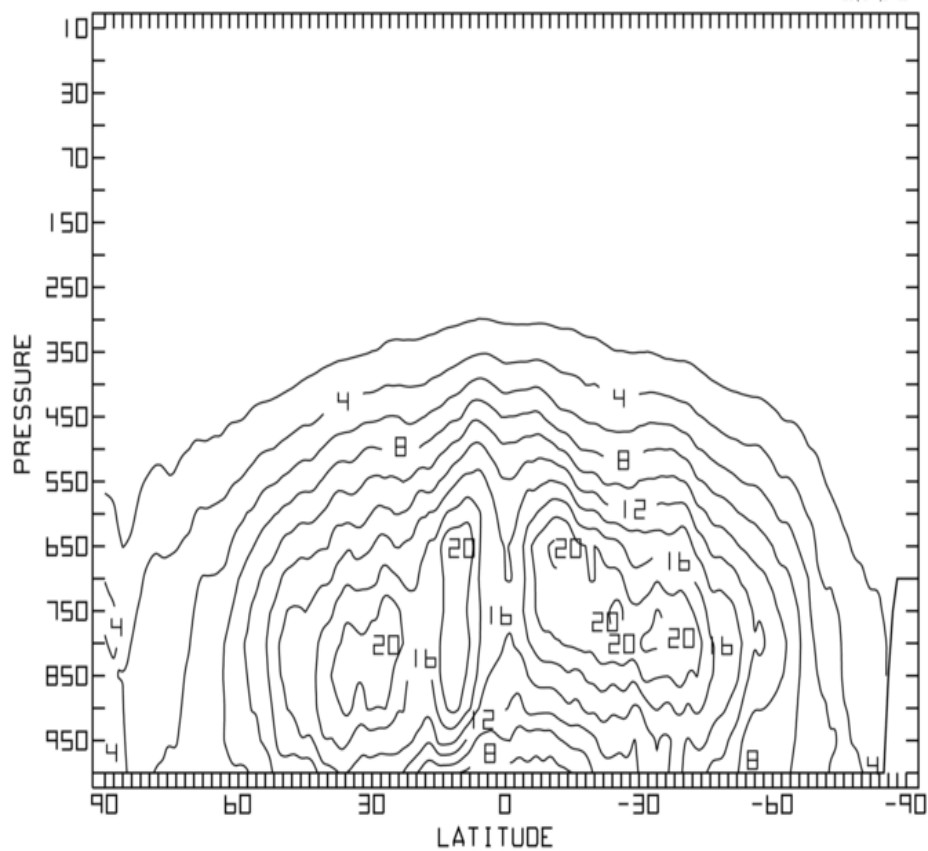
GFS Physics



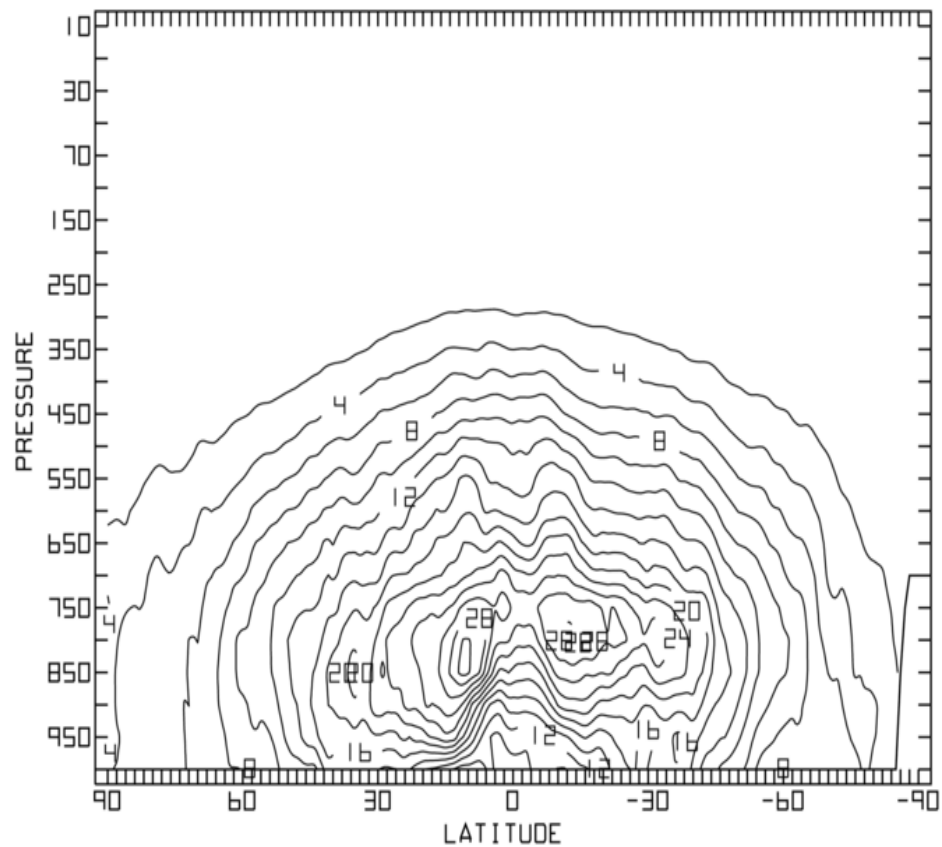
CAM3 Physics

Day 5

Zonal average root mean square (F-O) Q ($2.e-4$ KG/KG)

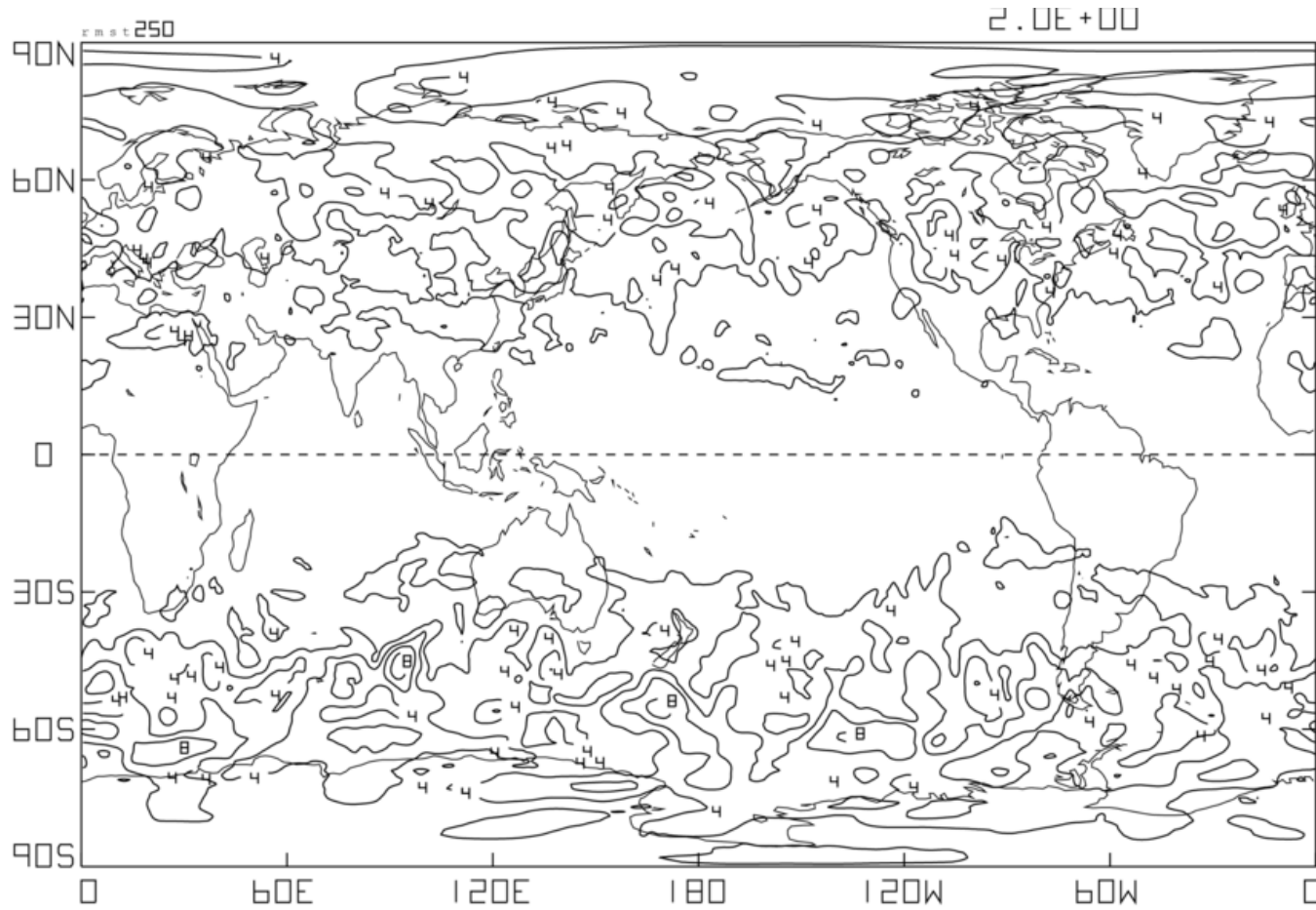


GFS Physics

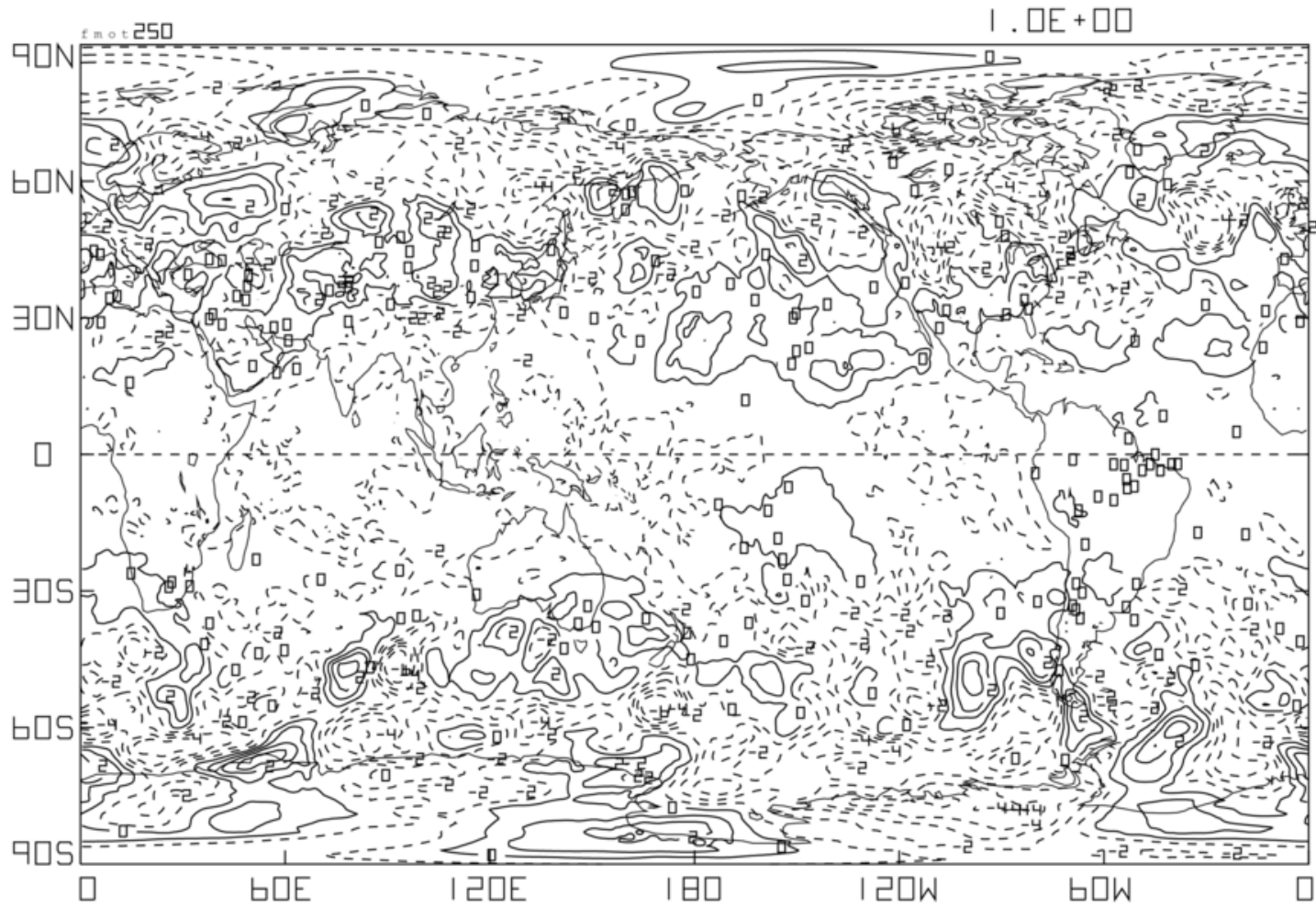


CAM3 Physics

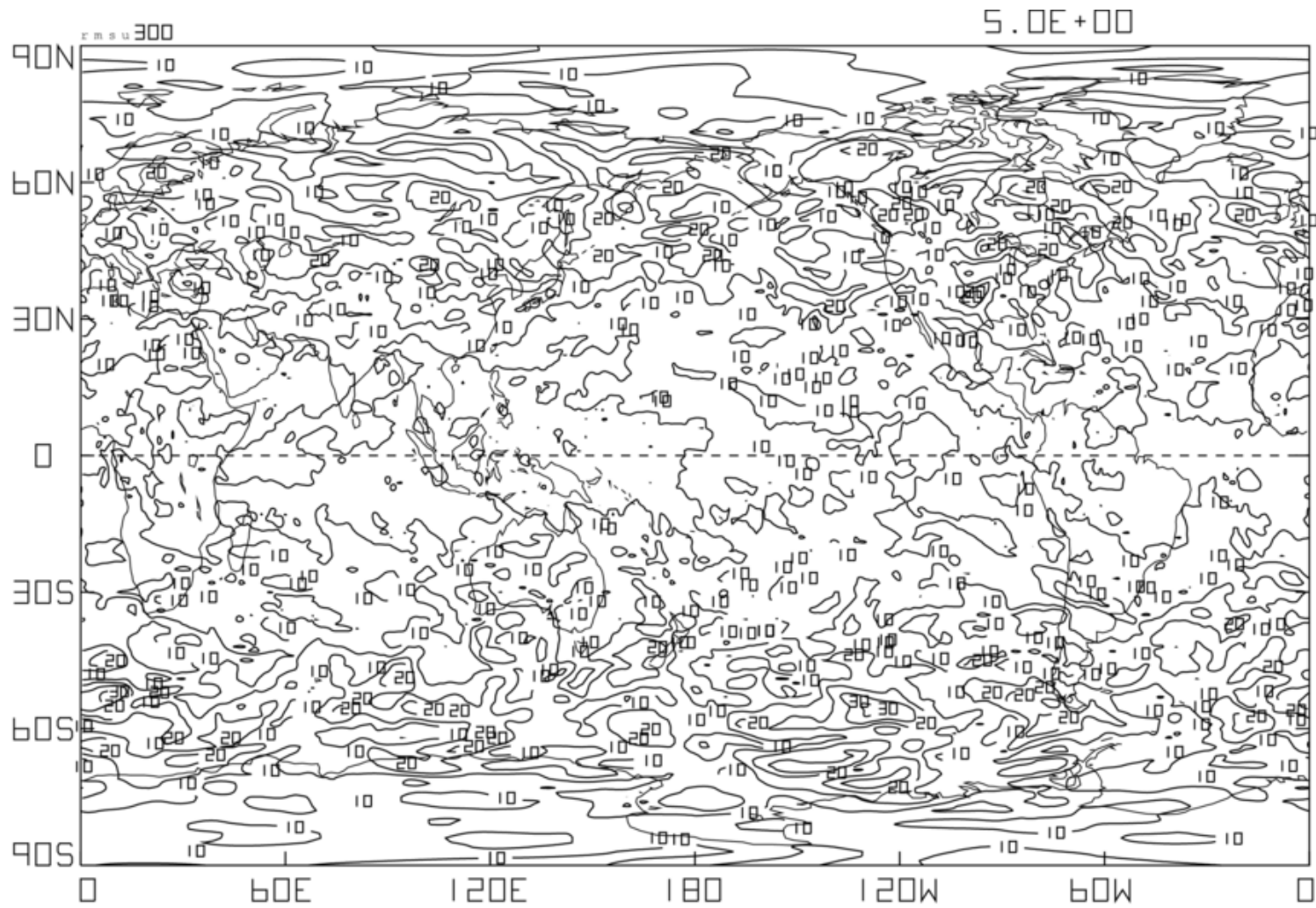
Day 5



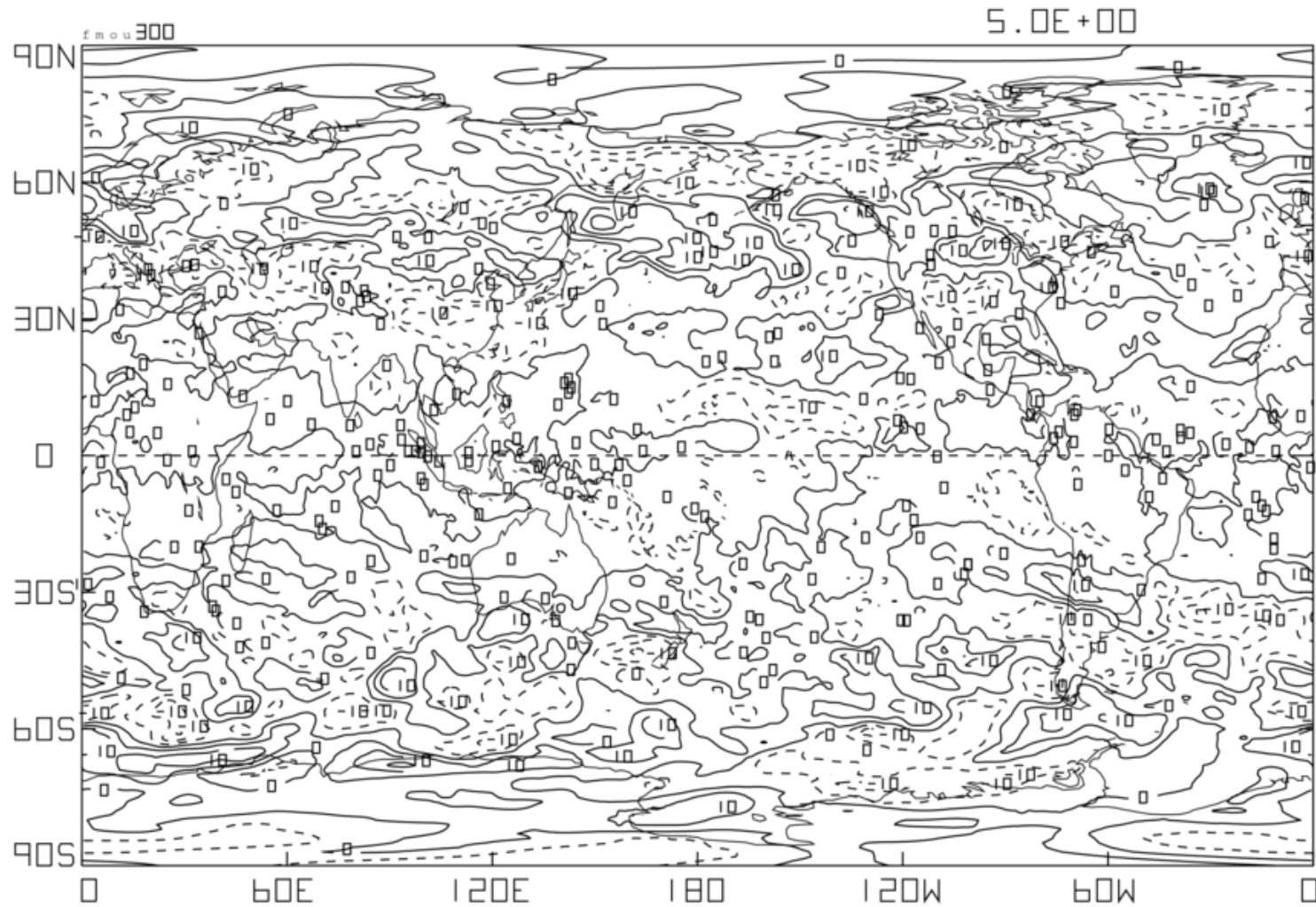
Ave root mean square T250 (2K) day 5 GFS Physics



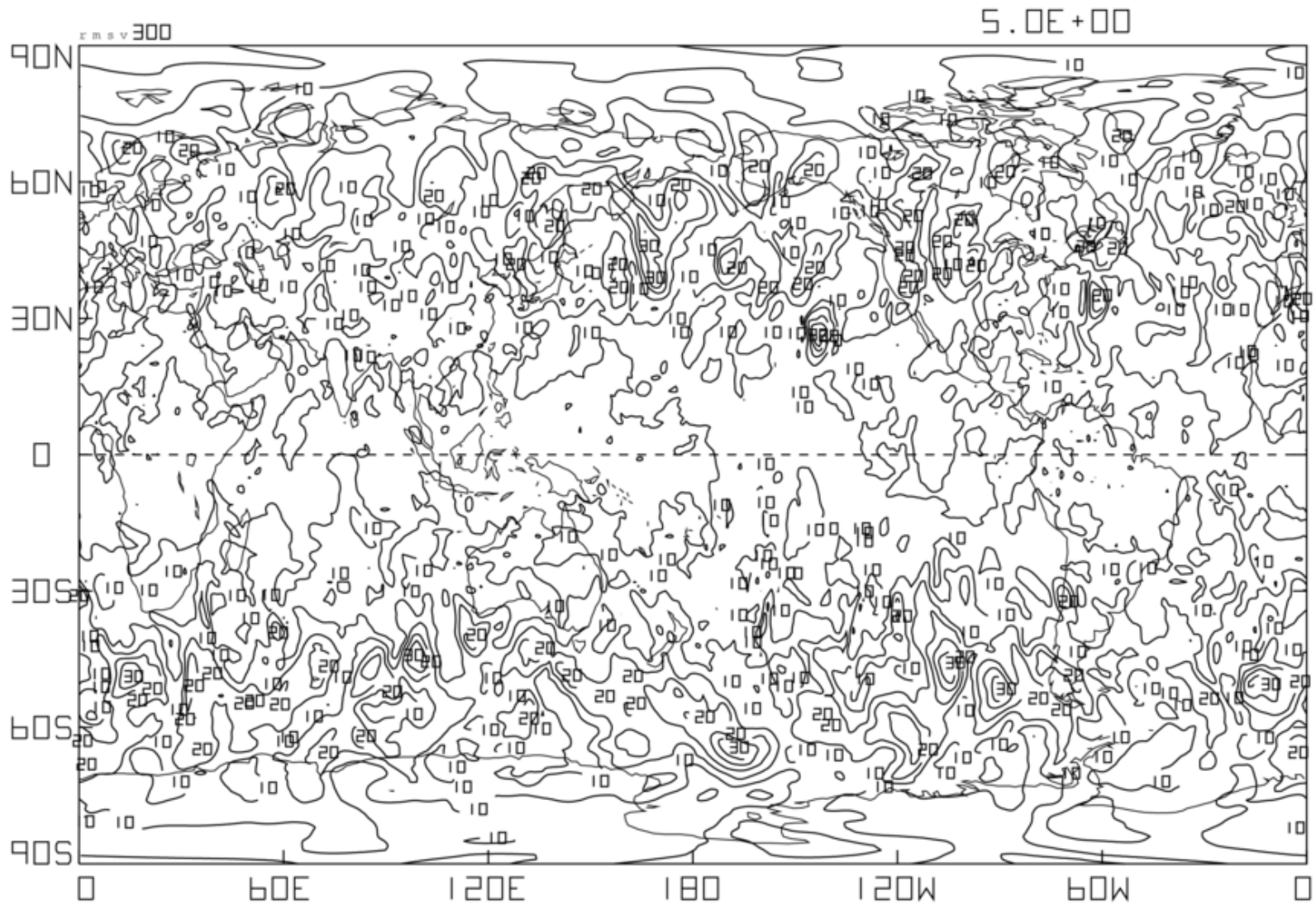
Average biasT 250 mb (1K) GFS physics Day5



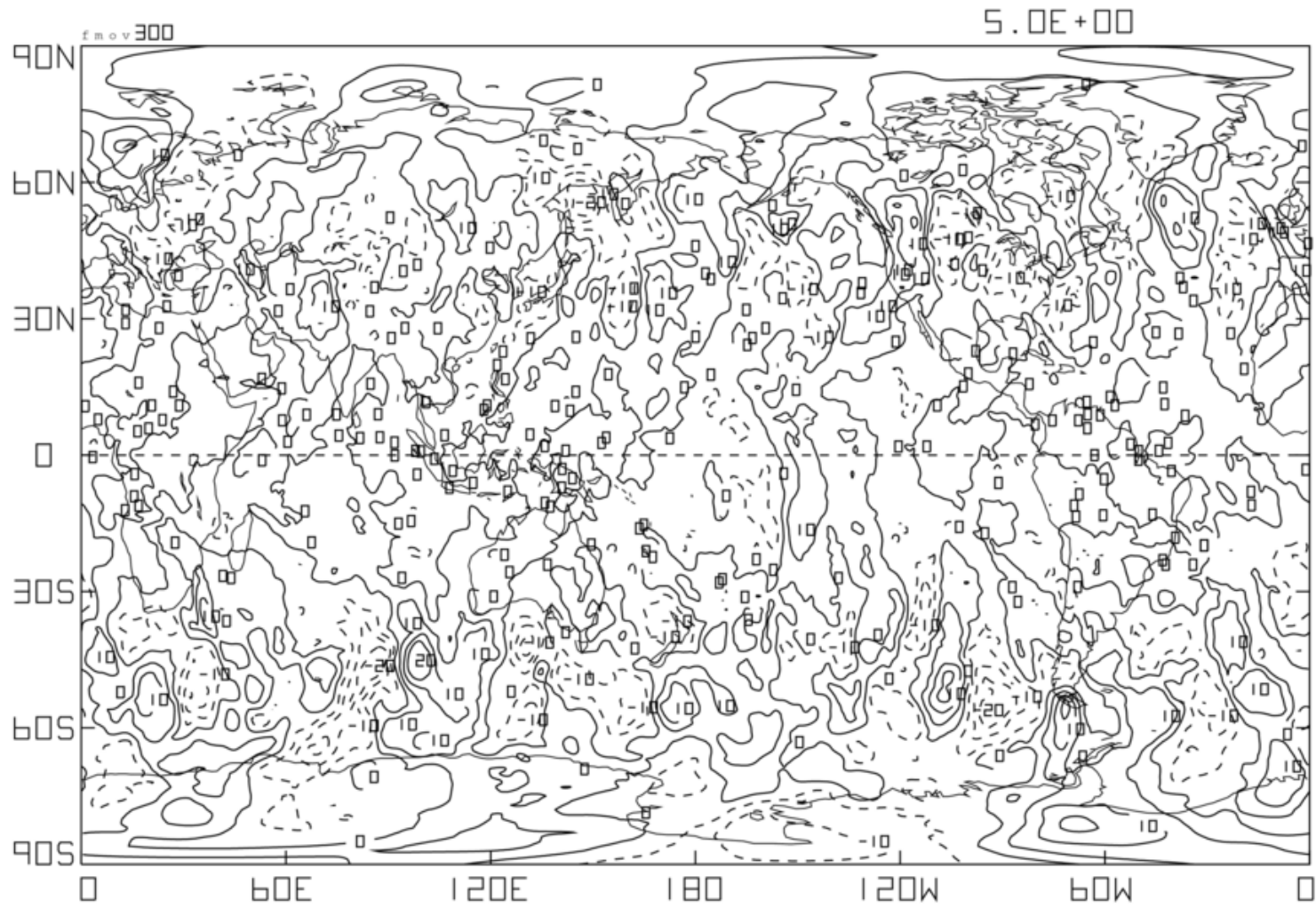
Ave RMS U 300 MB (5m/sec) GFS Physics Day 5



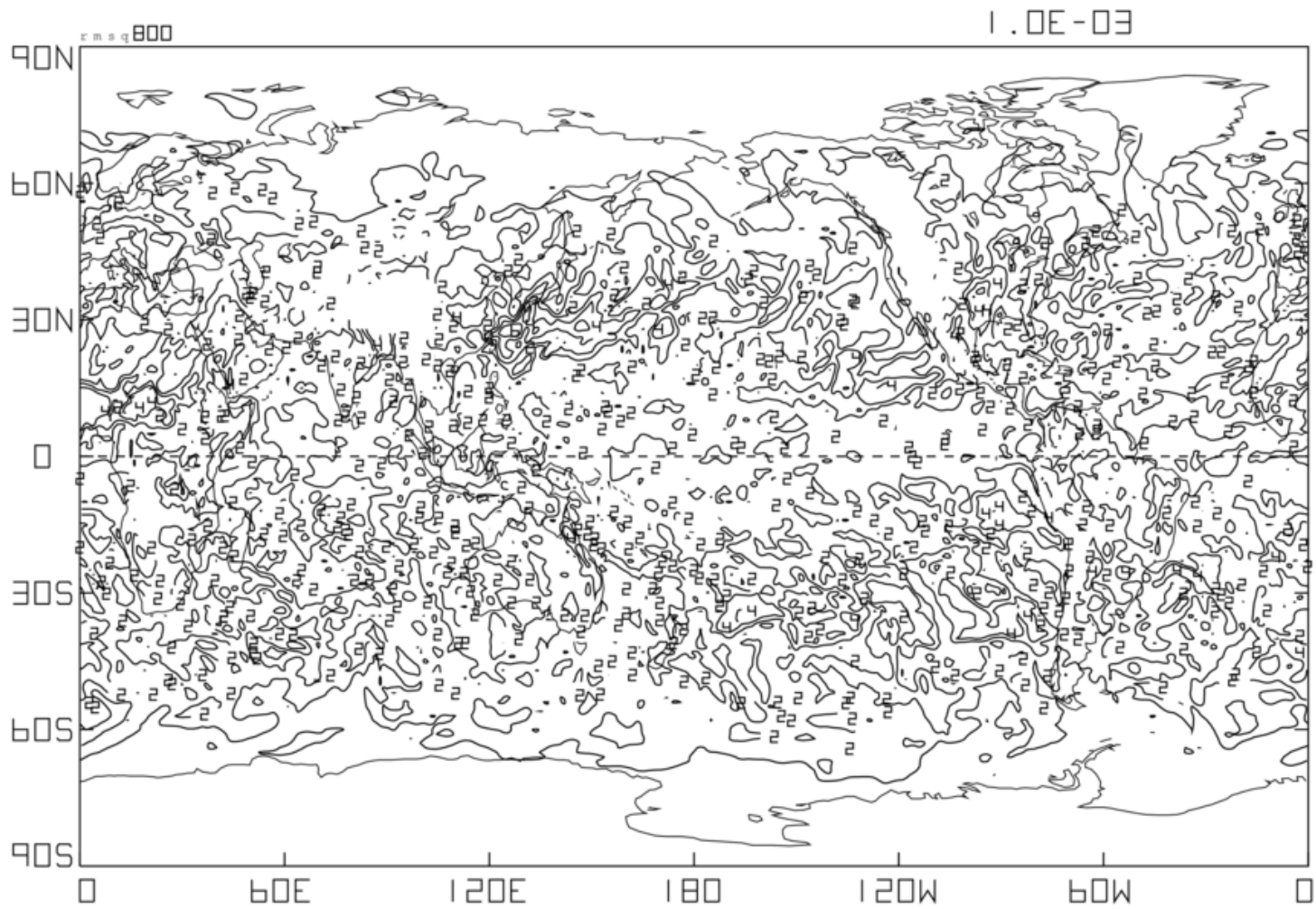
Ave Bias U 300mb (5m/sec) GFS Physics DAY 5



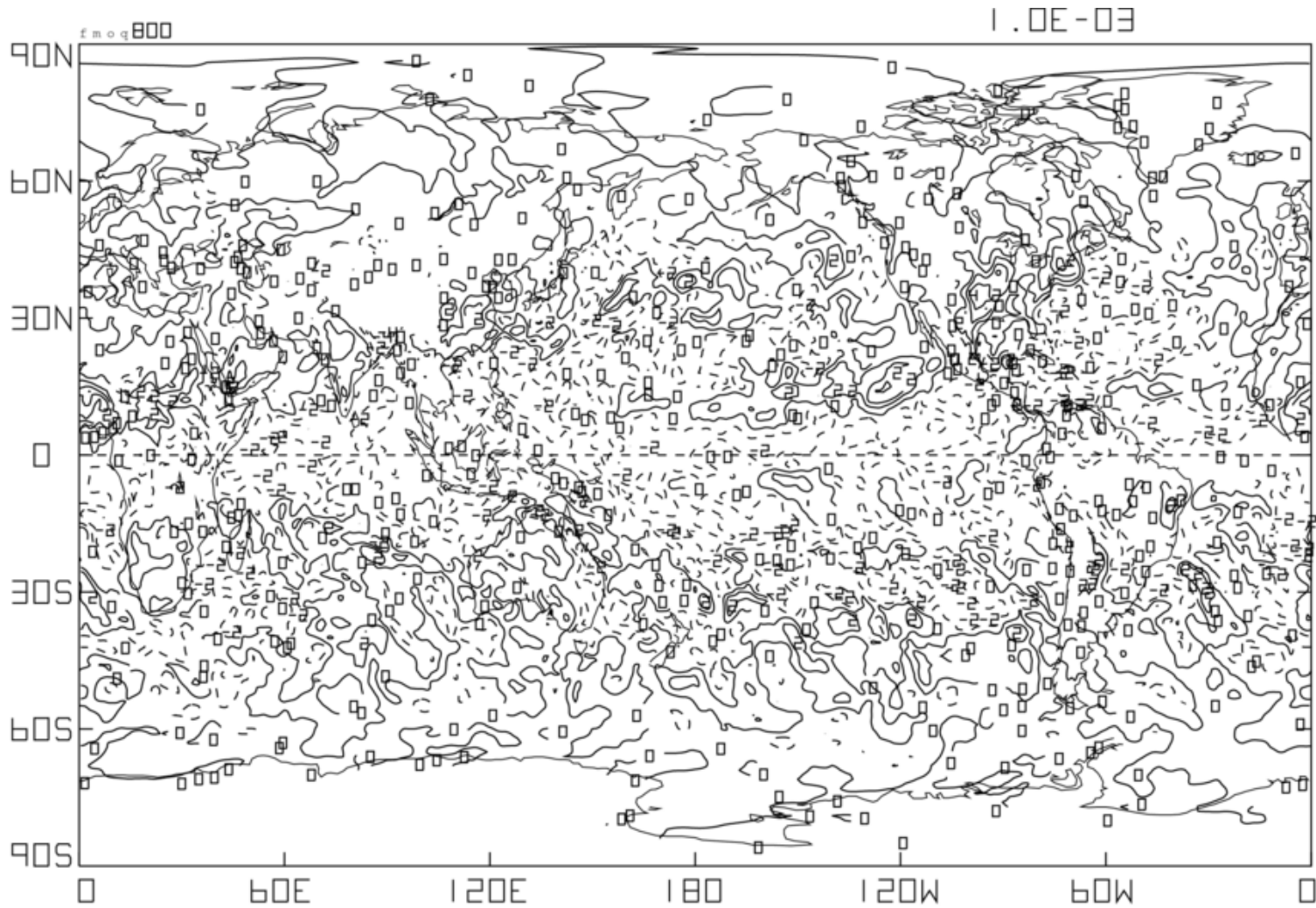
Ave RMS V 300mb (5m/sec) GFS Physics Day 5



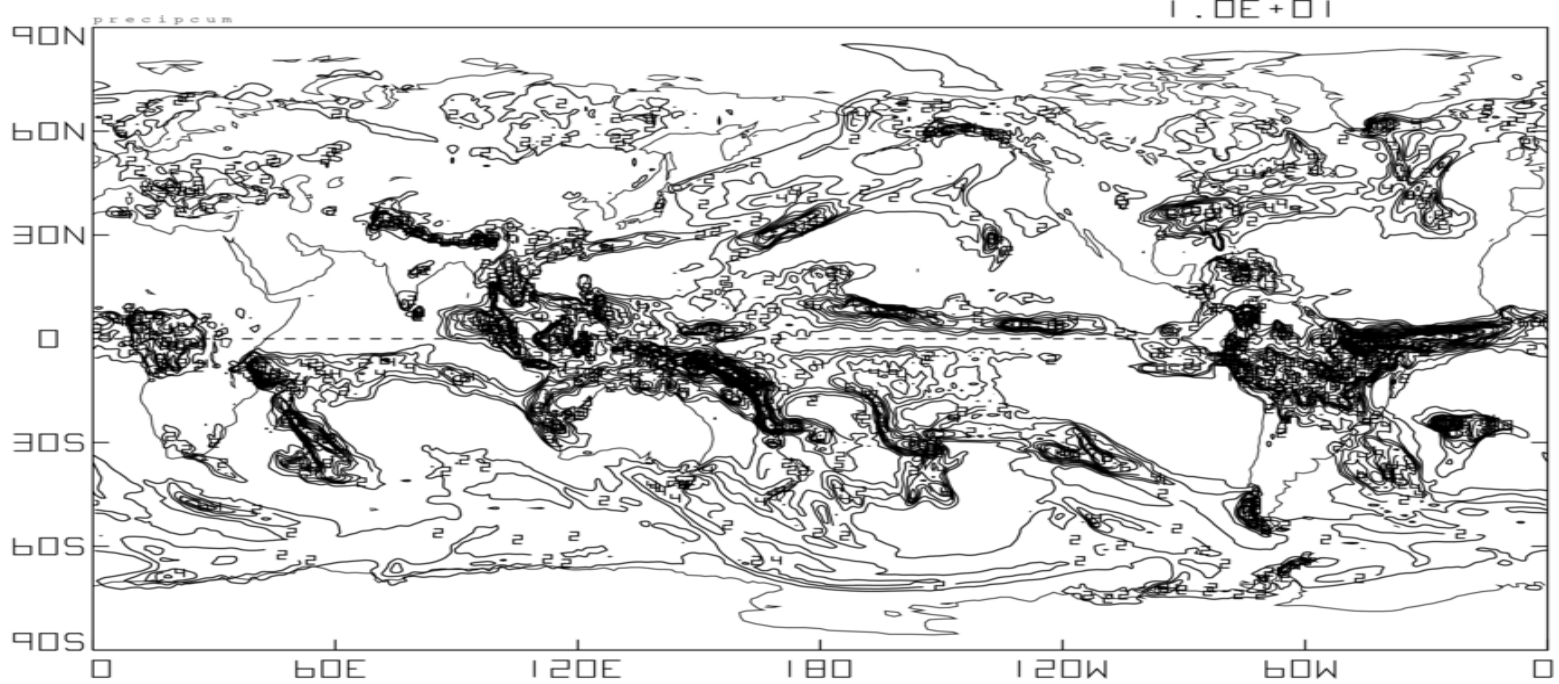
Ave Bias V 300 mb (5m/sec) GFS Physics Day 5



Ave RMS Q 800 mb GFS Physics Day 5

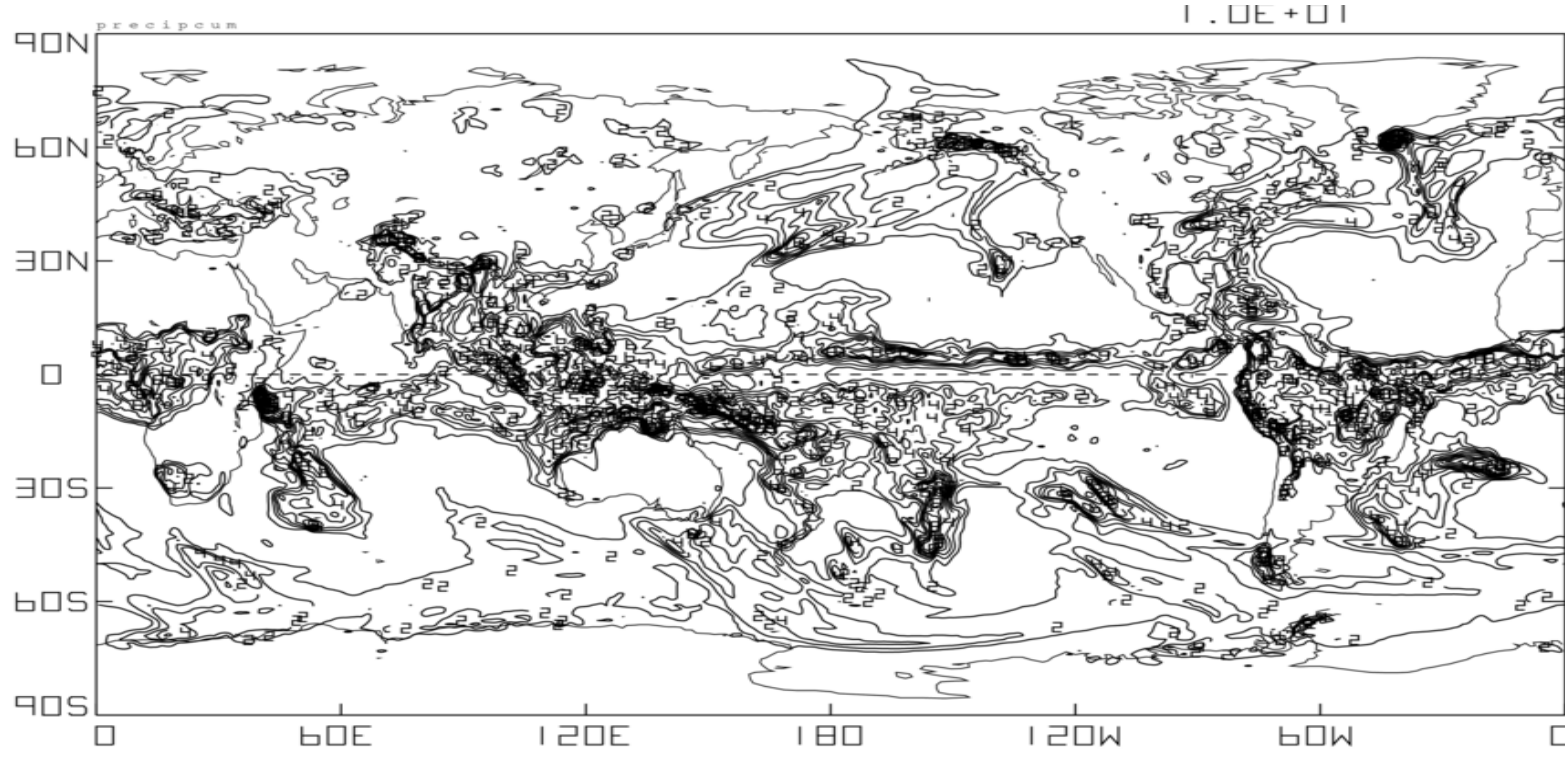


Ave bias Q 800mb (1.e-3 Kg/Kg) GFS Physics Day 5



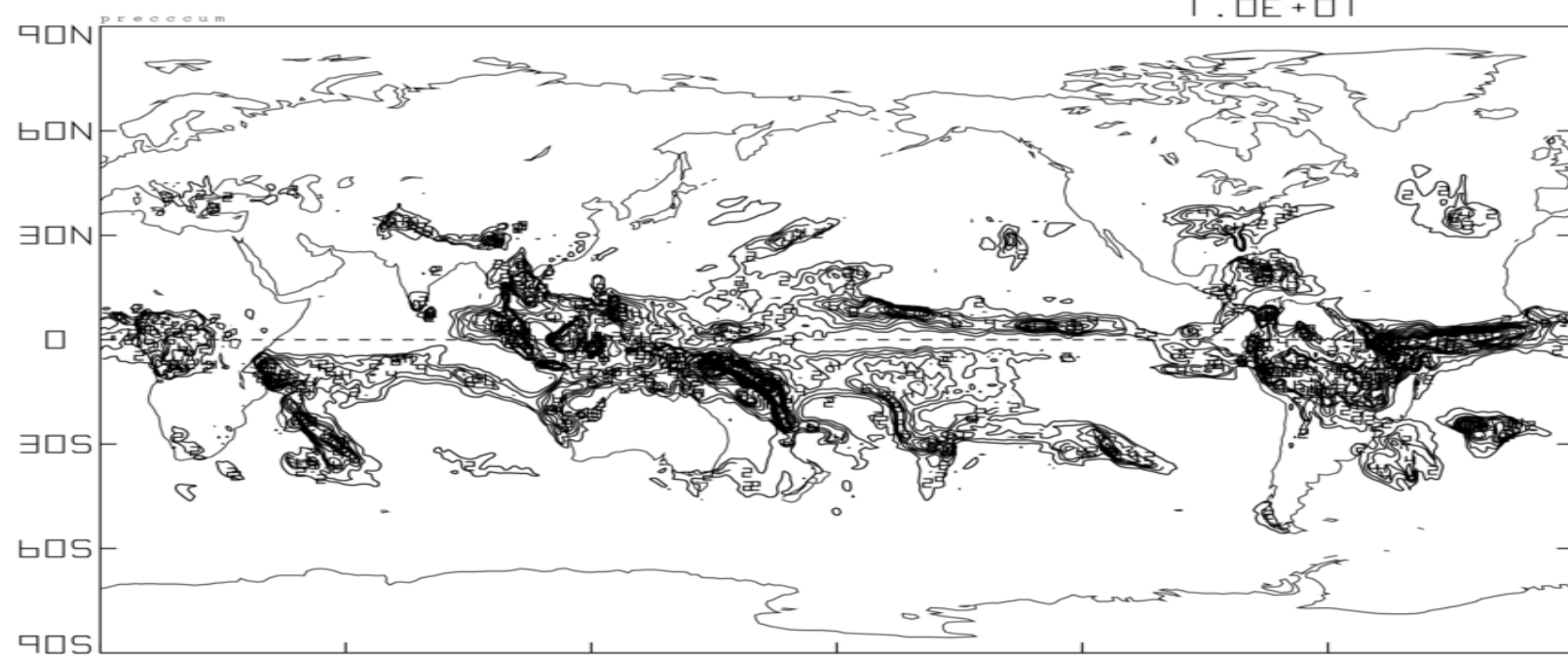
April 1
5 day

GFS

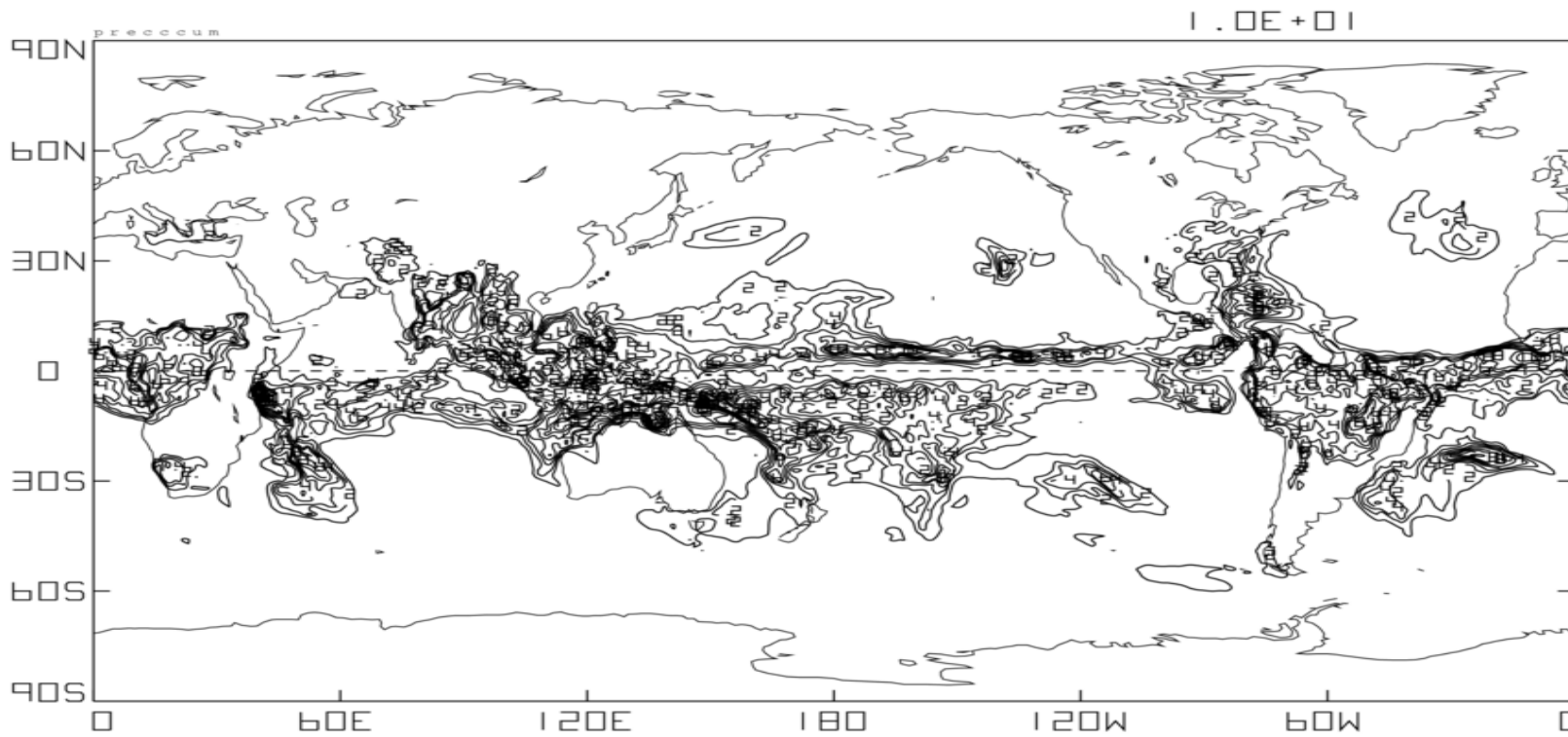


CAM3

CUM
PRECIP
10 MM

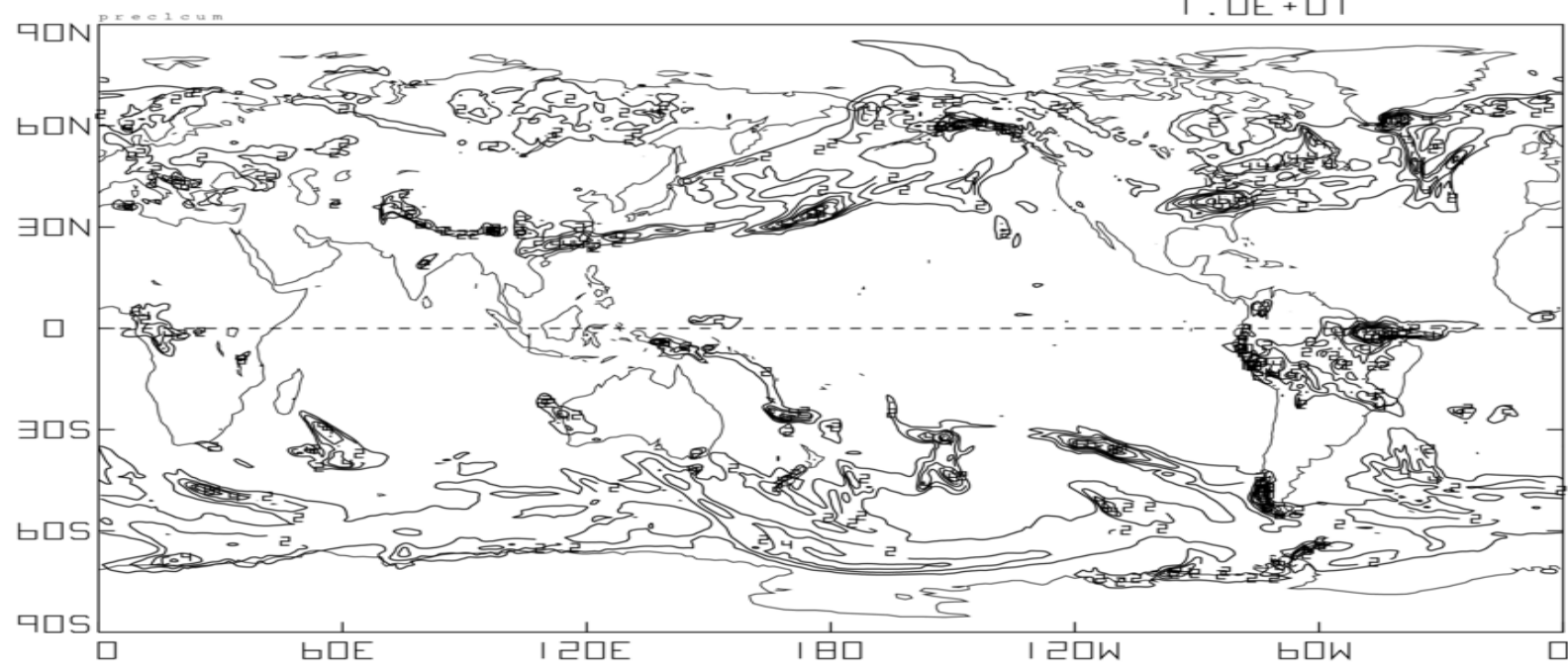


GFS

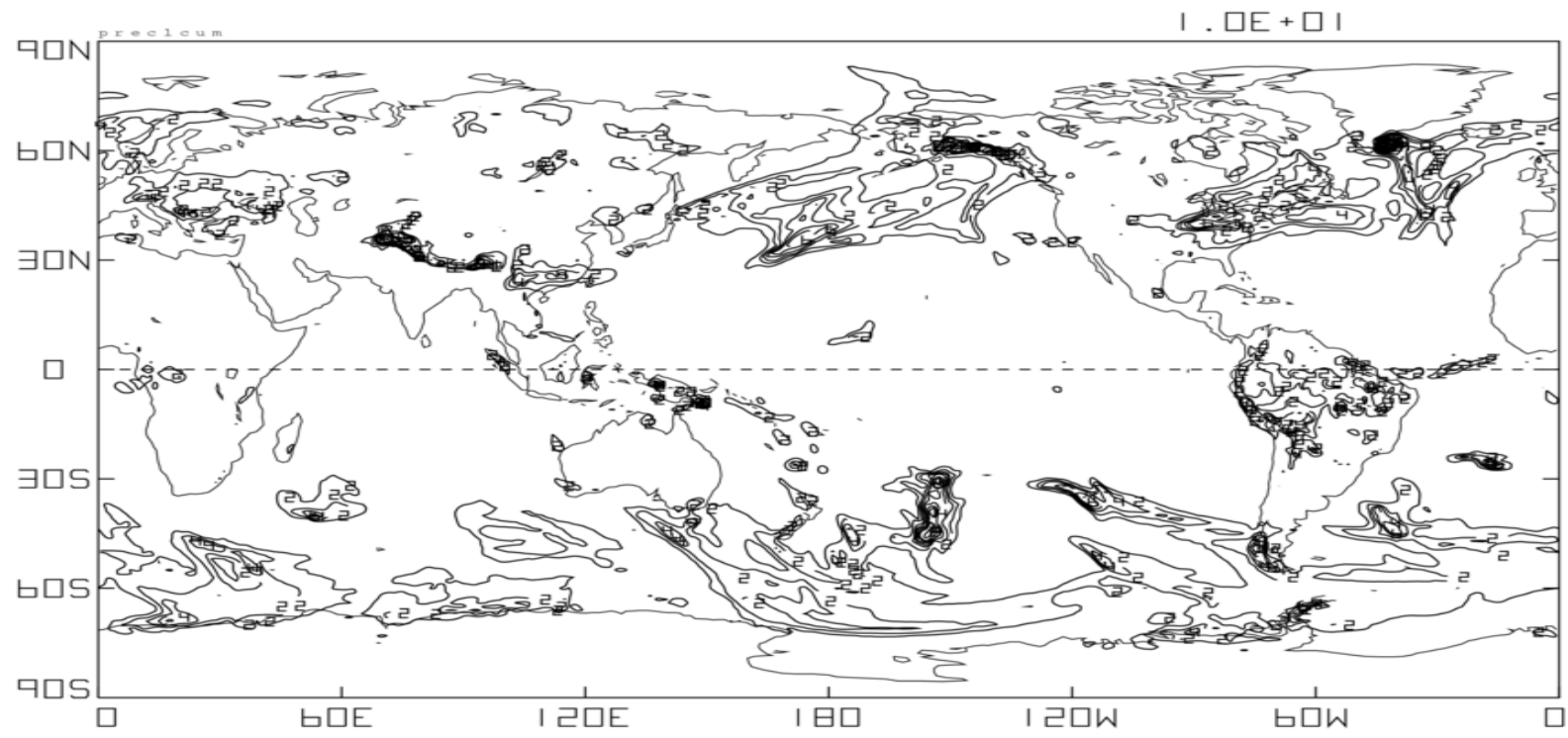


CAM3

CONV
PRE
10 MM

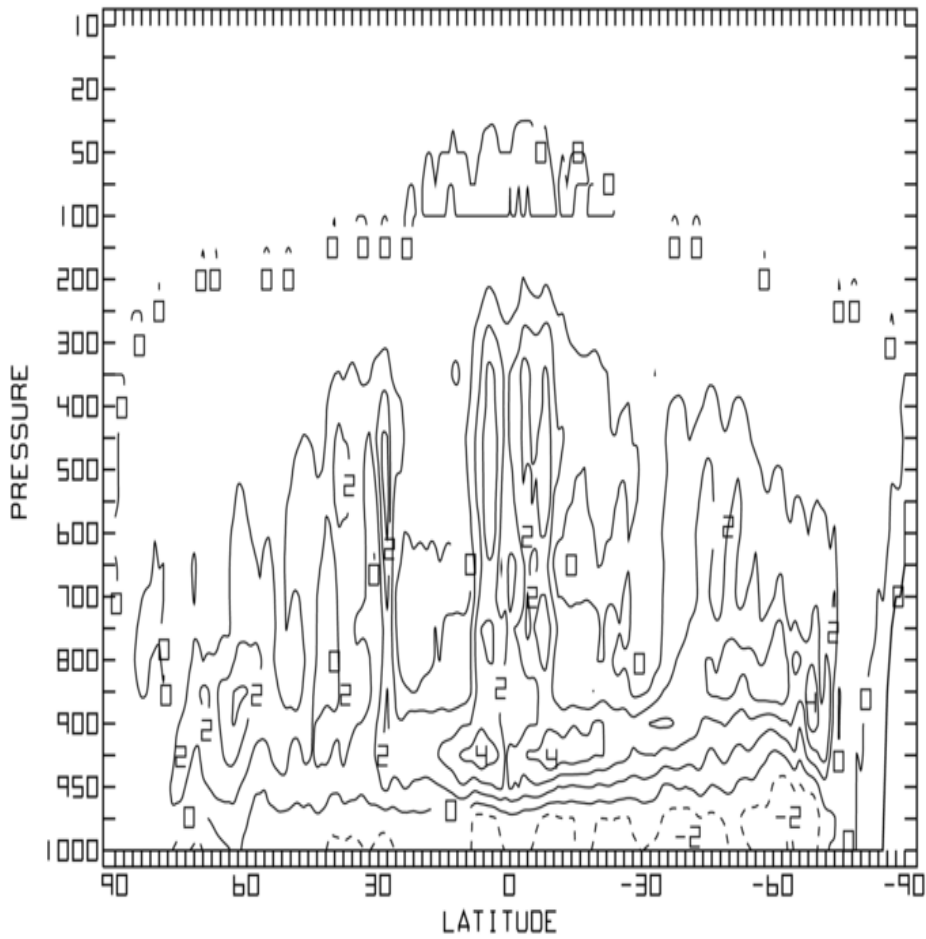


GFS

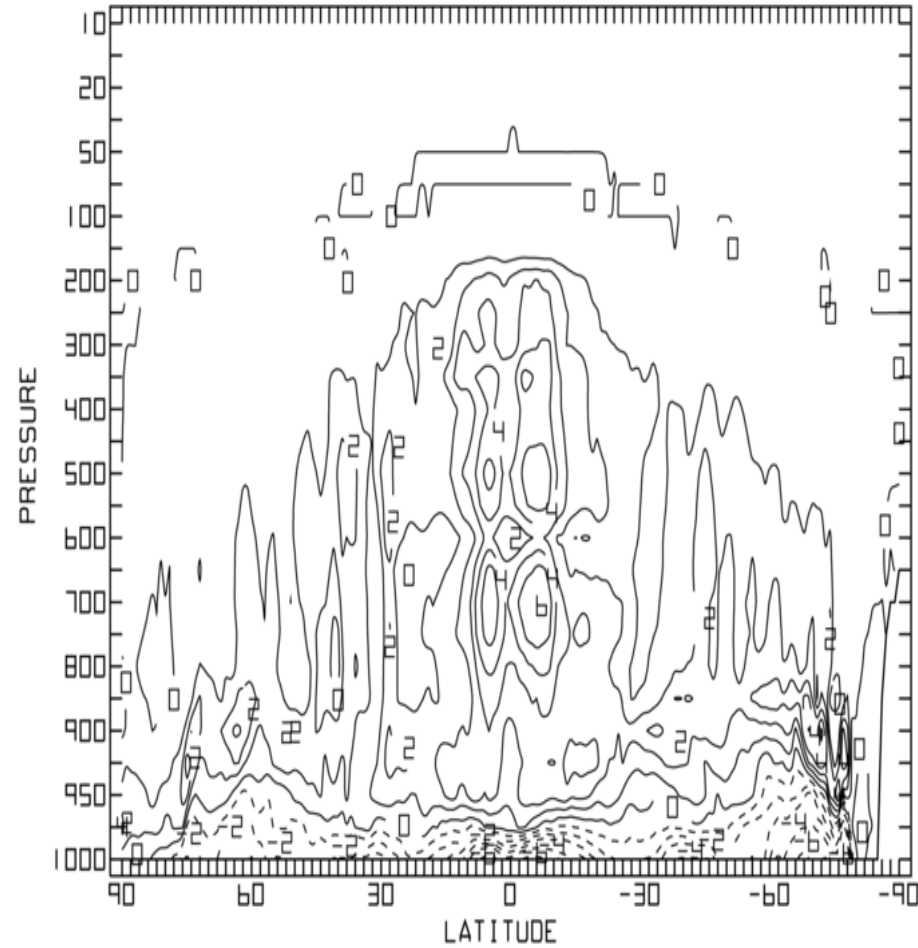


CAM3

CONV
LARGE
10 MM

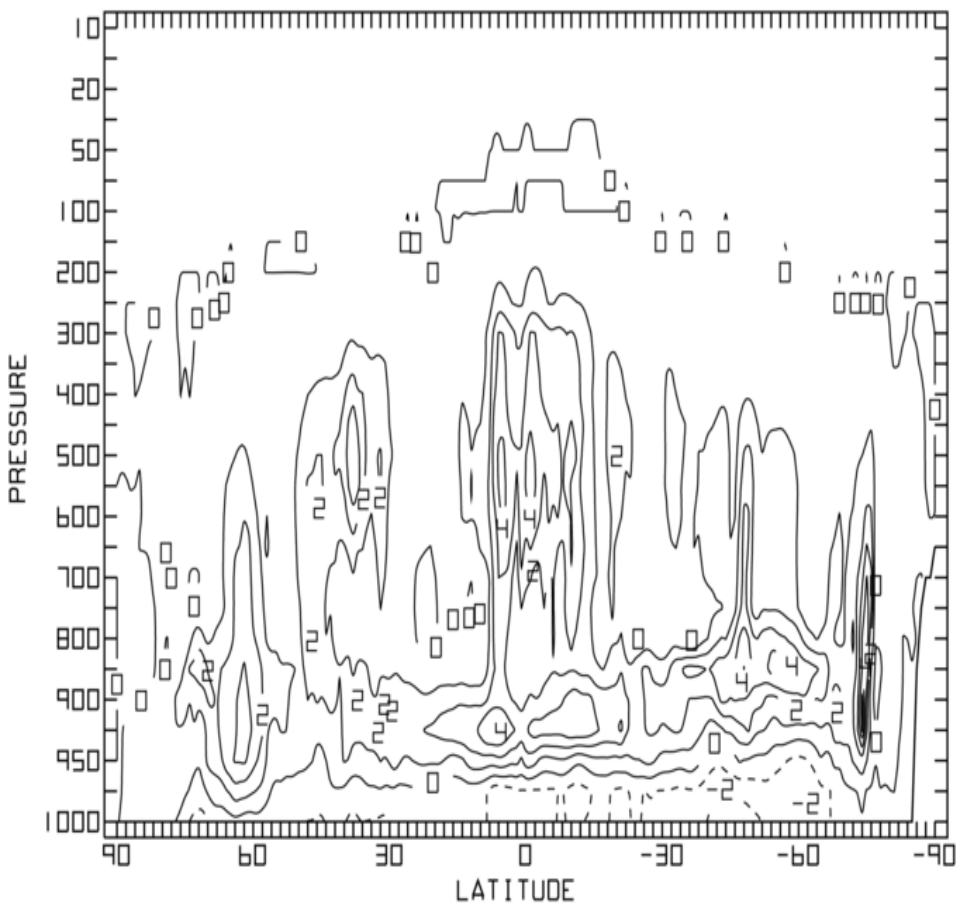


GFS Physics

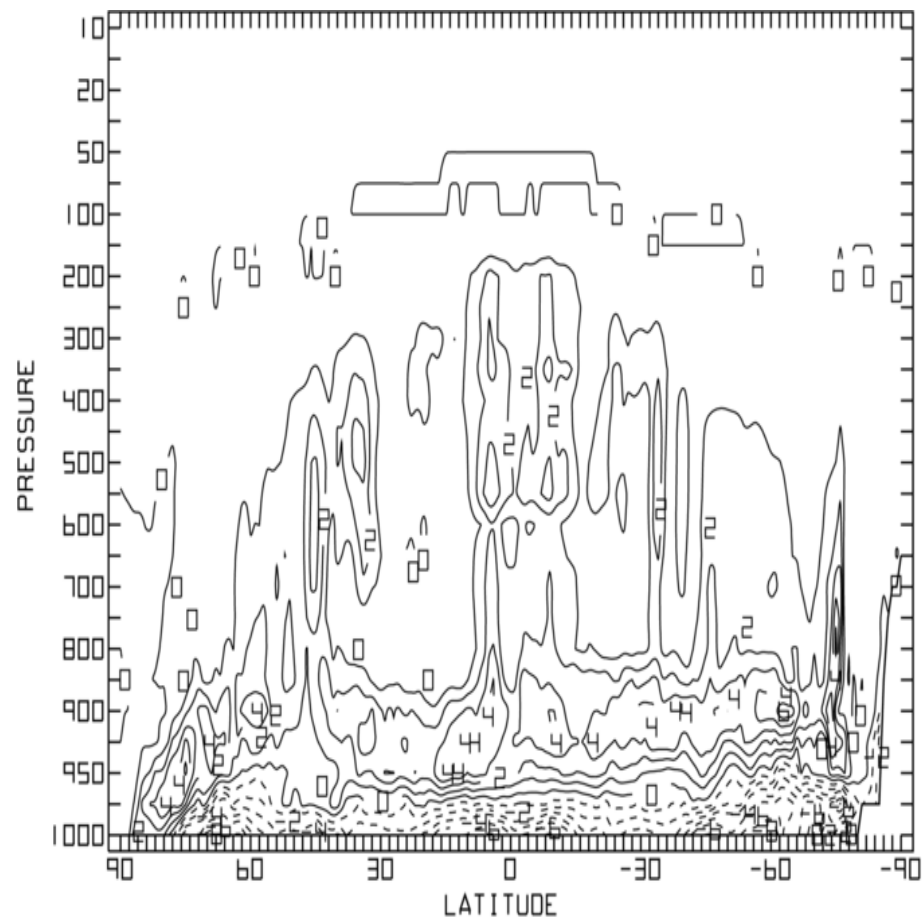


CAM3 Physics

DT/dt due to condensation (K/sec) at 12 hr 2008040606



GFS Physics



CAM3 Physics

DT/dt due to condensation (K/sec) at 5 days 2008040606

Conclusions