

Model Equilibration to Initial Start-up Conditions

Evaluating the rate at which the TIEGCM adjusts to start-up histories that differ in known ways from the model run

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January 27, 2011



Example Equilibration Tests:

- Evaluate equilibration from a solar minimum startup history to solar maximum conditions.
- Evaluate equilibration from a startup history with a temporal/seasonal offset from model start time.
- Validation of CCMC output, using HAO runs with different equilibration run times.
- Test equilibration rates for any results-changing modification to the source code.

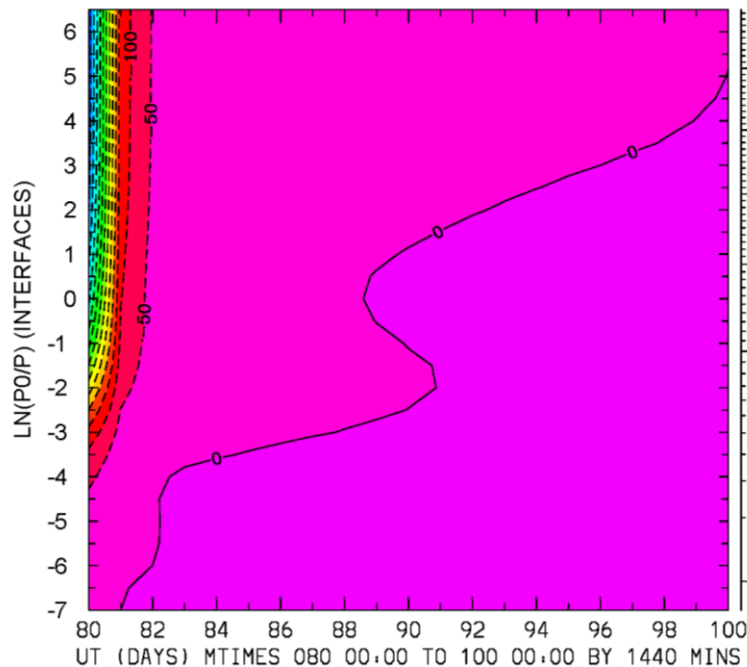
Equilibration from Solar Minimum to Solar Maximum Conditions

- Solar Min $f_{10.7}=70.$, Solar Max $f_{10.7}=250.$
 - Offset of 180 $f_{10.7}$ units
- Control run (case smax):
 - Days 80-100, solar maximum conditions, *started from solar maximum* start-up history.
- Offset run (case smin2smax):
 - Days 80-100, solar maximum conditions, *started from solar minimum* start-up history.
- Difference fields:
 - Daily histories, offset minus control
 - UT vs Z_p and UT vs Latitude
 - Assess recovery times and structure

Difference: smin2max minus smax UT vs ZP (days 80-100) Neutral Temperature (deg K)

TN: Lat,lon = -67.5,0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



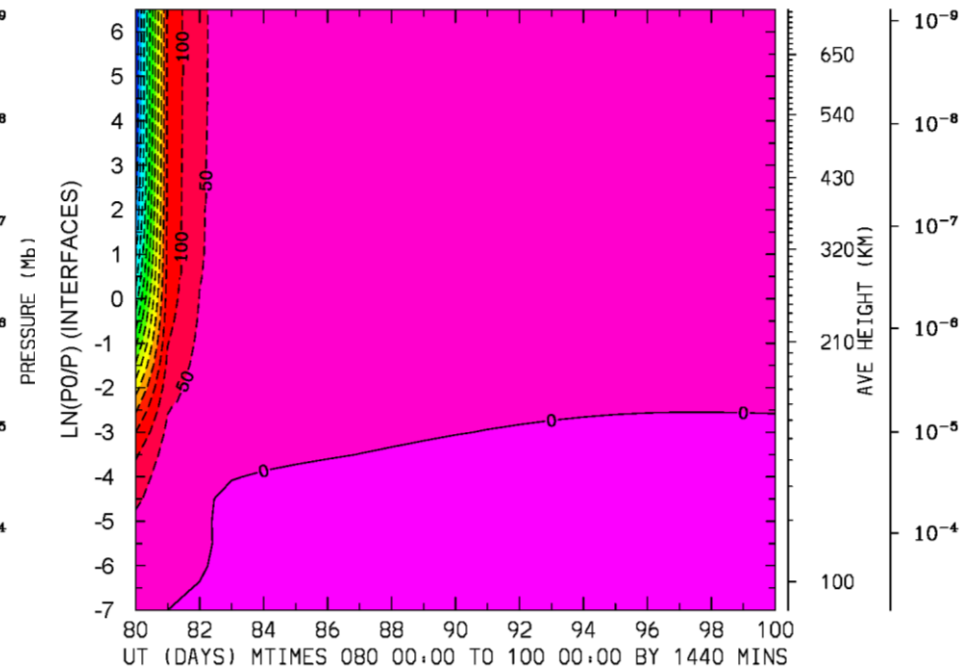
MIN,MAX= -6.3338E+02 7.5116E+00 INTERVAL= 5.0000E+01

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc T: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max = -633, 7.5
Interval = 50

TN: Lat,lon = 67.5,0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON= 67.50, 0.00



MIN,MAX= -6.9551E+02 5.6385E+00 INTERVAL= 5.0000E+01

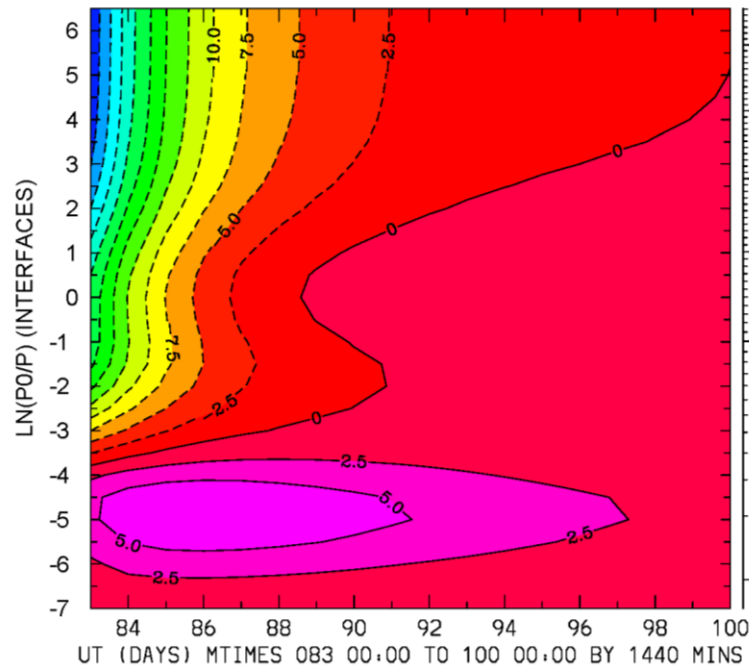
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TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max = -695, 5.6
Interval = 50

Difference: smin2max minus smax UT vs ZP (days 83-100) Neutral Temperature (deg K)

TN: Lat,lon = -67.5,0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



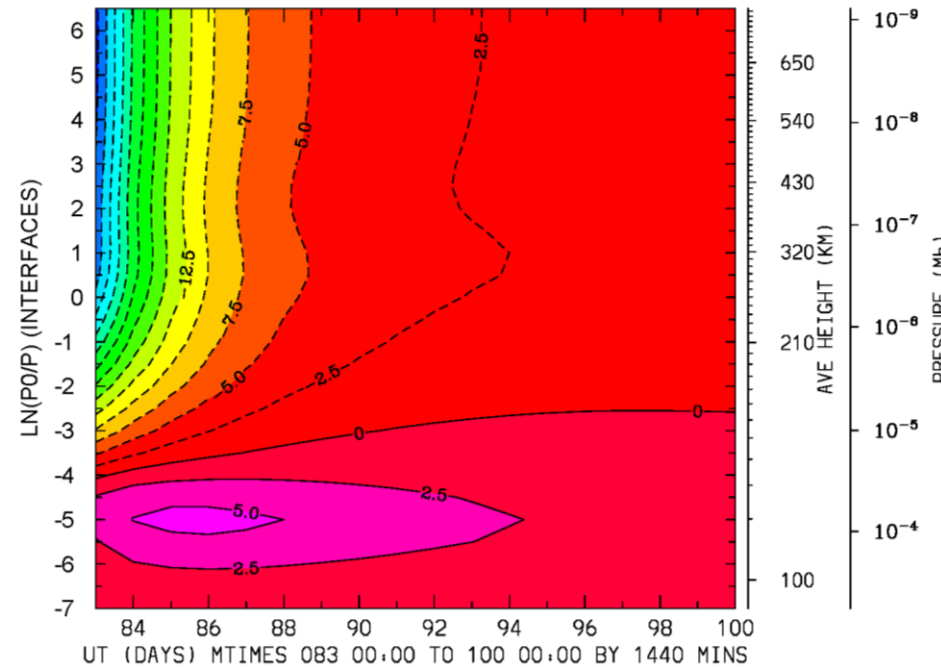
MIN,MAX= -2.9473E+01 7.5116E+00 INTERVAL= 2.5000E+00

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max = -29, 7.5
Interval = 2.5

TN: Lat,lon = 67.5,0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON= 67.50, 0.00



MIN,MAX= -3.3237E+01 5.6385E+00 INTERVAL= 2.5000E+00

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

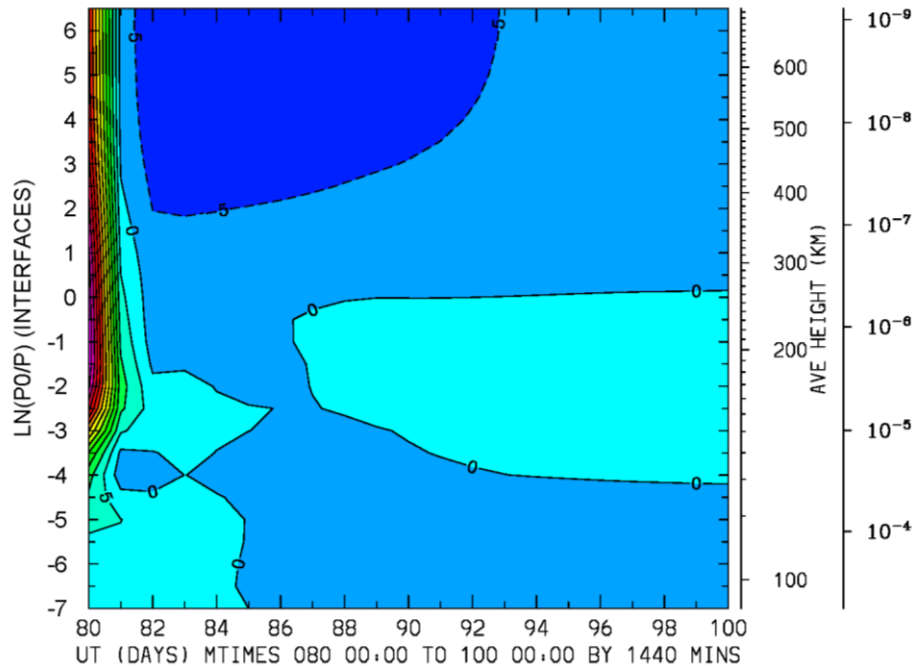
Min,Max = -33, 5.6
Interval = 2.5

Difference: smin2max minus smax

UT vs ZP (daily histories)

Neutral Zonal Wind (m/s)

DIFFS: NEUTRAL ZONAL WIND (M/S)
LAT, LON=-67.50, 0.00

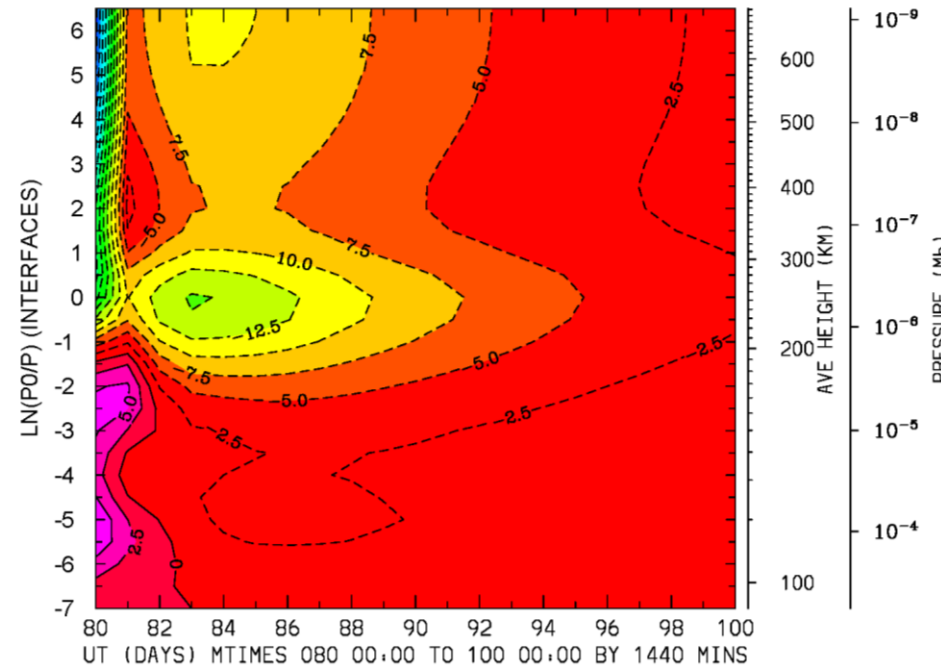


MIN,MAX= -8.8817E+00 6.4880E+01 INTERVAL= 5.0000E+00

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Lat,lon = -67.5,0
Min,Max=-9, 65
Interval = 5.

DIFFS: NEUTRAL ZONAL WIND (M/S)
LAT, LON= 32.50, 0.00



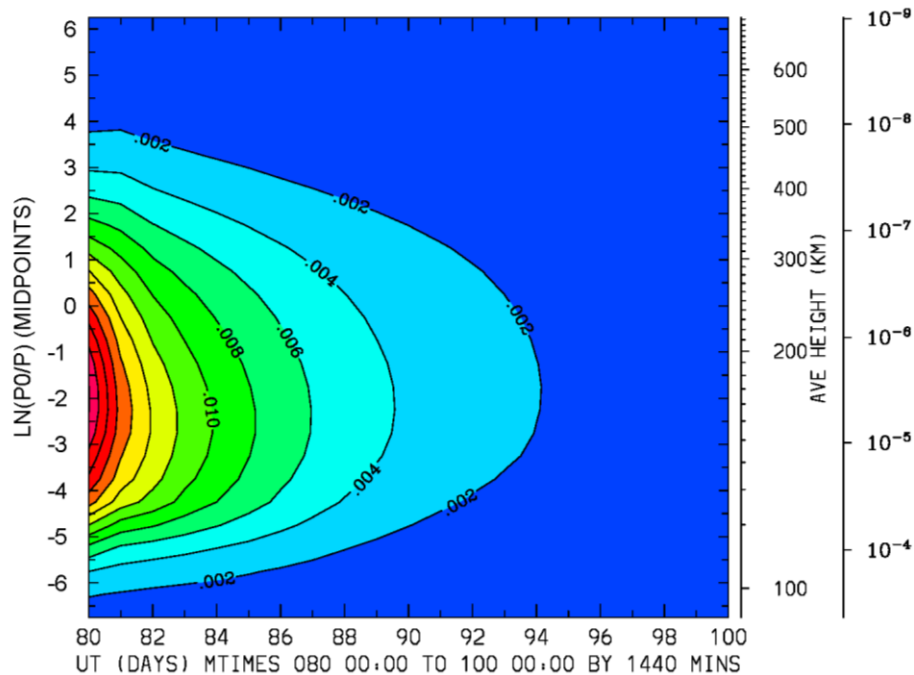
MIN,MAX= -3.3735E+01 7.3668E+00 INTERVAL= 2.5000E+00

Lat,lon = 32.5,0
Min,Max = -34, 7
Interval = 2.5

Difference: smin2max minus smax
UT (20 days) vs Zp

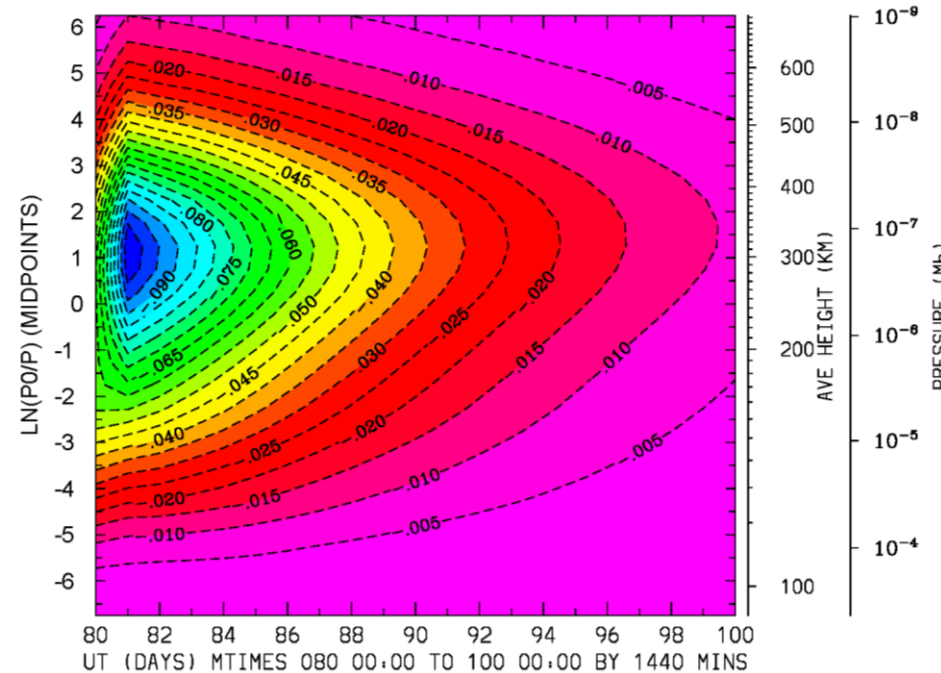
O2 (mmr) Lat=67.5

DIFFS: MOLECULAR OXYGEN (MMR)
LAT, LON= 67.50, 0.00



O (mmr) Lat=67.5

DIFFS: ATOMIC OXYGEN (MMR)
LAT, LON= 67.50, 0.00



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MIN,MAX= 2.0607E-05 2.4136E-02 INTERVAL= 2.0000E-03
RST, FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST, FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST, FOSTER.tiegcm1.93.p_smax_001.nc LAST, FOSTER.tiegcm1.93.p_smax_003.nc

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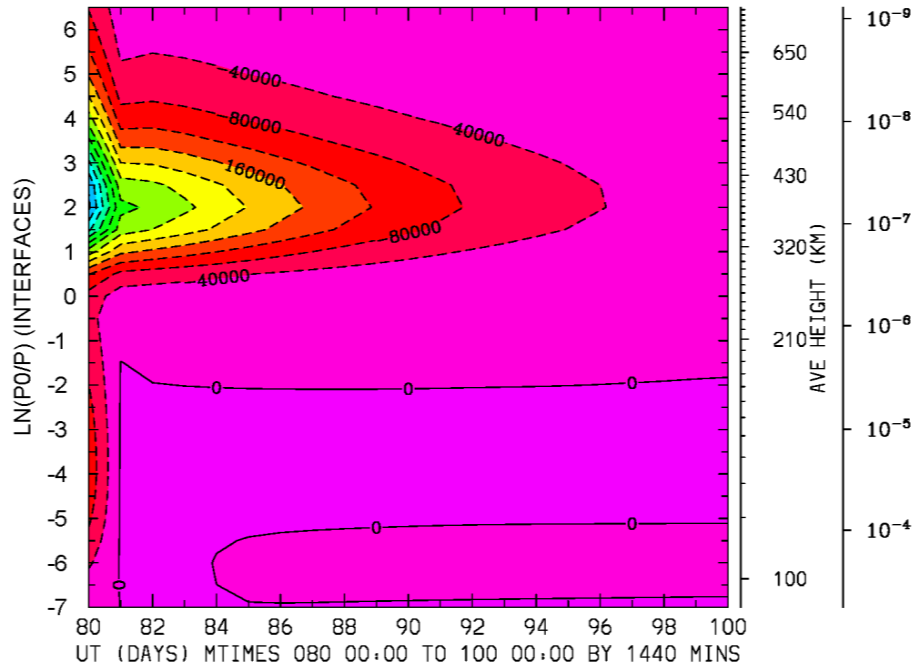
Min,Max = 2e-5, .024
Interval = 2.e-3

Min,Max = -.1, -1.2e-4
Interval = 5.e-3

Difference: smin2max minus smax UT (20 days) vs ZP

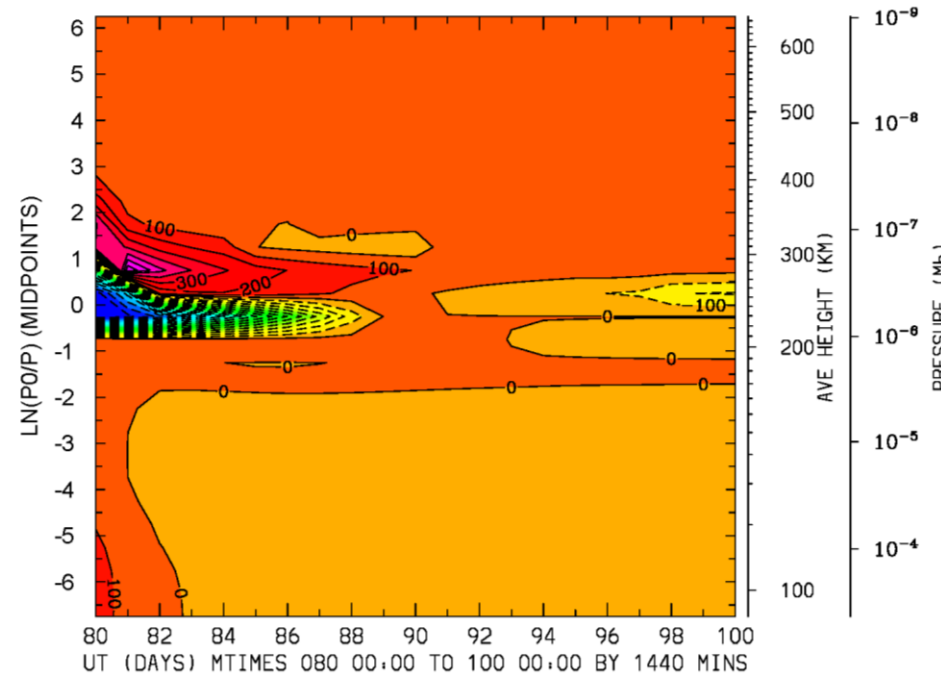
NE (cm³) Lat=67.5

DIFFS: ELECTRON DENSITY (CM³)
LAT, LON= 67.50, 0.00



O₂⁺ (cm³) Lat=32.5

DIFFS: O₂⁺ ION (CM³)
LAT, LON= 32.50, 0.00



MIN,MAX= -4.8821E+05 3.2899E+03 INTERVAL= 4.0000E+04

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
R FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max=-5e5,3.3e3
Interval = 40,000

MIN,MAX= -1.5989E+03 7.7723E+02 INTERVAL= 1.0000E+02

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
R FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max=-1600,777
Interval = 100.

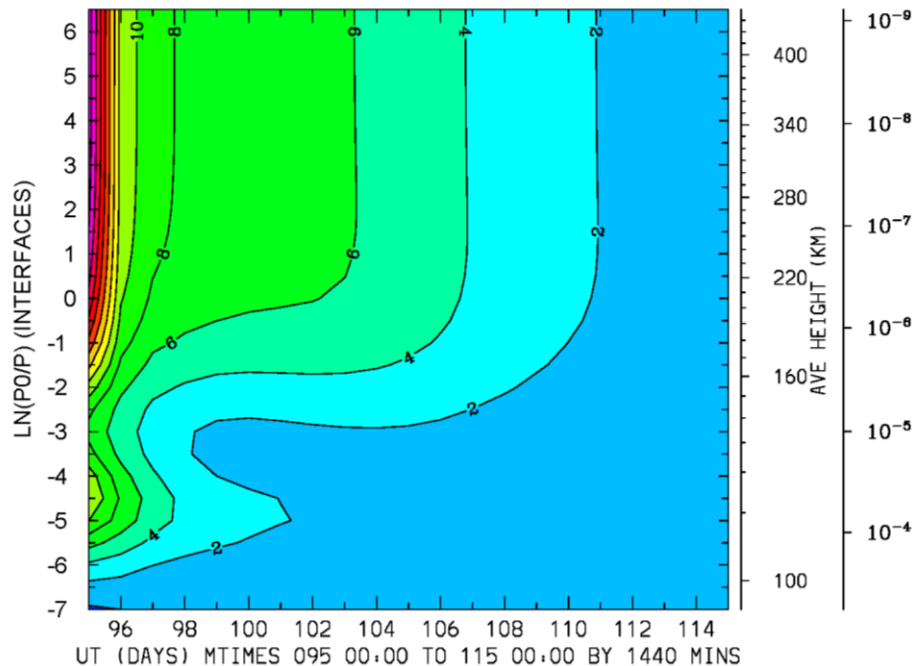
Equilibration to a 15-day Temporal Offset from the Source History:

1. Obtain a day 95 control source history:
 - Run days 80-95 from steady-state day 80 history
2. Control Run:
 - Run days 95-115 from day 95 source (step 1)
3. Offset Run:
 - Run days 95-115 from day 80 source (15-day offset)
4. Plot differences of Offset minus Control runs:
 - U_t vs Z_p and U_t vs Latitude (daily histories)
 - Assess recovery time and structure

Difference: 15-day Offset run Minus Control UT (20 days) vs Zp Neutral Temperature (deg K)

Lat, lon = -67.5, 0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



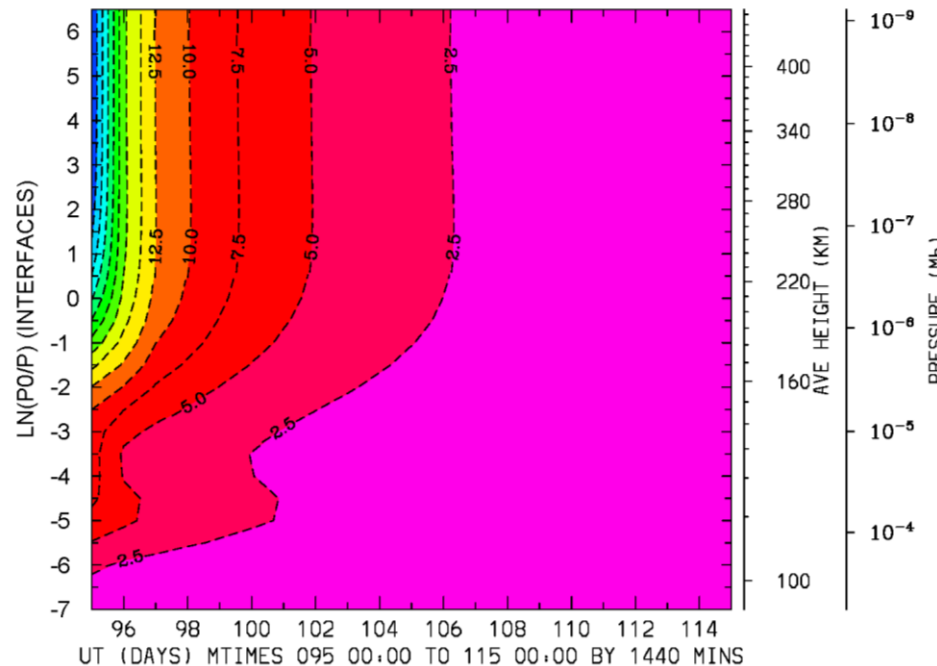
MIN,MAX= -2.8827E-01 2.5249E+01 INTERVAL= 2.0000E+00

ST, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.3T, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.nc
ST, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.3T, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.nc

Min,Max = -0.3, 25
Interval = 2.

Lat, lon = 67.5, 0

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON= 67.50, 0.00



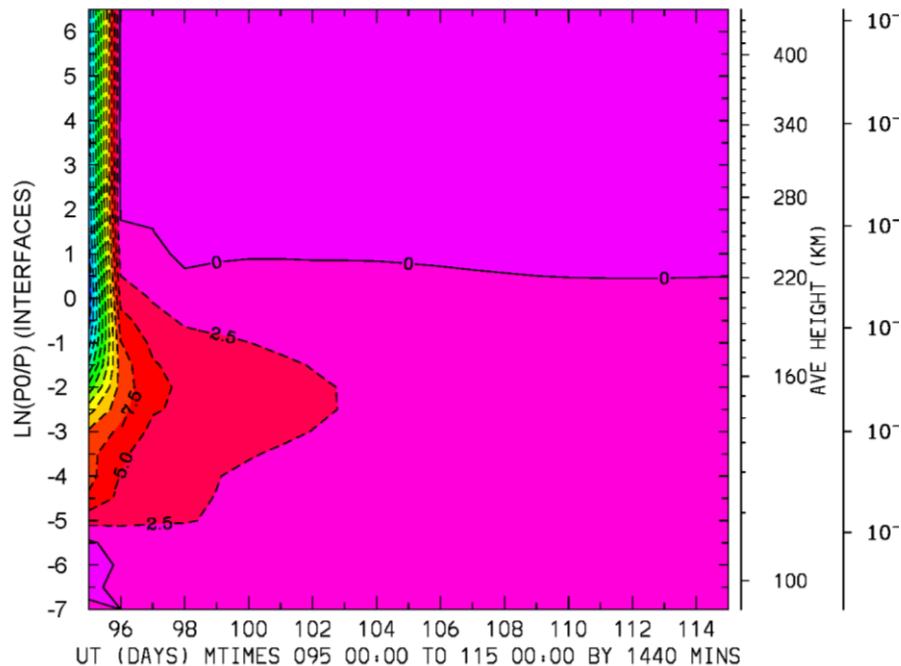
MIN,MAX= -3.2340E+01 0.0000E+00 INTERVAL= 2.5000E+00

Min,Max = -32, 0
Interval = 2.5

Difference: 15-day Offset run Minus Control UT (20 days) vs Zp Neutral Zonal Wind (m/s)

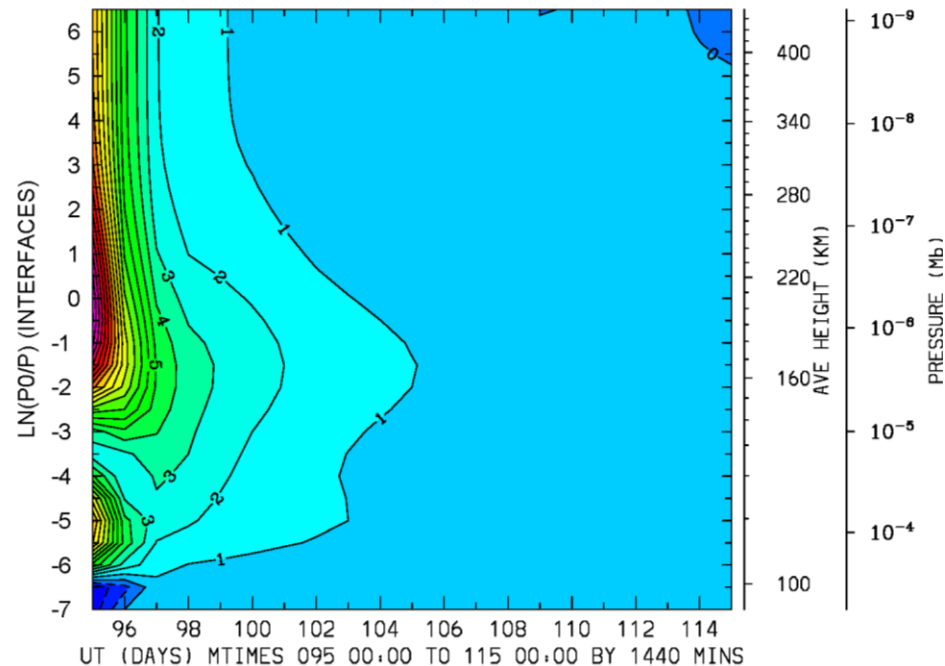
Lat, lon = -67.5, 0

DIFFS. NEUTRAL ZONAL WIND (M/S)
LAT, LON=-67.50, 0.00



Lat, lon = 32.5, 0

DIFFS. NEUTRAL ZONAL WIND (M/S)
LAT, LON= 32.50, 0.00



MIN,MAX= -3.1851E+01 1.9331E+00 INTERVAL= 2.5000E+00

ST, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.nc
ST, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.nc

Min,Max = -32, 1.9
Interval = 2.5

MIN,MAX= -2.6814E+00 1.9125E+01 INTERVAL= 1.0000E+00

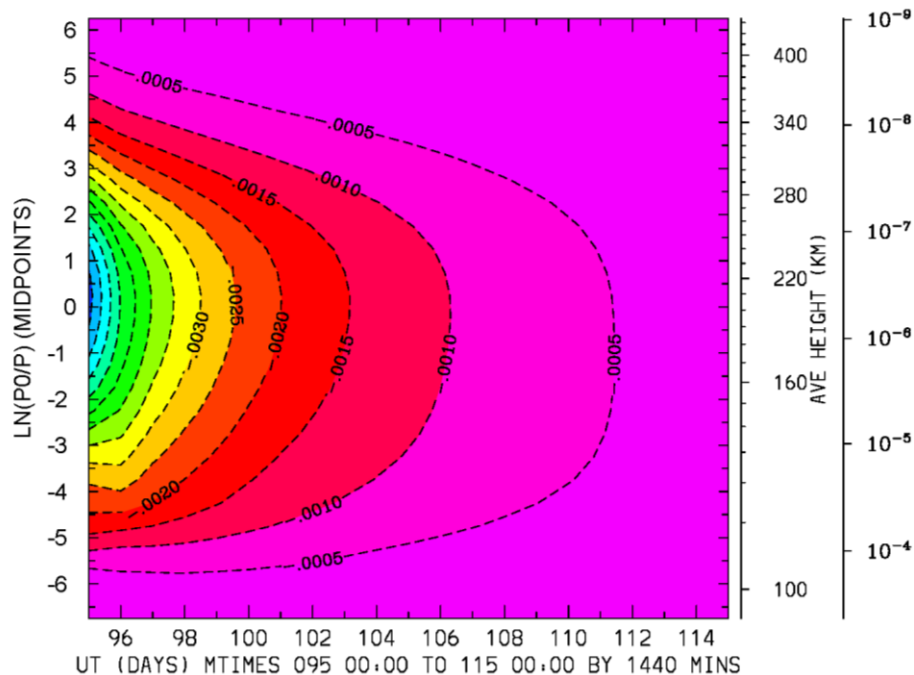
Min,Max = -2.7, 1.9
Interval = 1.0

Difference: 15-day Offset run Minus Control
UT (20 days) vs Zp

O2 (mmr)

Lat, lon = 67.5, 0

DIFFS: MOLECULAR OXYGEN (MMR)
LAT, LON= 67.50, 0.00



MIN,MAX= -6.7005E-03 -1.7092E-05 INTERVAL= 5.0000E-04

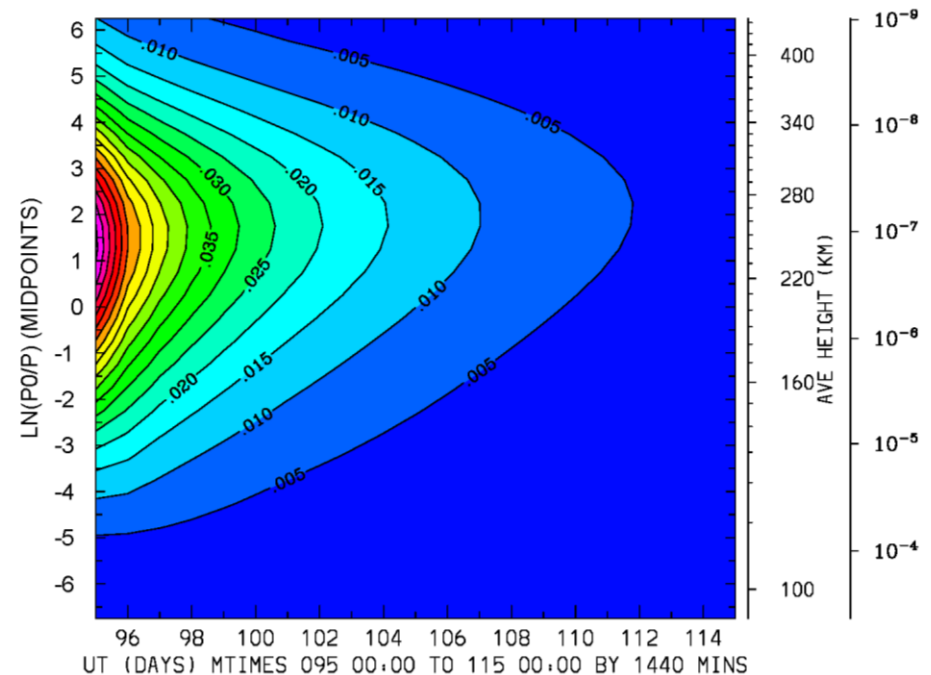
ST, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.nc ST, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.nc
ST, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.nc ST, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.nc

Min,Max = -6.7e-3, -1.7e-5
Interval = 5.e-4

O (mmr)

Lat, lon = 67.5, 0

DIFFS: ATOMIC OXYGEN (MMR)
LAT, LON= 67.50, 0.00



MIN,MAX= 4.1433E-05 8.6623E-02 INTERVAL= 5.0000E-03

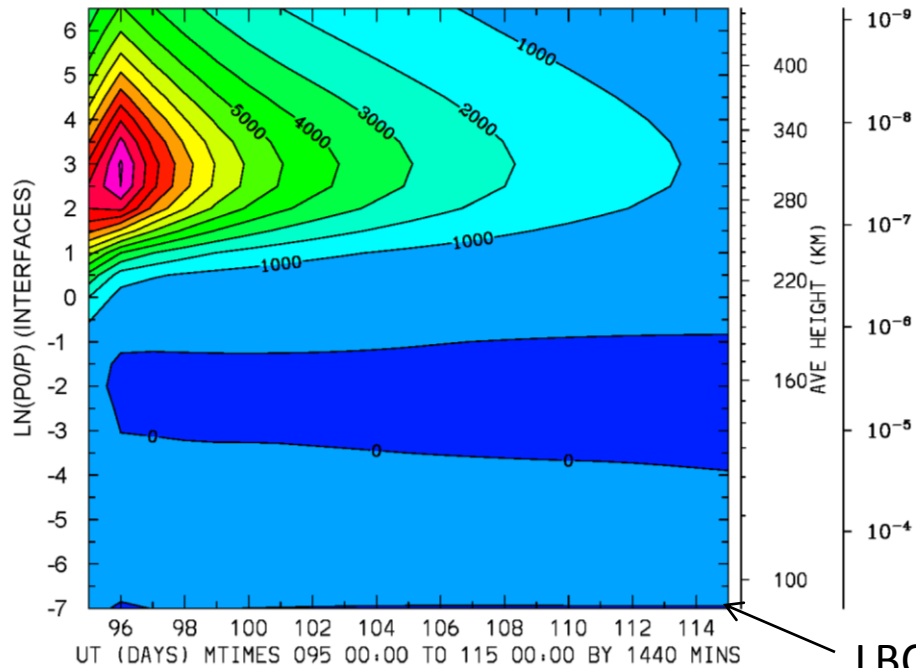
Min,Max = 4.1e-5, 8.7e-2
Interval = 5.e-3

Difference: 15-day Offset run Minus Control UT (20 days) vs Zp

NE (cm³)

Lat, lon = 67.5, 0

DIFFS: ELECTRON DENSITY (CM3)
LAT, LON= 67.50, 0.00



MIN,MAX= -9.3387E+01 1.3139E+04 INTERVAL= 1.0000E+03

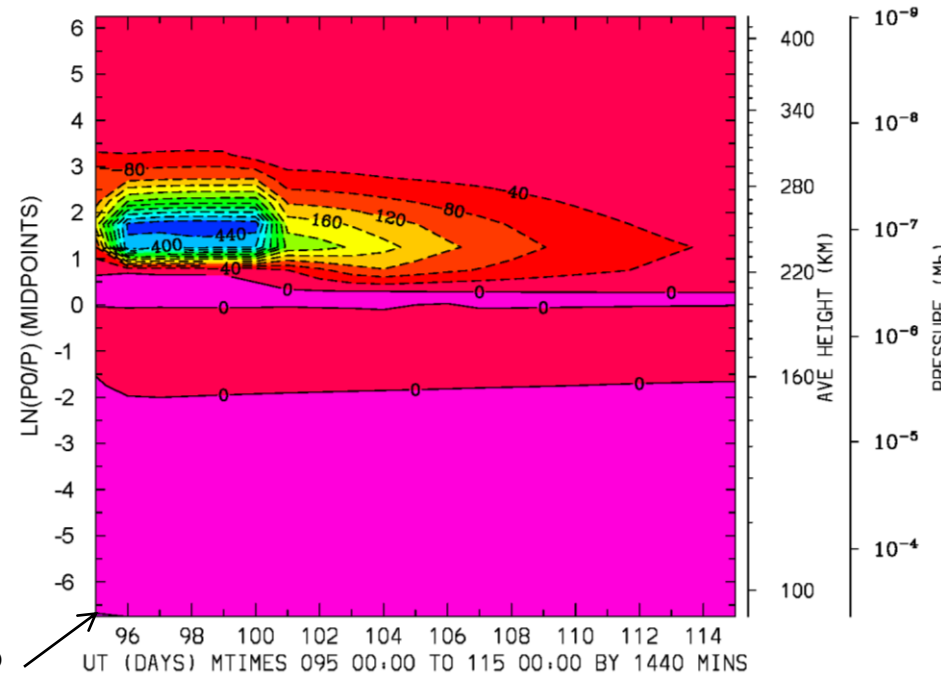
ST, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.3T, data/FOSTER.tiegcm1.93.p_src80_001.nc LAST, data/FOSTER.tiegcm1.93.p_src80_003.nc
ST, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.3T, data/FOSTER.tiegcm1.93.p_src95_001.nc LAST, data/FOSTER.tiegcm1.93.p_src95_003.nc

Min,Max = -93, 1.3e4

O2+ (cm³)

Lat, lon = 32.5, 0

DIFFS: O2+ ION (CM3)
LAT, LON= 32.50, 0.00



MIN,MAX= -4.7127E+02 4.2328E+01 INTERVAL= 4.0000E+01

Min,Max = -471, 42

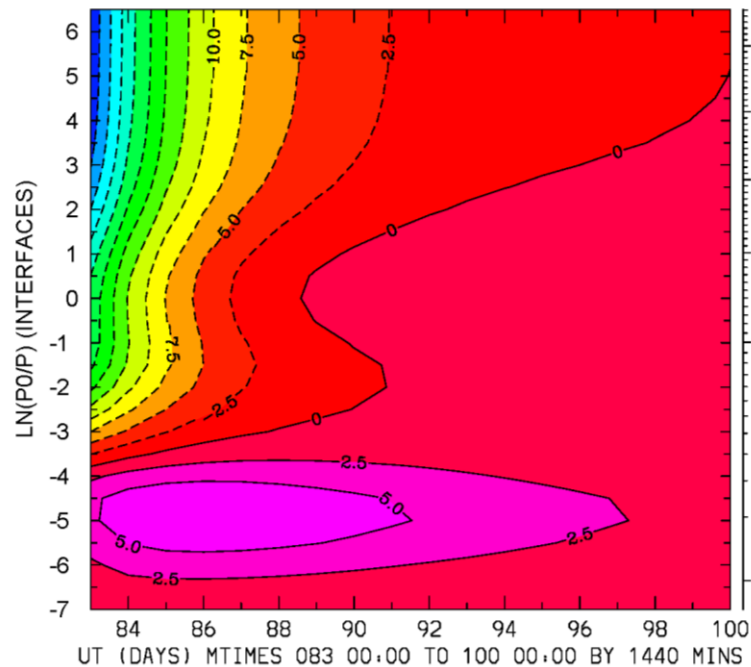
Side-by-side Comparisons of the two
cases: smin2max and 15-day offset

Case Comparisons

TN: Ut vs Zp, Lat -67.5

Differences: smin2smax
Days 83-100
TN: Lat = -67.5

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



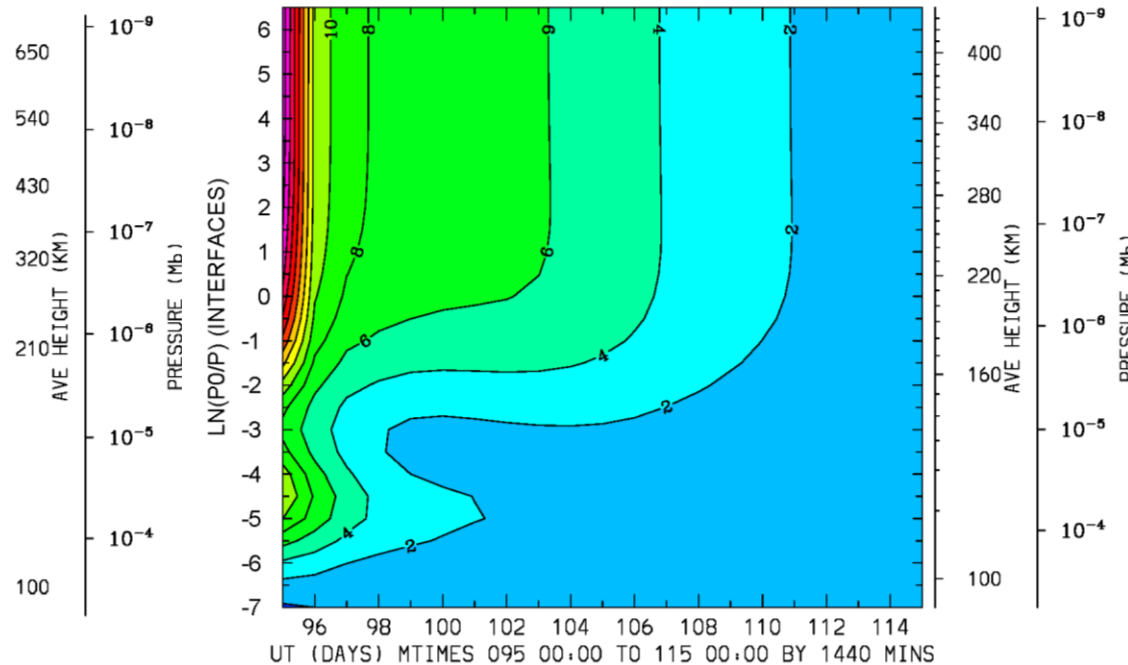
MIN,MAX= -2.9473E+01 7.5116E+00 INTERVAL= 2.5000E+00

RST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max = -29, 7.5
Interval = 2.5

Differences: 15-day Offset
Days 80-100
TN: Lat = -67.5

DIFFS: NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



MIN,MAX= -2.8827E-01 2.5249E+01 INTERVAL= 2.0000E+00

data/FOSTER.tiegcm1.93.p_src80_001.nc LAST: data/FOSTER.tiegcm1.93.p_src80_003.nc
data/FOSTER.tiegcm1.93.p_src95_001.nc LAST: data/FOSTER.tiegcm1.93.p_src95_003.nc

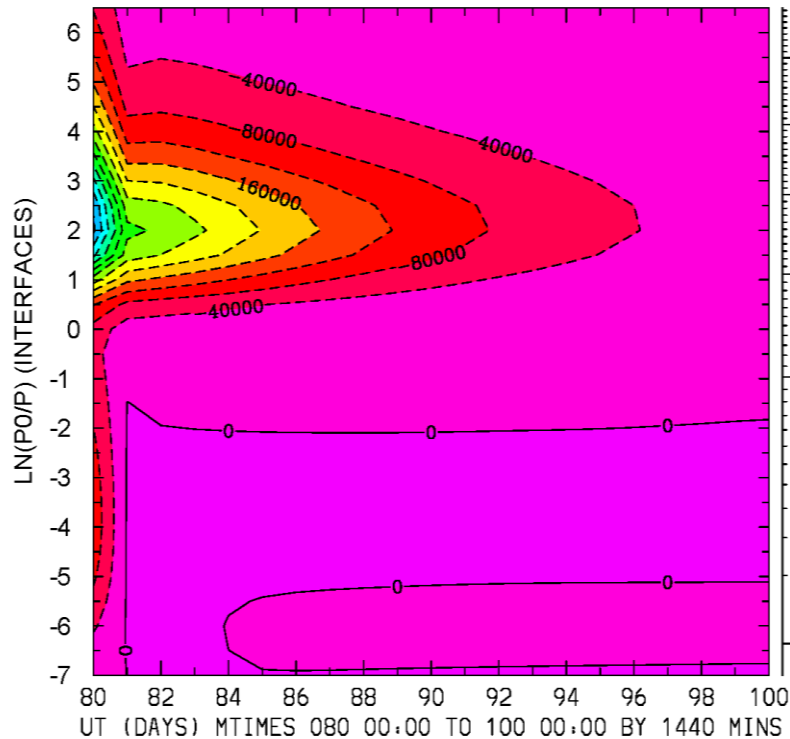
Min,Max = -0.3, 25
Interval = 2.0

Case Comparisons

NE: Ut vs Zp, Lat 67.5

Differences: smin2smax

DIFFS: ELECTRON DENSITY (CM3)
LAT, LON= 67.50, 0.00



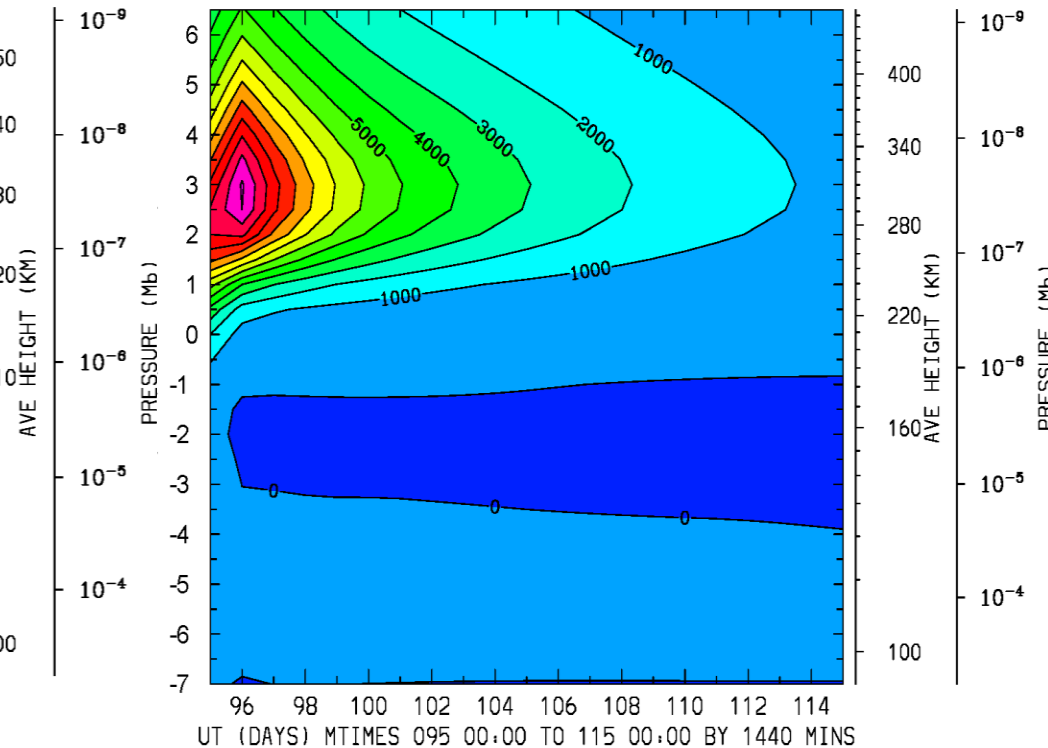
MIN,MAX= -4.8821E+05 3.2899E+03 INTERVAL= 4.0000E+04

IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_003.nc
TR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_003.nc

Min,Max=-5e5, 3.3e3
Interval = 40,000

Differences: 15-day Offset

DIFFS: ELECTRON DENSITY (CM3)
LAT, LON= 67.50, 0.00



MIN,MAX= -9.3387E+01 1.3139E+04 INTERVAL= 1.0000E+03

ta/FOSTER.tiegcm1.93.p_src80_001.nc LAST: data/FOSTER.tiegcm1.93.p_src80_003.nc
ta/FOSTER.tiegcm1.93.p_src95_001.nc LAST: data/FOSTER.tiegcm1.93.p_src95_003.nc

Min,Max = -93, 1.3e4
Interval = 1000

Replicating CCMC Simulations:

- A 5-day GPI/Linux run was made by the CCMC, following a 20-day equilibration run.
- A series of equivalent 5-day GPI runs were made on a 64-bit HAO Linux machine (arc), following different equilibration times:
 - 5-day equilibration preceding 5-day production run
 - 10-day equilibration preceding 5-day production run
 - 20-day equilibration preceding 5-day production run
- Comparisons are made between CCMC output and the three HAO runs.

CCMC vs HAO/5-day spinup

TN: Ut vs Zp (20-minute histories)

HAO

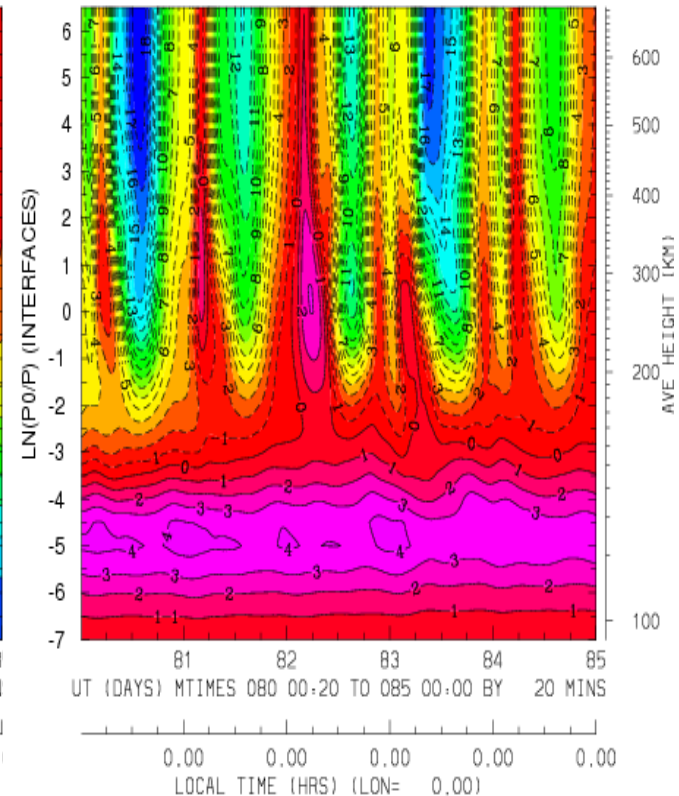
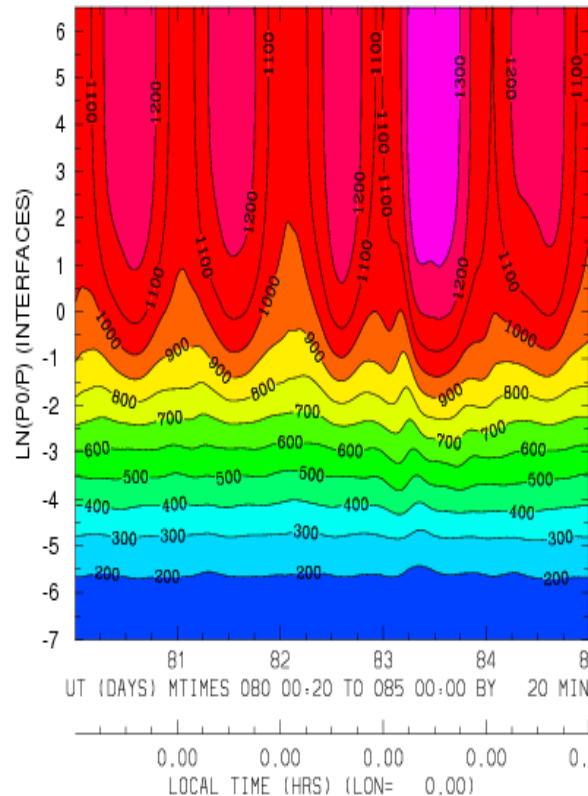
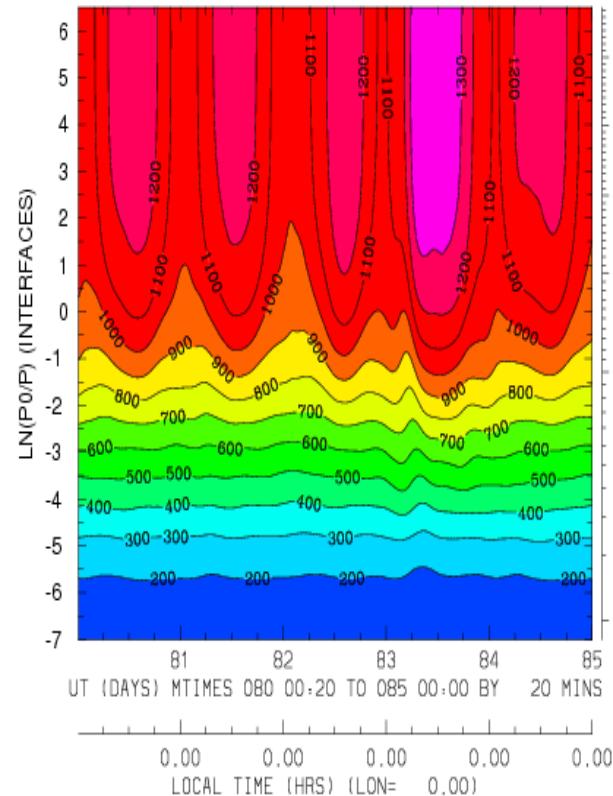
CCMC

Diffs: HAO-CCMC

NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00

NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00

DIFFS, NEUTRAL TEMPERATURE (DEG K)
LAT, LON=-67.50, 0.00



MIN,MAX= 1.6620E+02 1.3783E+03 INTERVAL= 1.0000E+02
FIRST: hao_05daysrc/FOSTER.tlegcm_05daysrc.sgpl_eqnx_001.nc
LAST: hao_05daysrc/FOSTER.tlegcm_05daysrc.sgpl_eqnx_015.nc

MIN,MAX= 1.6541E+02 1.3954E+03 INTERVAL= 1.0000E+02
FIRST: ccmc_data/s001.nc
LAST: ccmc_data/s015.nc

MIN,MAX= -1.8936E+01 4.3940E+00 INTERVAL= 1.0000E+00
FOSTER.tlegcm_05daysrc.sgpl_eqnx_001.nc LAST: hao_05daysrc/FOSTER.tlegcm_05daysrc.sgpl_eqnx_015.nc
CNTR FIRST: ccmc_data/s001.nc LAST: ccmc_data/s015.nc

Full Field: Min,Max = 165, 1395 (deg K)

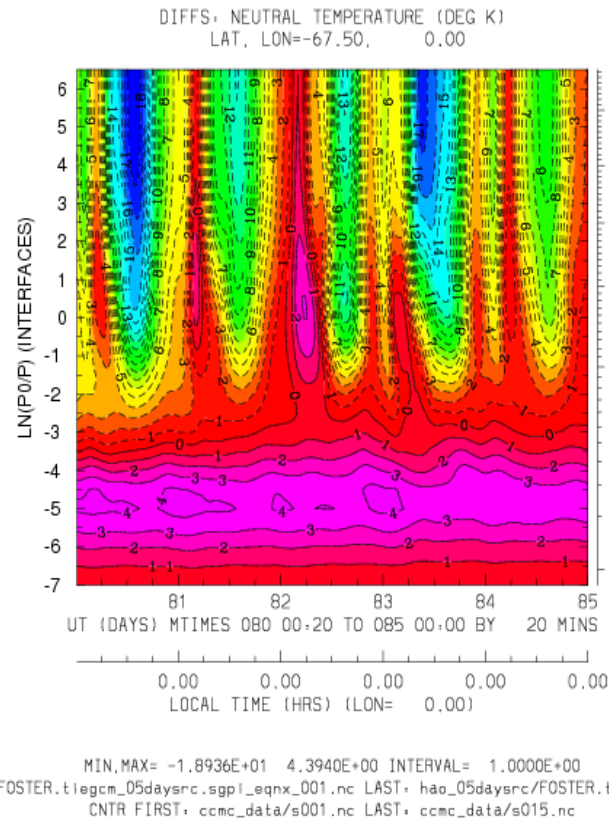
Diffs: Min,Max = -19, 4.4 (K)

Differences: HAO minus CCMC

(5, 10, and 20 day HAO spinups)

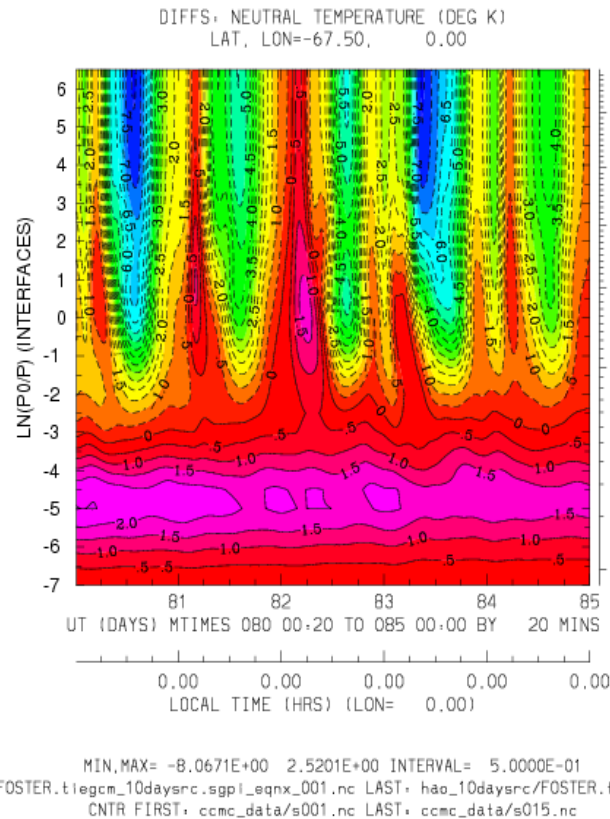
TN: Ut vs Zp (20-min histories)

Diffs: 5-day spinup



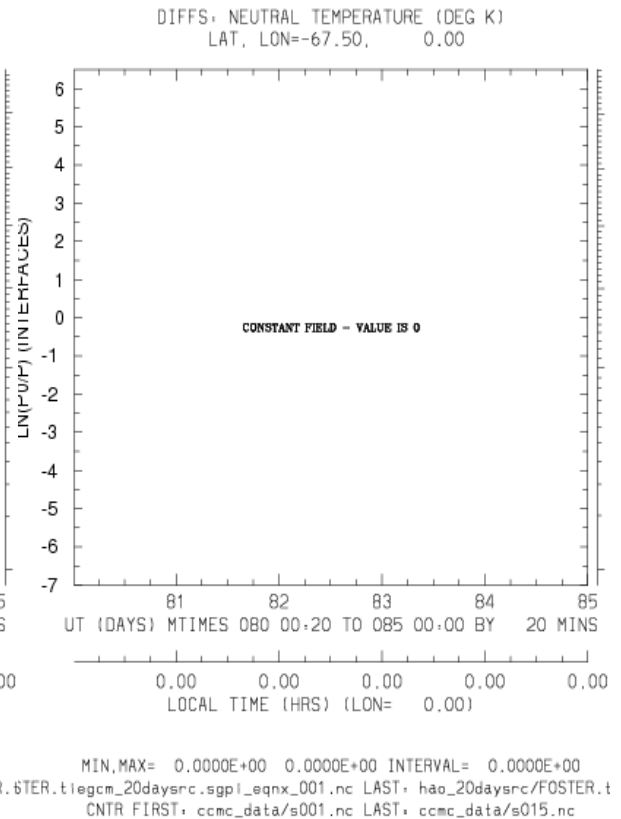
Min,Max = -19,4.4 deg K
Interval = 1.

Diffs: 10-day spinup



Min,Max = -8,2.5 deg K
Interval = 0.5

Diffs 20-day spinup



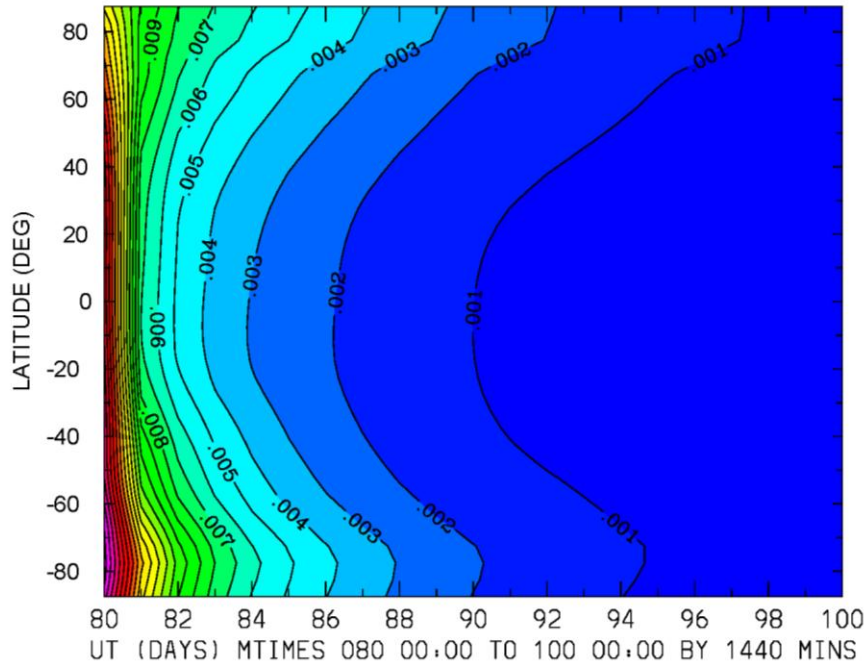
Min,Max = 0,0 deg K

The End
(additional plots follow)

Difference: smin2max Offset minus smax Control UT (20 days) vs Latitude

O₂ (mmr) Z_p = 0.75

DIFFS: MOLECULAR OXYGEN (MMR)
ZP = 0.750 LONGITUDE = -180.00



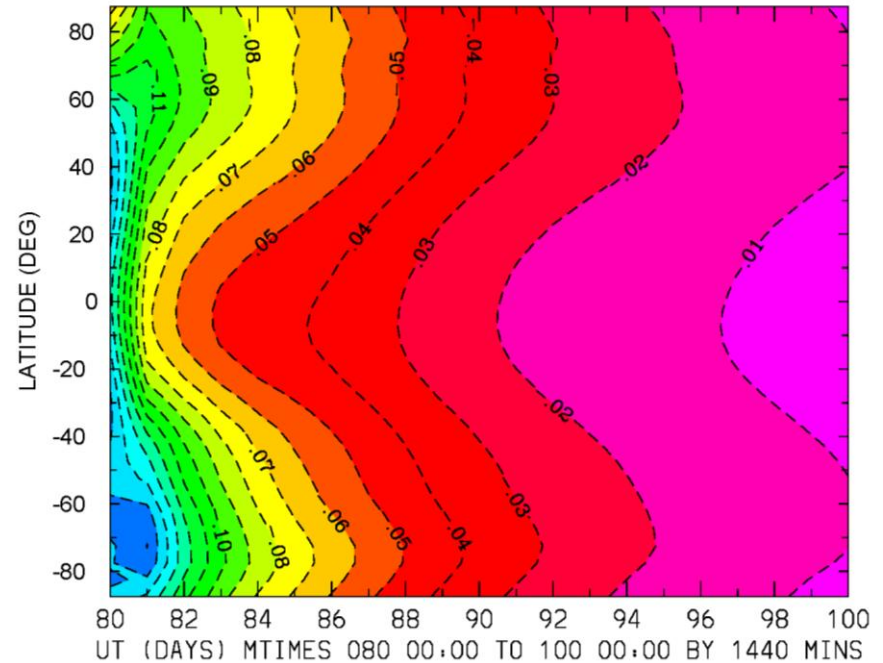
MIN,MAX= 2.4197E-04 2.3449E-02 INTERVAL= 1.0000E-03

IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc

Min,Max = 2.4e-4, 2.3e-2

O (mmr) Z_p = 0.75

DIFFS: ATOMIC OXYGEN (MMR)
ZP = 0.750 LONGITUDE = -180.00

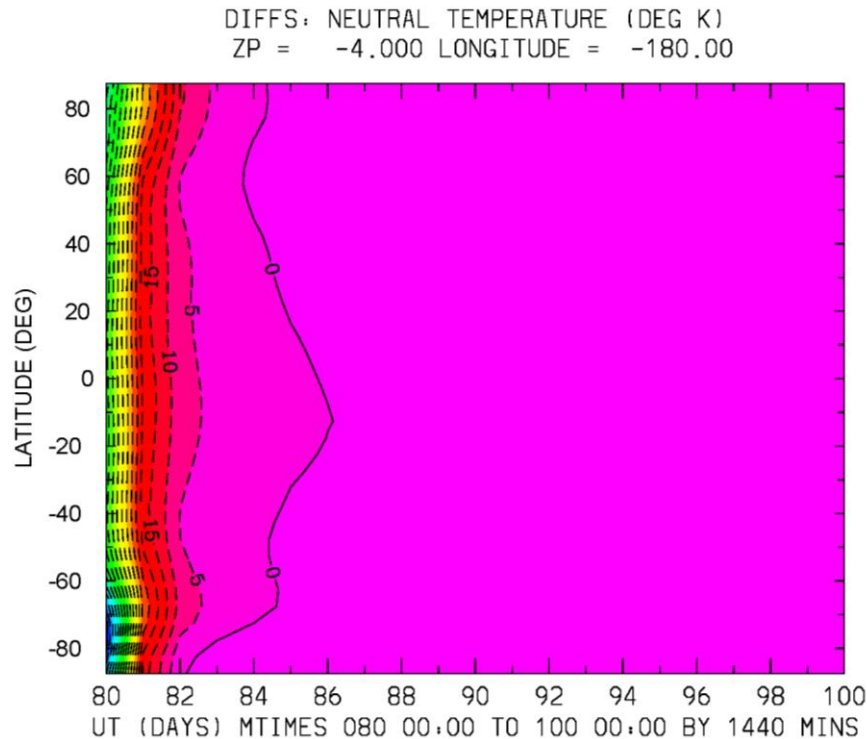


MIN,MAX= -1.6018E-01 -6.5495E-03 INTERVAL= 1.0000E-02

Min,Max = -1.6e-1, -6.5e-3

Difference: smin2max minus smax
UT vs Latitude (daily)

TN (deg K) $Z_p=-4$

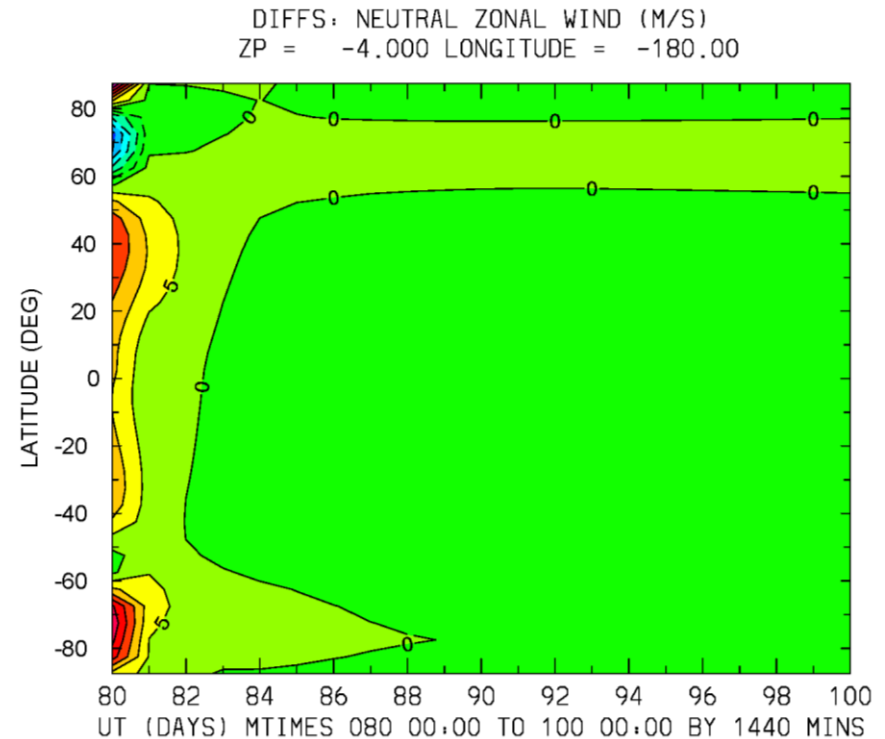


MIN,MAX= -9.8516E+01 4.6892E+00 INTERVAL= 5.0000E+00

RST, FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST, FOSTER.tiegcm1.93.p_smiRST, FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST, FOSTER.tiegcm1.93.p_smin2
NTR FIRST, FOSTER.tiegcm1.93.p_smax_001.nc LAST, FOSTER.tiegcm1.93.p_smaNTR FIRST, FOSTER.tiegcm1.93.p_smax_001.nc LAST, FOSTER.tiegcm1.93.p_smax_

Min,Max = -100, 4.7
Interval = 5.

UN (m/s) Zp=-4



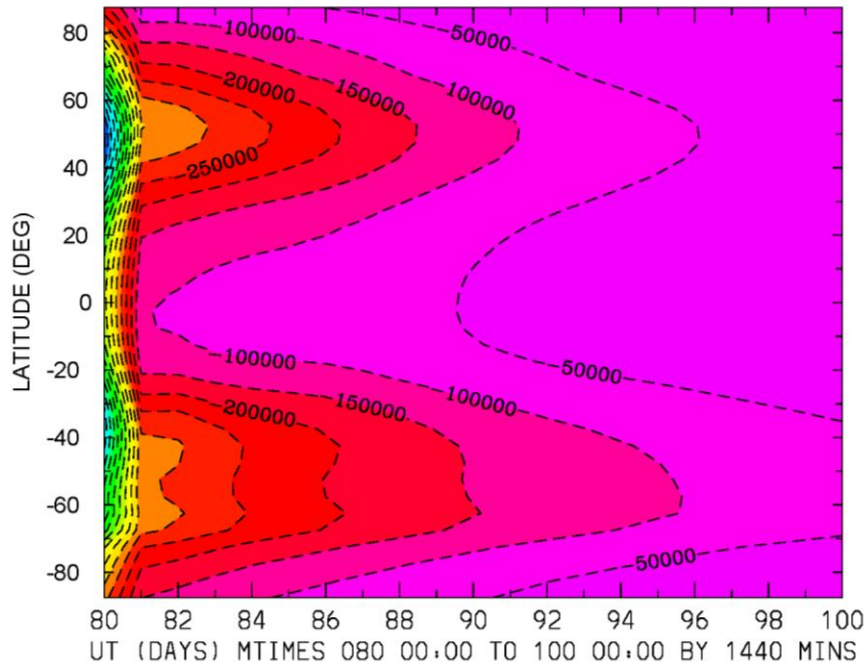
MIN,MAX= -2.7013E+01 3.7176E+01 INTERVAL= 5.0000E+00

Min,Max=-27,37
Interval = 5.

Difference: smin2max minus smax UT vs Latitude

NE (cm³) Zp = 0

DIFFS: ELECTRON DENSITY (CM3)
ZP = 0.000 LONGITUDE = -180.00



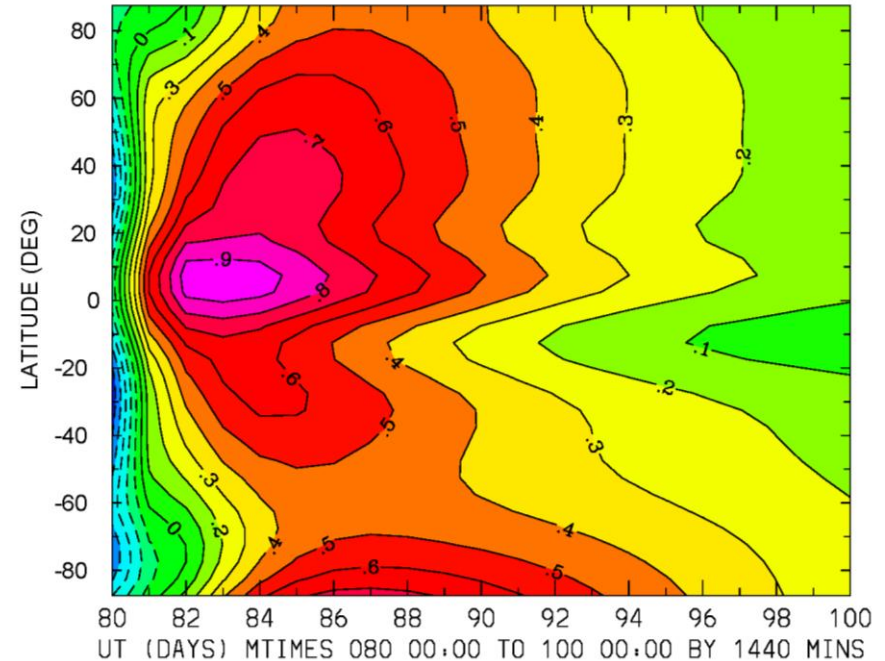
MIN,MAX= -9.1238E+05 -5.4423E+03 INTERVAL= 5.0000E+04

IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
NTR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_001.nc

Min,Max=-9e5,-5e3
Interval = 5.e4

TE (deg K) Zp = -6.75

DIFFS: ELECTRON TEMPERATURE (DEG K)
ZP = -6.750 LONGITUDE = -180.00



MIN,MAX= -5.6381E-01 9.6094E-01 INTERVAL= 1.0000E-01

IRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
NTR FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_001.nc

Min,Max=-.5,.96
Interval = 0.1

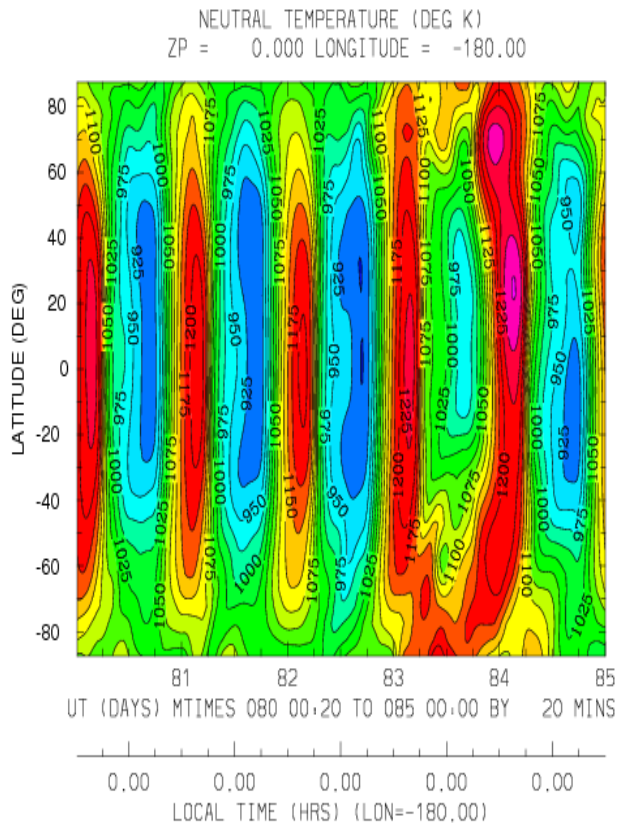
CCMC vs HAO/5-day spinup:

TN: Ut vs Latitude (20-minute histories)

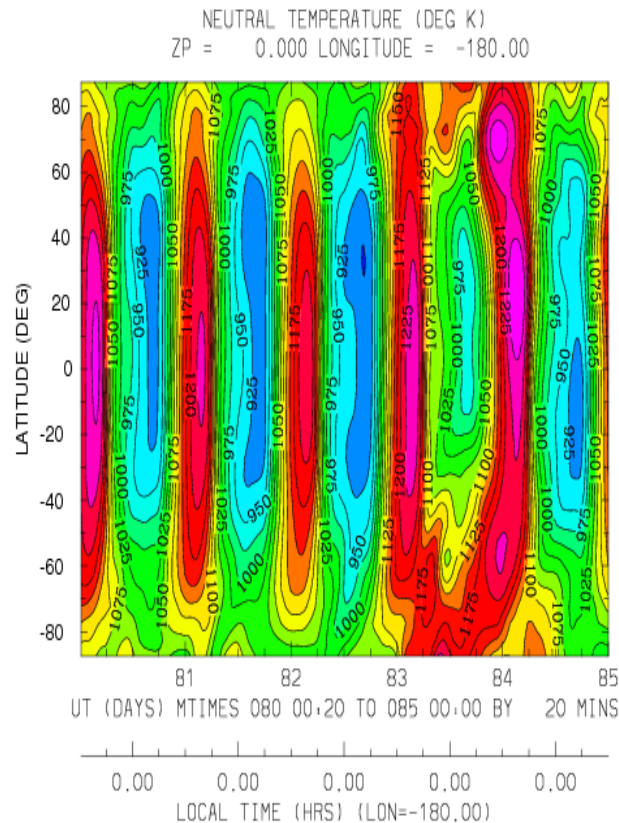
HAO

CCMC

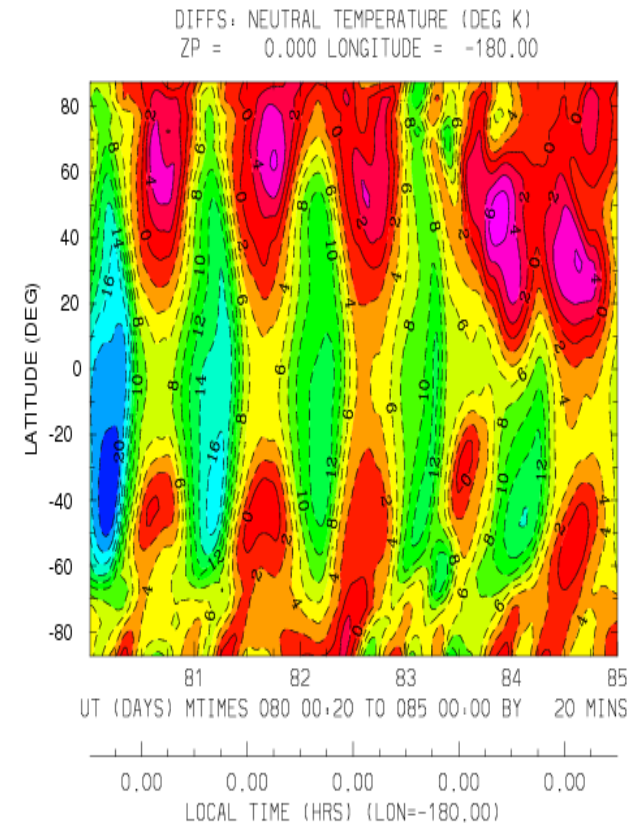
Diffs: HAO-CCMC



MIN,MAX= 8.9928E+02 1.2763E+03 INTERVAL= 2.5000E+01
FIRST: hao_05daysrc/FOSTER.tiegcm_05daysrc.sgpi_eqnx_001.nc
LAST: hao_05daysrc/FOSTER.tiegcm_05daysrc.sgpi_eqnx_015.nc



MIN,MAX= 8.9887E+02 1.2747E+03 INTERVAL= 2.5000E+01
FIRST: ccmc_data/s001.nc
LAST: ccmc_data/s015.nc



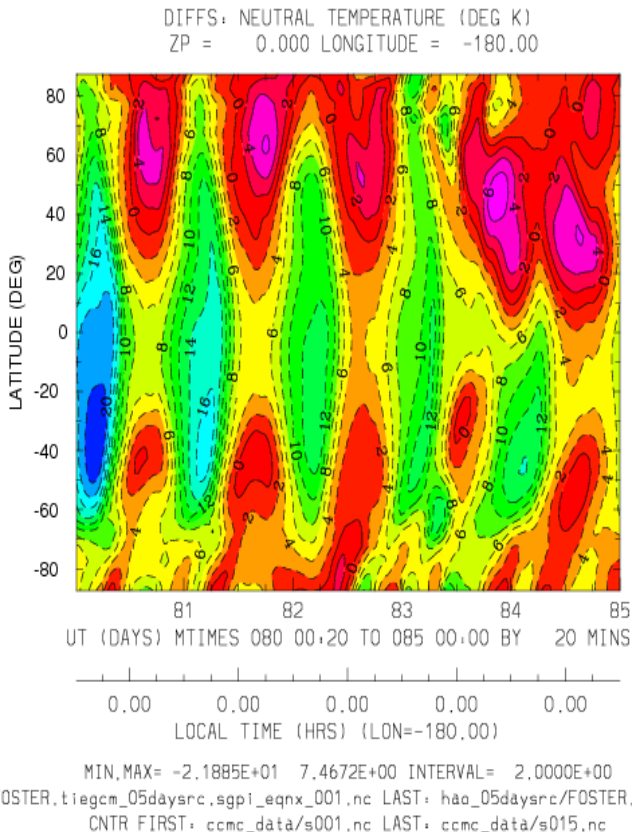
MIN,MAX= -2.1885E+01 7.4672E+00 INTERVAL= 2.0000E+00
FOSTER.tiegcm_05daysrc.sgpi_eqnx_001.nc LAST: hao_05daysrc/FOSTER.tiegcm_05daysrc.sgpi_eqnx_015.nc
CNTR FIRST: ccmc_data/s001.nc LAST: ccmc_data/s015.nc

Full Field: Min,Max = 900, 1275 (deg K)

Diffs: Min,Max = -22, 7.5 (K)

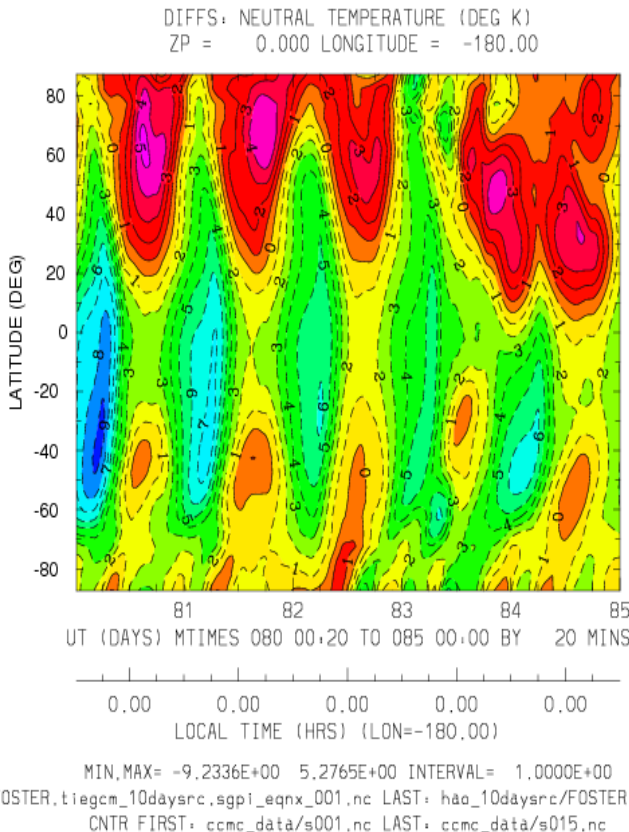
TN: Ut vs Latitude (20-min histories)

Diffs: 5-day spinup



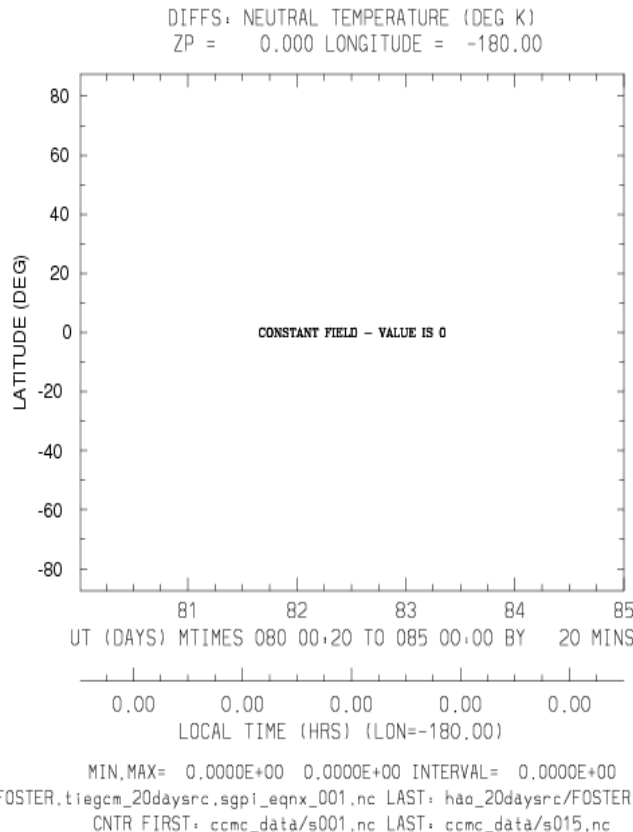
Min,Max = -22,7.5 deg K

Diffs: 10-day spinup



Min,Max = -9.2,5.2 deg K

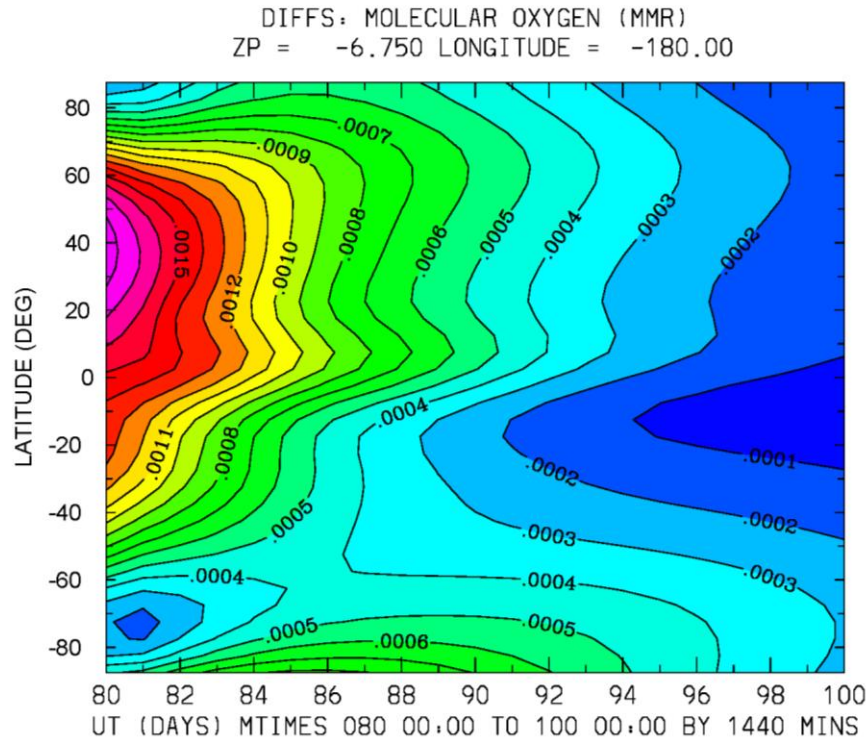
Diffs 20-day spinup



Min,Max = 0,0 deg K

Difference: smin2max minus smax UT (20 days) vs Latitude

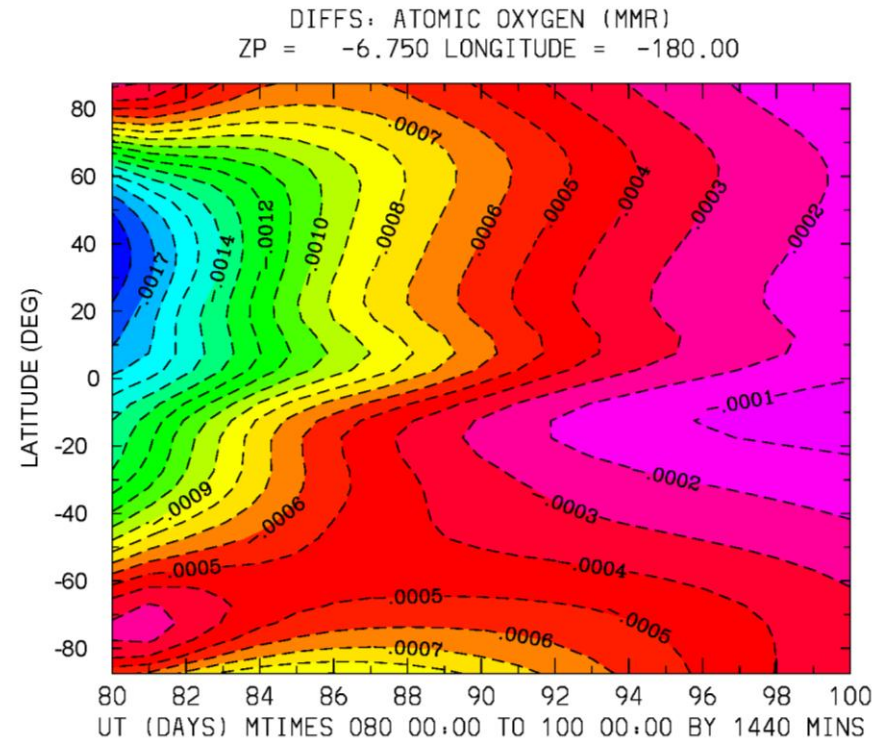
O₂ (mmr) Z_p = -6.75



MIN,MAX= 4.2647E-05 1.8534E-03 INTERVAL= 1.0000E-04
FIRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_001.nc

Min,Max=4e-5,2e-3
Interval = 1.e-4

O (mmr) Z_p = -6.75



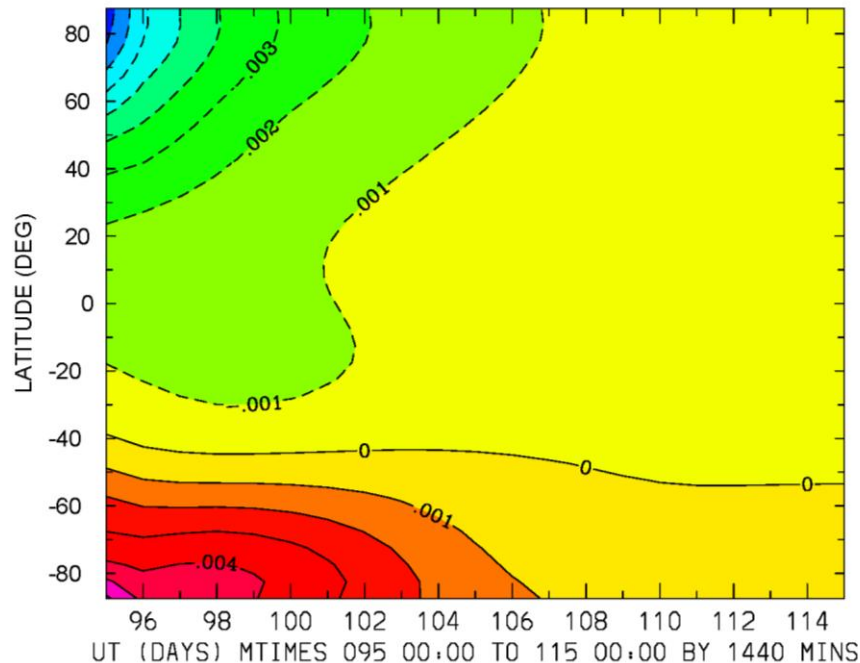
MIN,MAX= -1.8800E-03 -5.6044E-05 INTERVAL= 1.0000E-04
FIRST: FOSTER.tiegcm1.93.p_smin2smax_001.nc LAST: FOSTER.tiegcm1.93.p_smin2smax_001.nc
FIRST: FOSTER.tiegcm1.93.p_smax_001.nc LAST: FOSTER.tiegcm1.93.p_smax_001.nc

Min,Max=-2e-3,-6e-5
Interval = 1.e-4

Difference: 15-day Offset run Minus Control UT (20 days) vs Latitude

O₂ (mmr) Zp = 0.75

DIFFS: MOLECULAR OXYGEN (MMR)
ZP = 0.750 LONGITUDE = -180.00



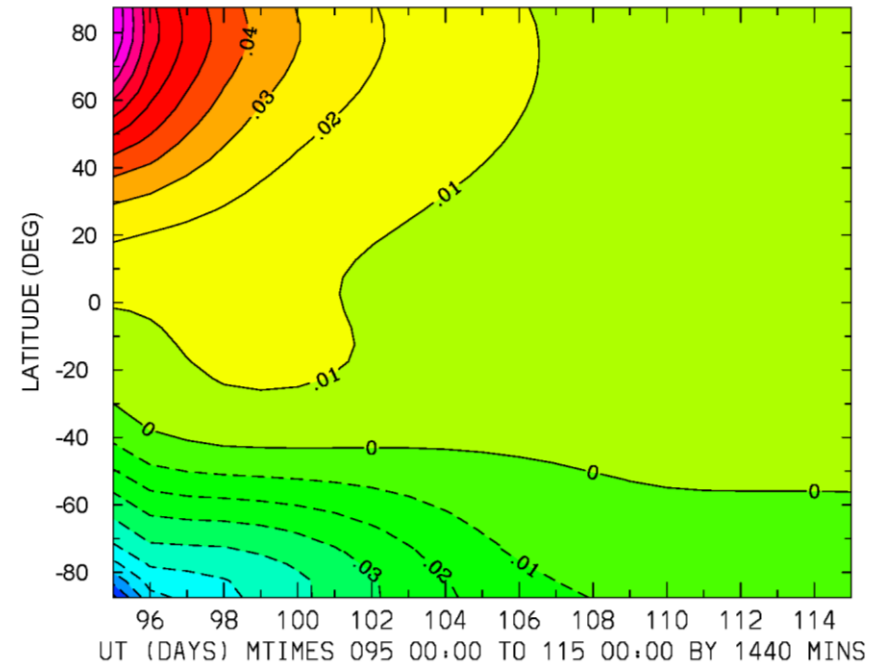
MIN,MAX= -8.5536E-03 6.1983E-03 INTERVAL= 1.0000E-03

ST: data/FOSTER.tiegcm1.93.p_src80_001.nc LAST: data/FOSTER.tiegcm1.93.p_src80_001.nc
ST: data/FOSTER.tiegcm1.93.p_src95_001.nc LAST: data/FOSTER.tiegcm1.93.p_src95_001.nc

Min,Max = -8.5e-3, 6.2e-3
Interval = 1.e-3

O (mmr) Zp = 0.75

DIFFS: ATOMIC OXYGEN (MMR)
ZP = 0.750 LONGITUDE = -180.00



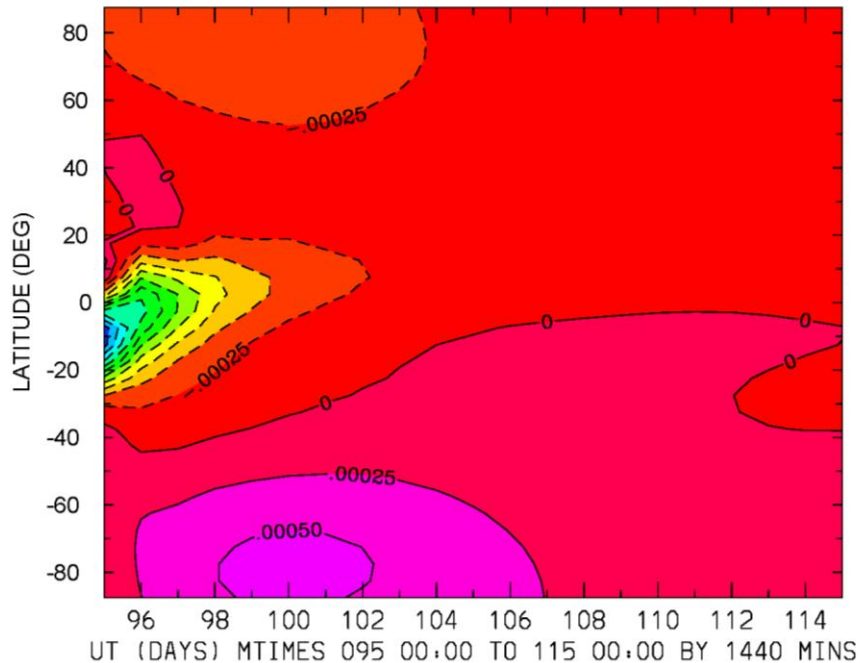
MIN,MAX= -9.2480E-02 1.0964E-01 INTERVAL= 1.0000E-02

Min,Max = -9.2e-2, 1.0e-1
Interval = 1.e-2

Difference: 15-day Offset run Minus Control UT (20 days) vs Latitude

O₂ (mmr) Z_p = -6.75

DIFFS: MOLECULAR OXYGEN (MMR)
ZP = -6.750 LONGITUDE = -180.00



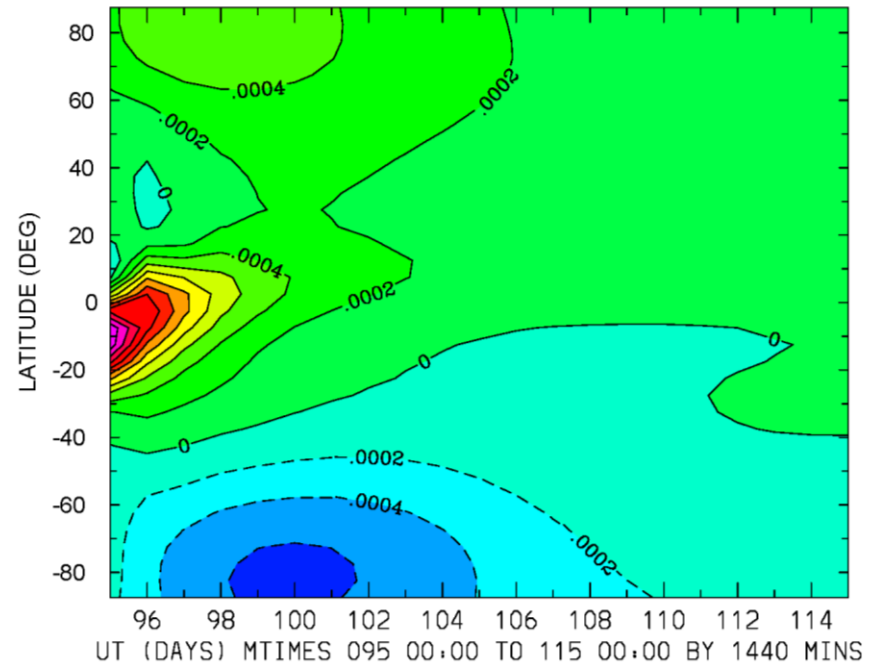
MIN,MAX= -2.6149E-03 5.6478E-04 INTERVAL= 2.5000E-04

ST: data/FOSTER.tiegcm1.93.p_src80_001.nc LAST: data/FOSTER.tiegcm1.93.p_src80_001.nc
ST: data/FOSTER.tiegcm1.93.p_src95_001.nc LAST: data/FOSTER.tiegcm1.93.p_src95_001.nc

Min,Max = -2.6e-3, 5.6e-4
Interval = 2.5e-4

O (mmr) Z_p -6.75

DIFFS: ATOMIC OXYGEN (MMR)
ZP = -6.750 LONGITUDE = -180.00



MIN,MAX= -6.5172E-04 2.1378E-03 INTERVAL= 2.0000E-04

ST: data/FOSTER.tiegcm1.93.p_src80_001.nc LAST: data/FOSTER.tiegcm1.93.p_src80_001.nc
ST: data/FOSTER.tiegcm1.93.p_src95_001.nc LAST: data/FOSTER.tiegcm1.93.p_src95_001.nc

Min,Max = -6.5e-4, 2.1e-3
Interval = 2.e-4