VALIDATION OF AIRS PRODUCTS USING ECMWF (AND TOMS)

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AIRS Science Team Meeting

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SCOPE

Results shown are from 2 JGR Validation papers

1) "Accuracy of Geophysical Parameters Derived from AIRS/AMSU as a function of Fractional Cloud Cover"

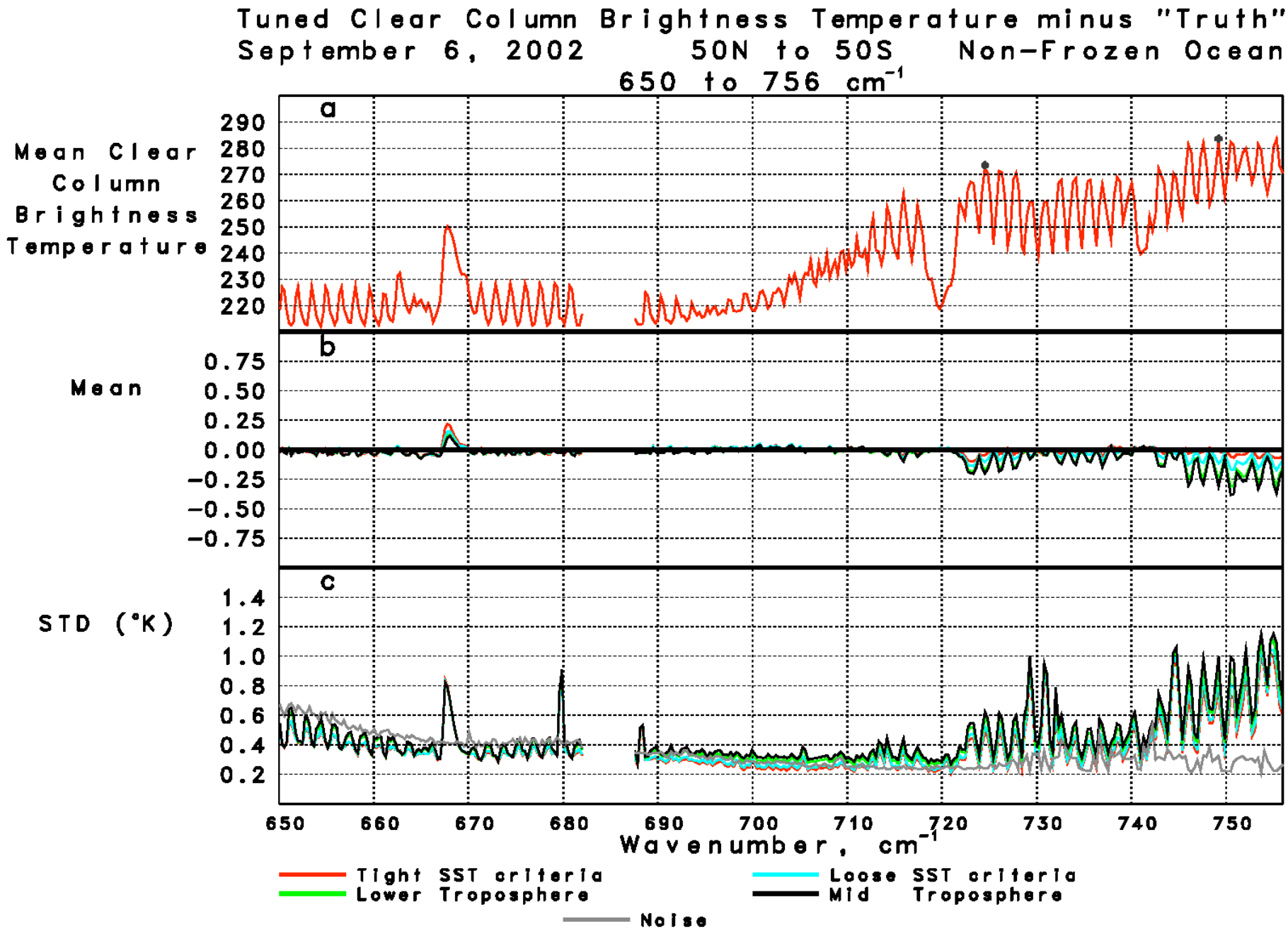
Will show comparison of single spot clear column radiances with ECMWF "truth"

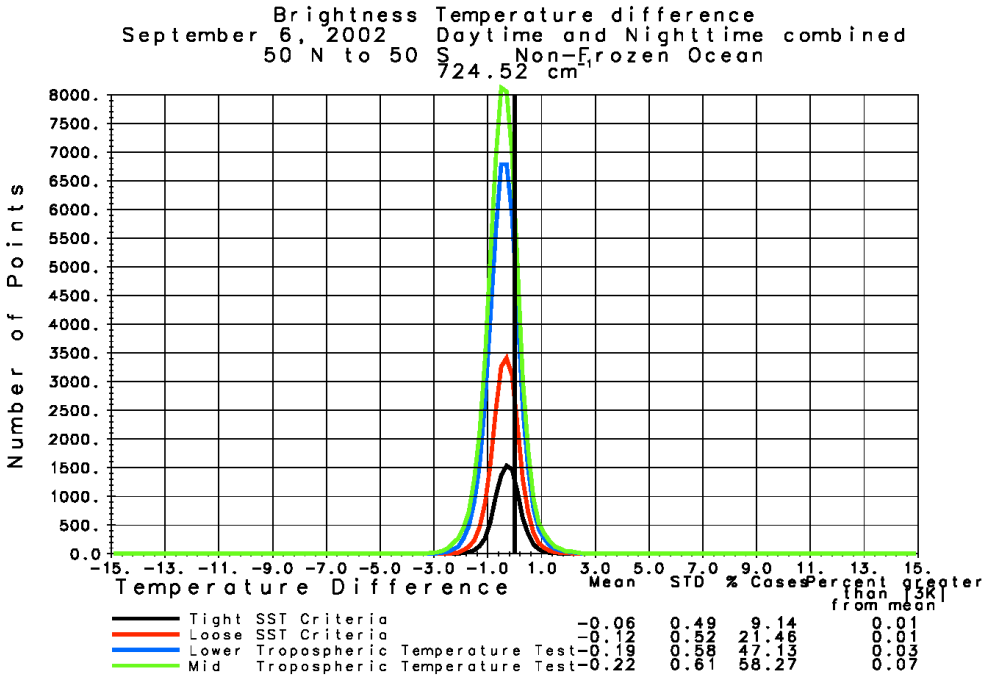
2) "Validation of interannual difference of AIRS monthly mean parameters"

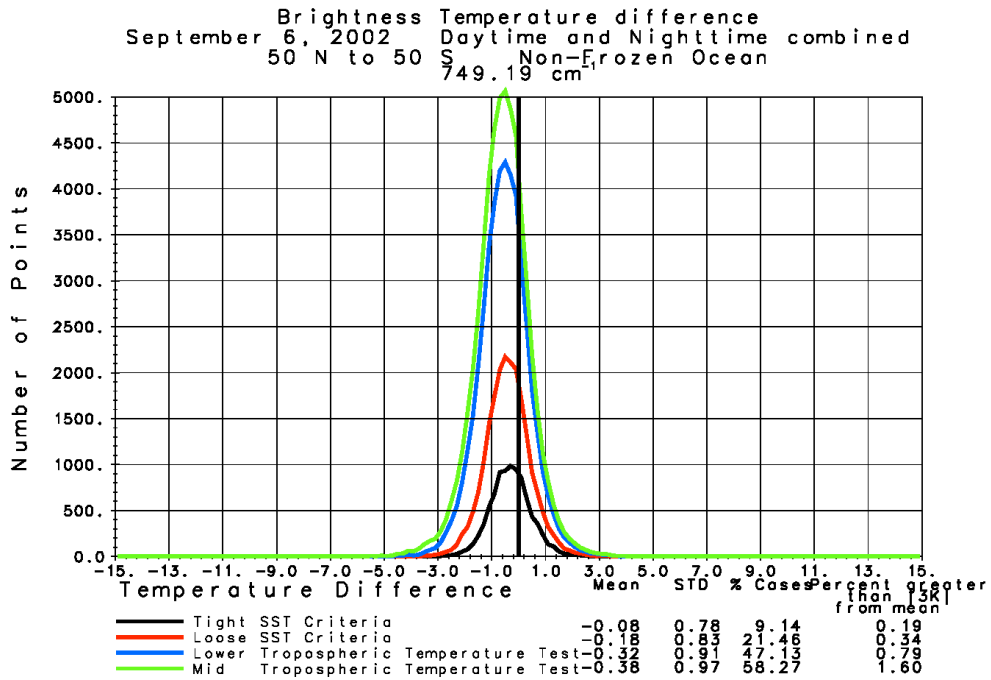
Will compare monthly T(p), q(p), T_{skin} with ECMWF

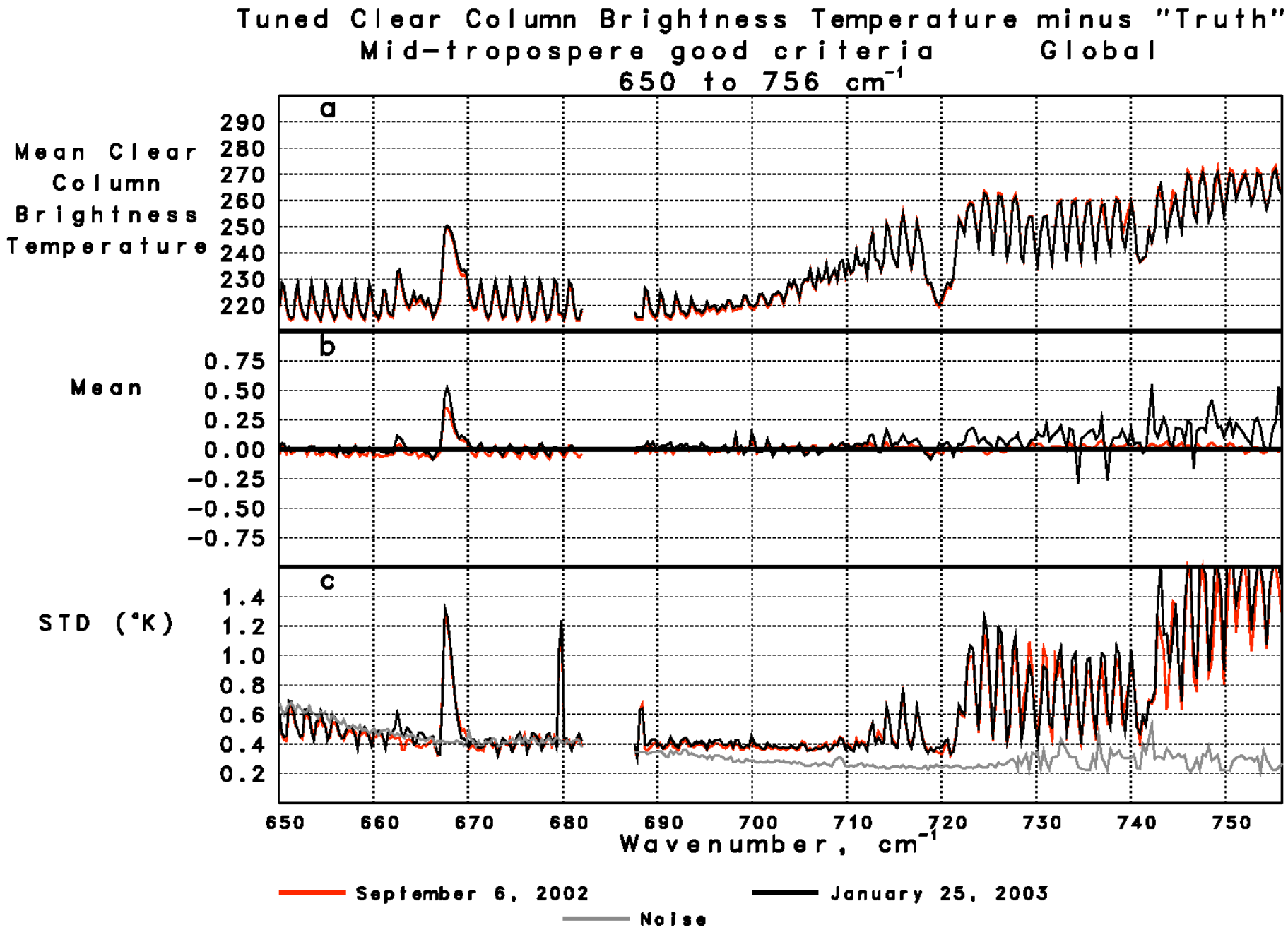
Will compare total O_3 with TOMS

OLR, MSU2R/MSU4 shown in Climate talk

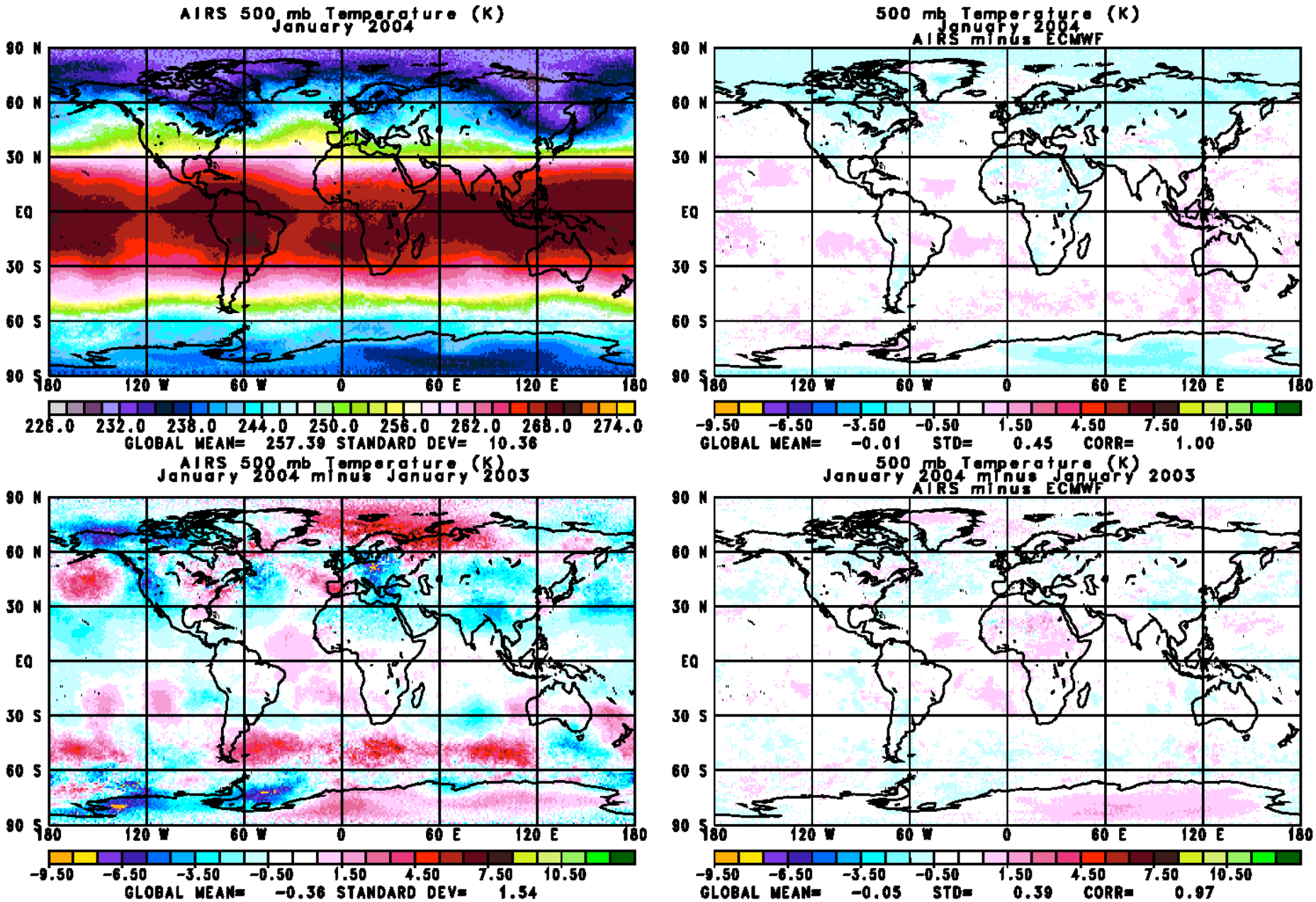

Tuned Clear Column Brightness Temperature minus "Truth"
September 6, 2002 50N to 50S Non-Frozen Ocean
650 to 756 cm-1
a
b
c
Mean Clear Column Brightness Temperature
Mean
STD (°K)
290
280
270
260
250
240
230
220
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
1.4
1.2
1.0
0.8
0.6
0.4
0.2
650
660
670
680
690
700
710
720
730
740
750
Wavenumber, cm-1
Tight SST criteria
Loose SST criteria
Lower Troposphere
Mid Troposphere
Noise


Brightness Temperature difference
September 6, 2002 Daytime and Nighttime combined
50 N to 50 S Non-Frozen Ocean
724.52 cm-1
Number of Points
Temperature Difference
Mean STD % Cases Percent greater than |3K| from mean
Tight SST Criteria -0.06 0.49 9.14 0.01
Loose SST Criteria -0.12 0.52 21.46 0.01
Lower Tropospheric Temperature Test -0.19 0.58 47.13 0.03
Mid Tropospheric Temperature Test -0.22 0.61 58.27 0.07

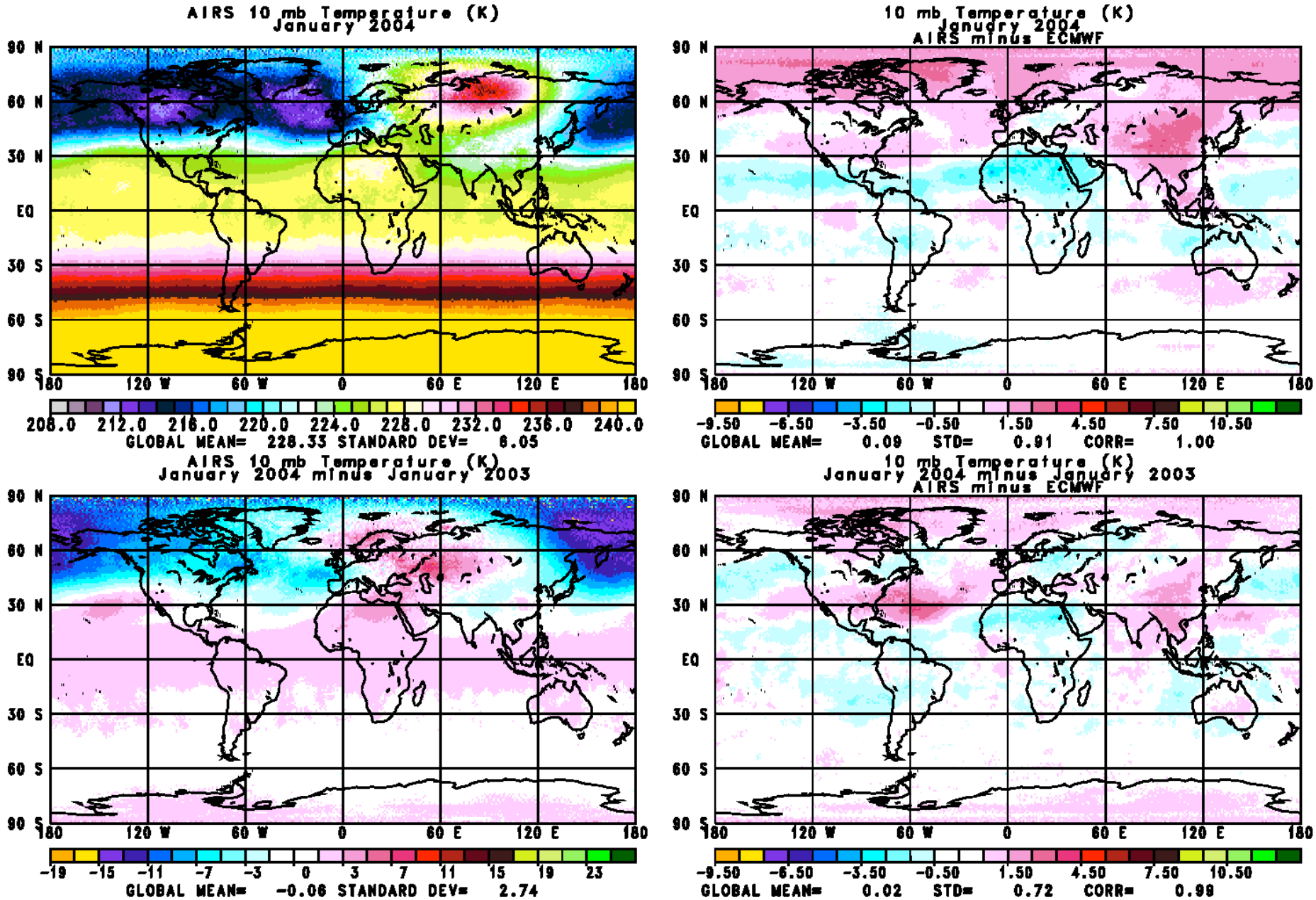

Brightness Temperature difference
September 6, 2002 Daytime and Nighttime combined
50 N to 50 S Non-Frozen Ocean
749.19 cm-1
Number of Points
Temperature Difference
Mean STD % Cases Percent greater than |3K| from mean
Tight SST Criteria -0.08 0.78 9.14 0.19
Loose SST Criteria -0.18 0.83 21.46 0.34
Lower Tropospheric Temperature Test -0.32 0.91 47.13 0.79
Mid Tropospheric Temperature Test -0.38 0.97 58.27 1.60


Tuned Clear Column Brightness Temperature minus "Truth"
Mid-tropospere good criteria Global
650 to 756 cm-1
a
b
c
Mean Clear Column Brightness Temperature
Mean
STD (°K)
290
280
270
260
250
240
230
220
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
1.4
1.2
1.0
0.8
0.6
0.4
0.2
650
660
670
680
690
700
710
720
730
740
750
Wavenumber, cm-1
September 6, 2002
January 25, 2003
Noise

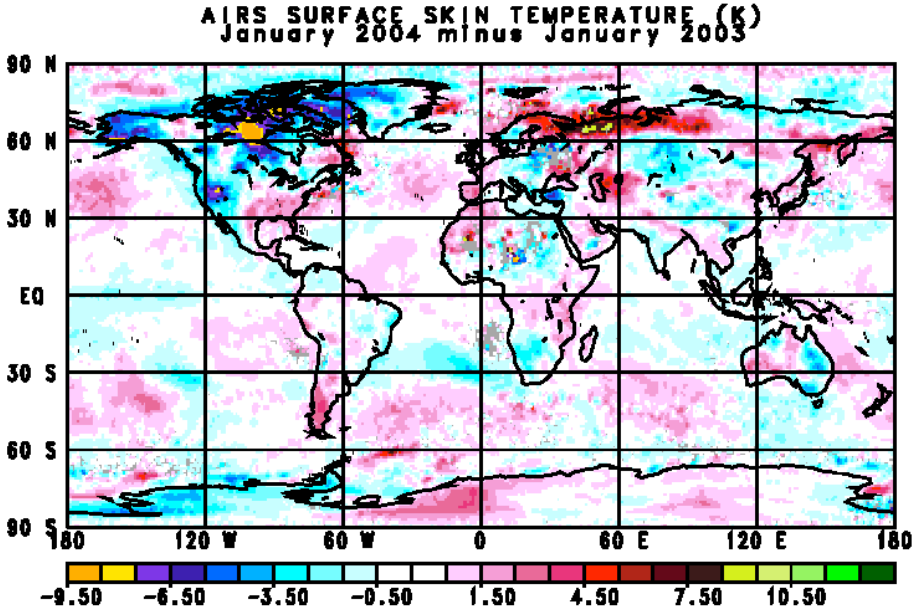
500 mb Temperature (K)

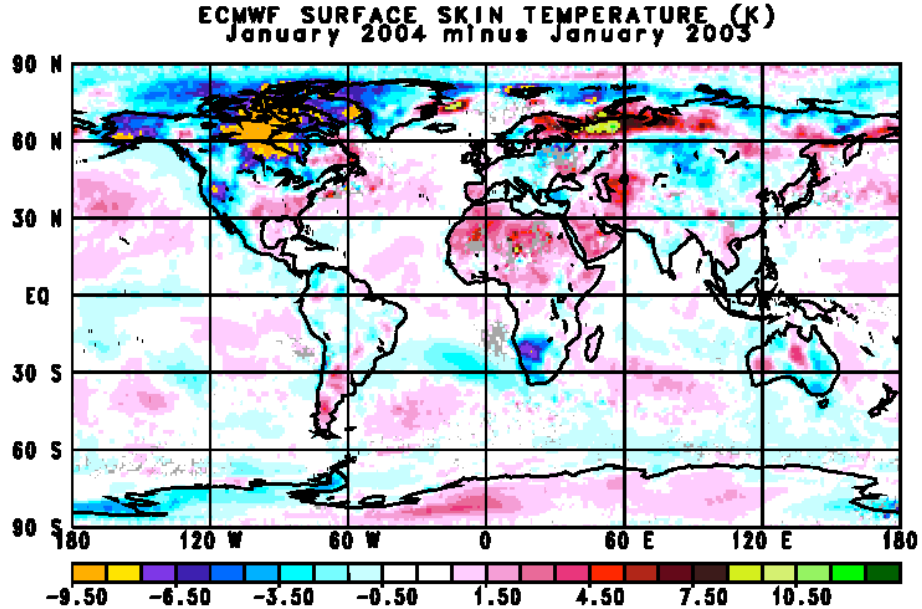


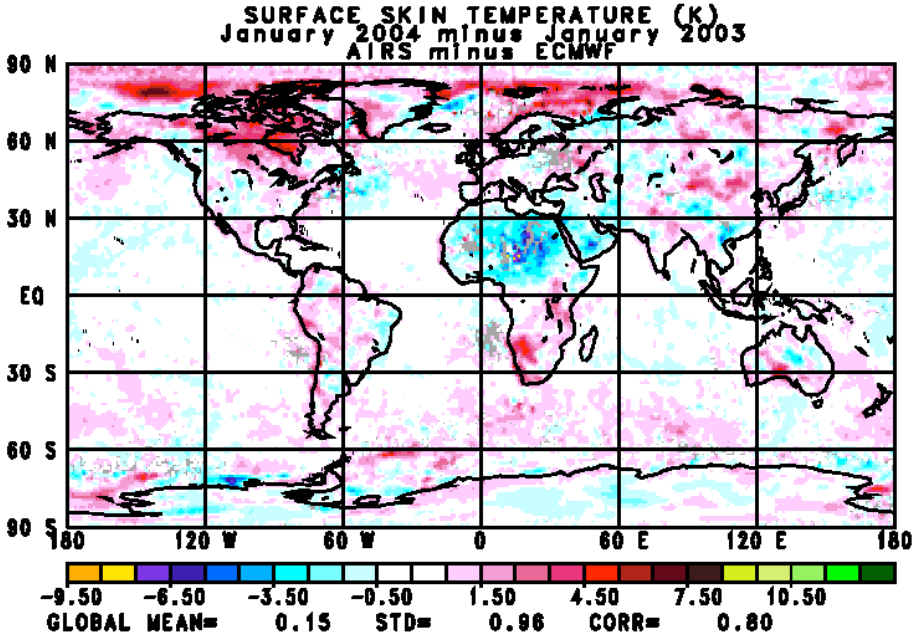
10 mb Temperature (K)

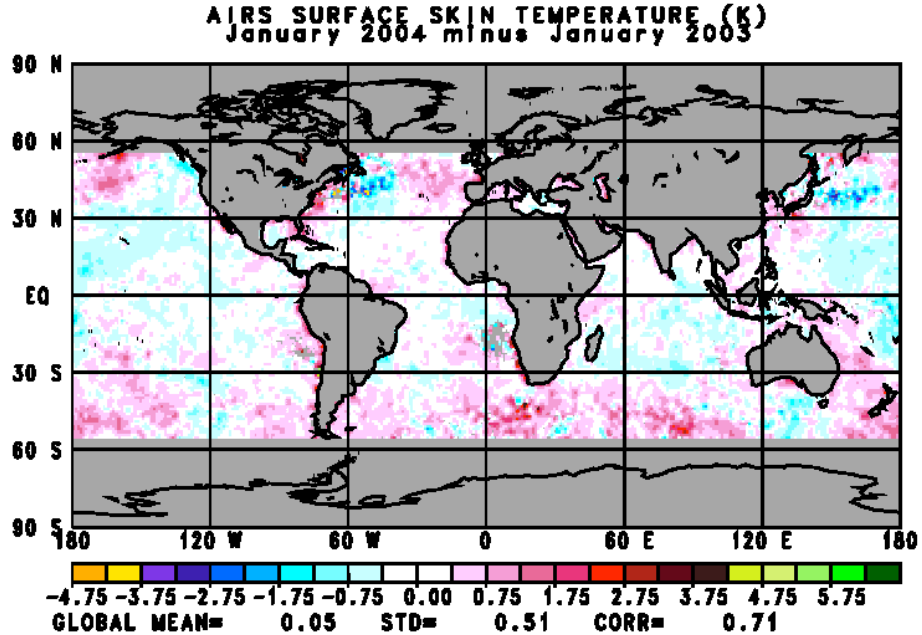


SST criteria
Mid-Troposphere criteria over land

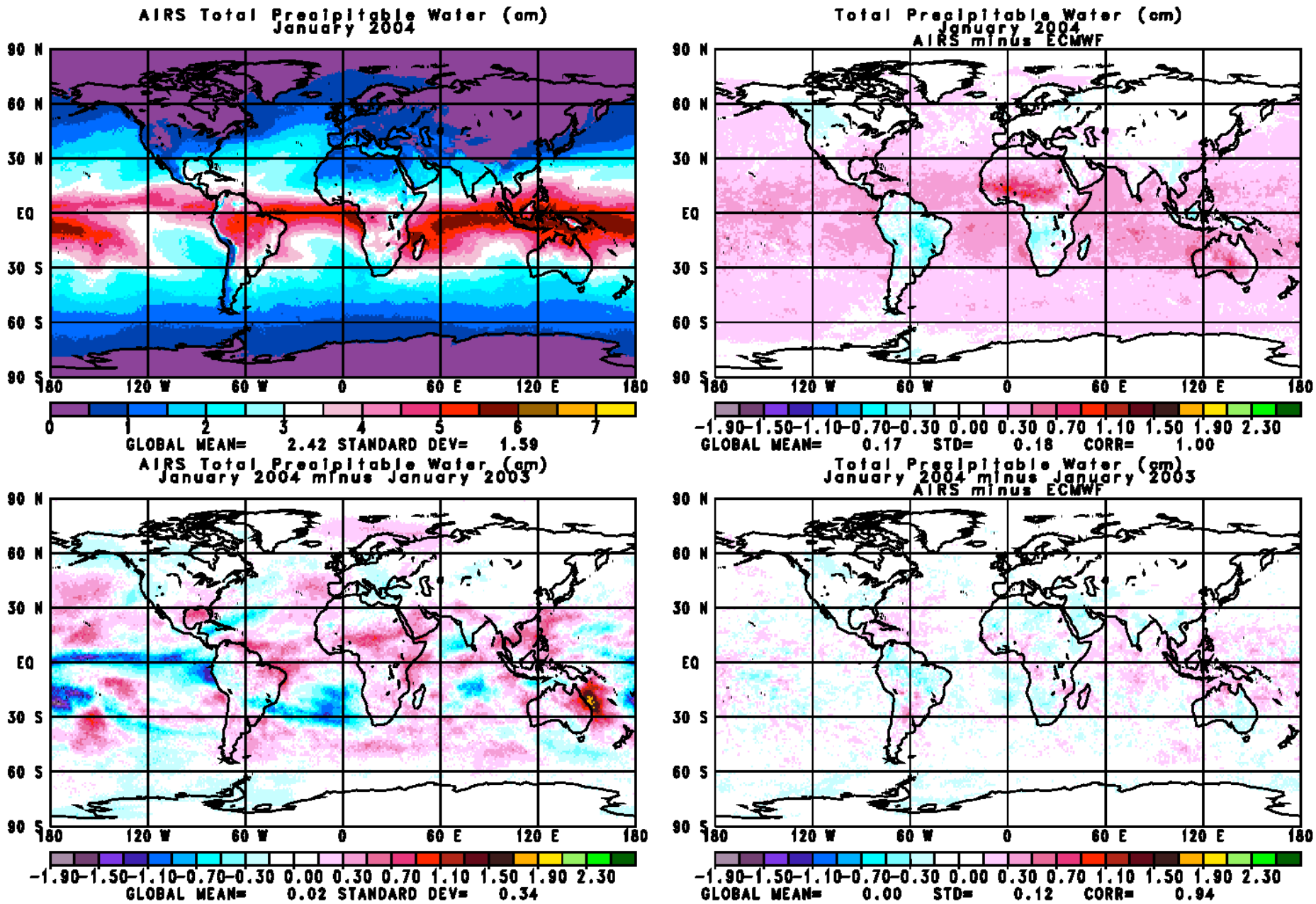




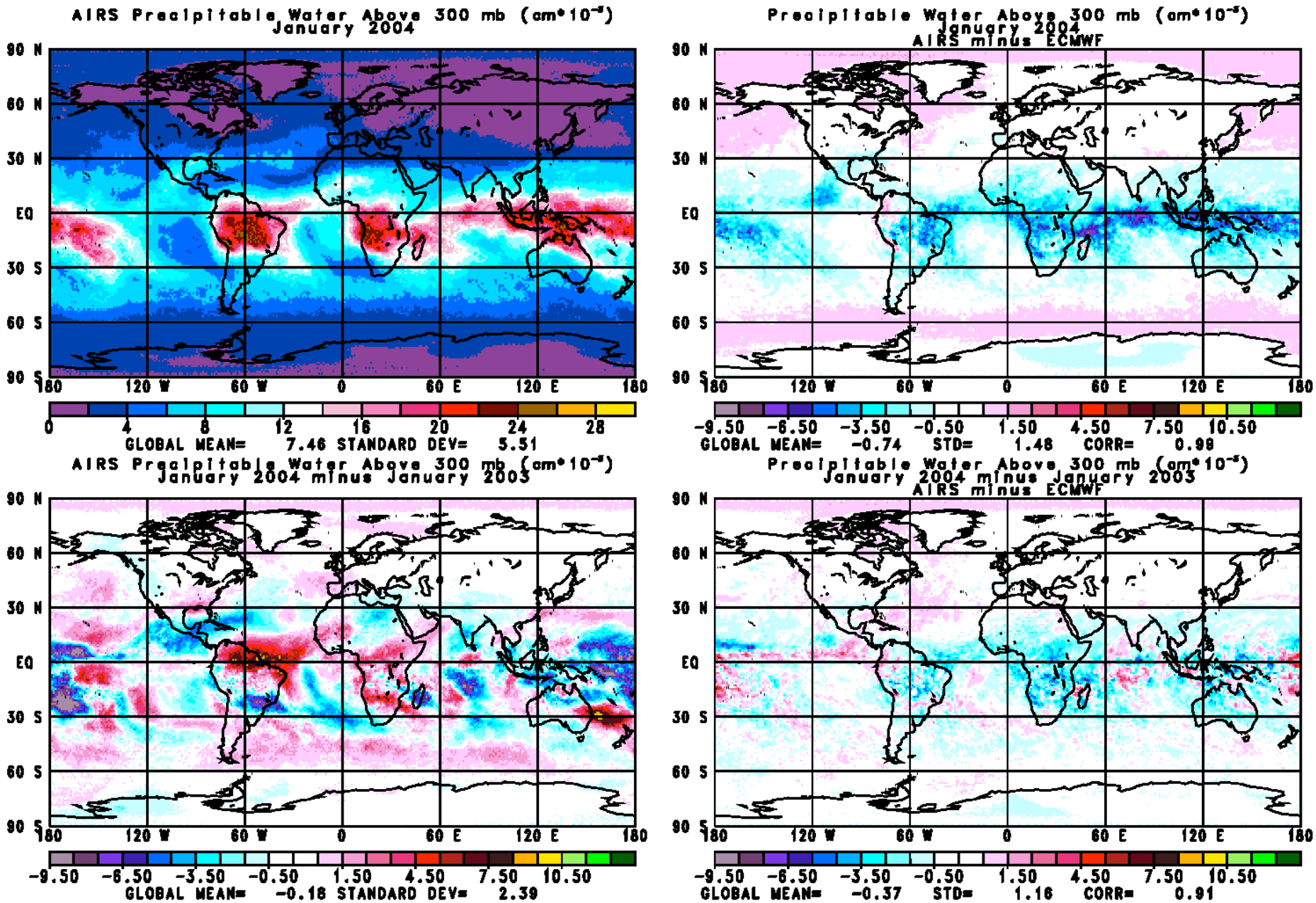




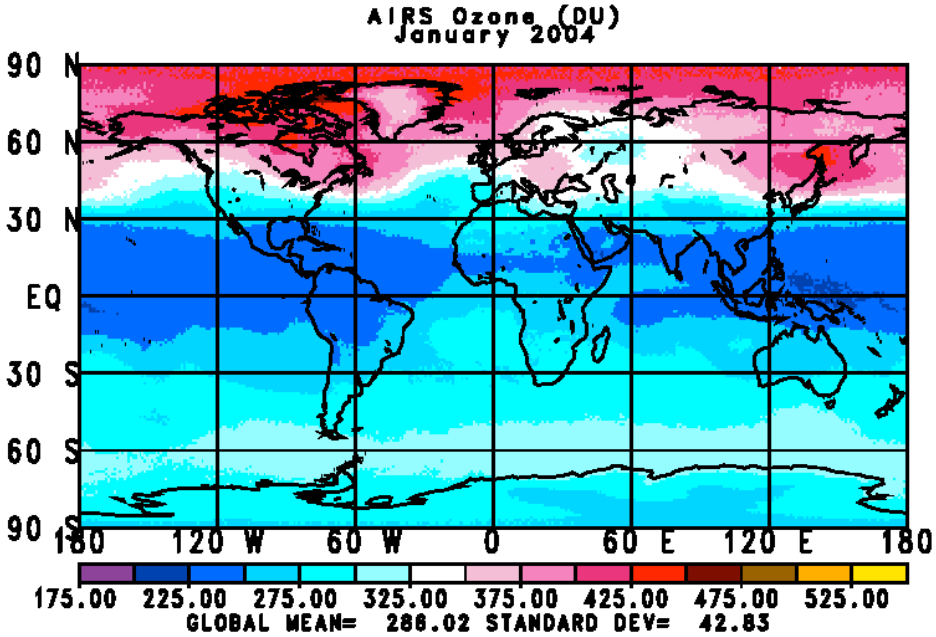
Total Precipitable Water (cm)

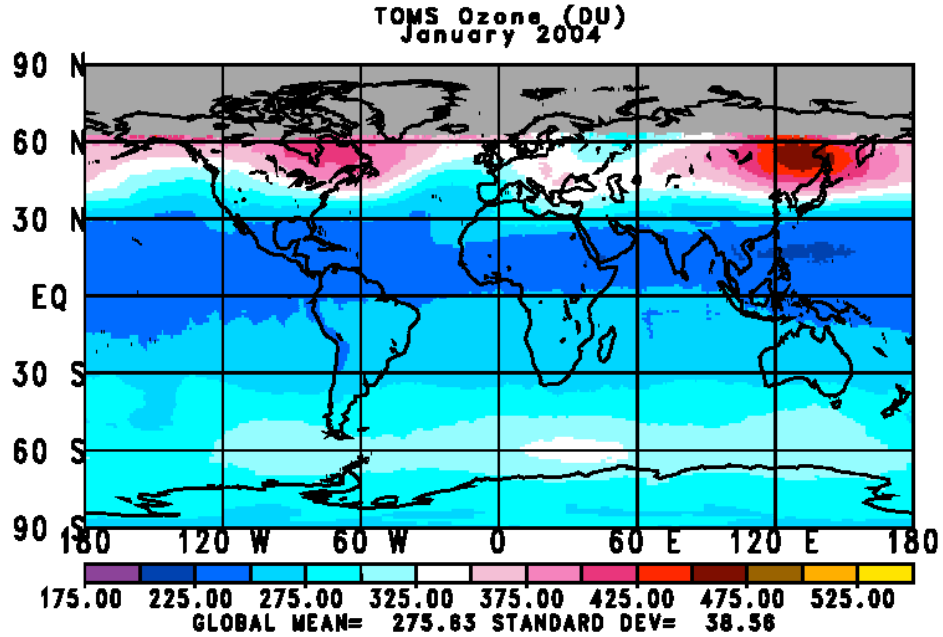


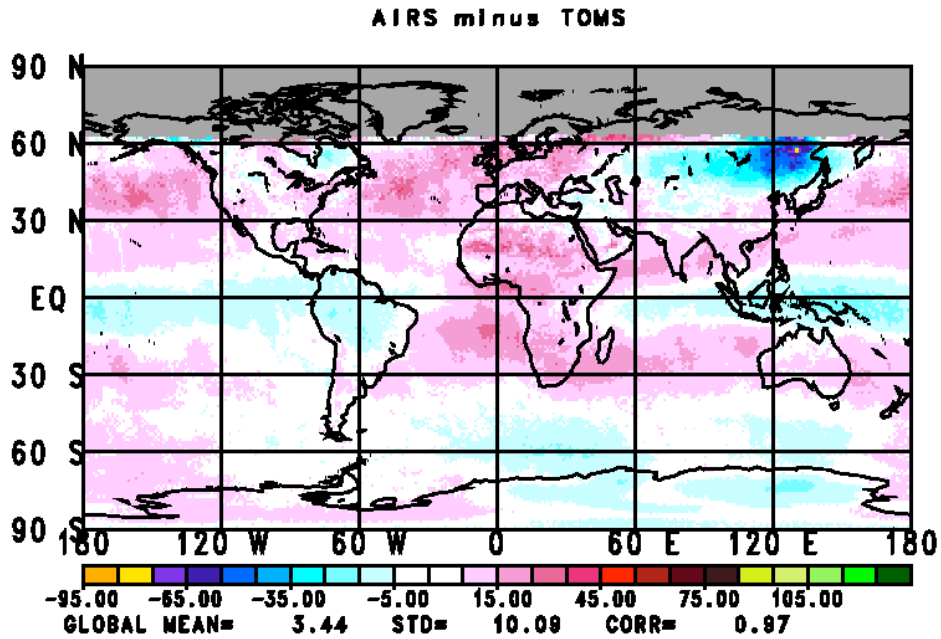
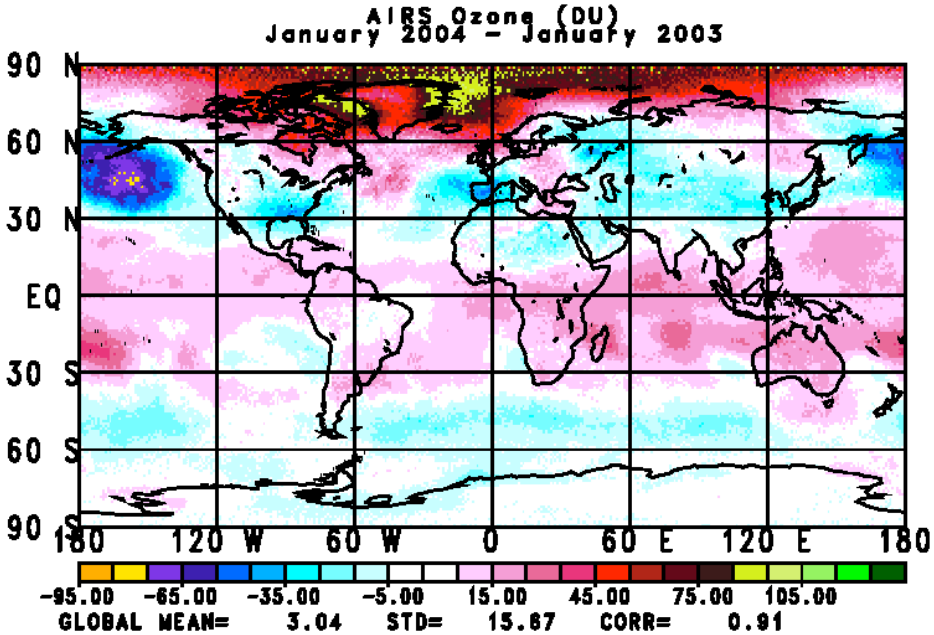
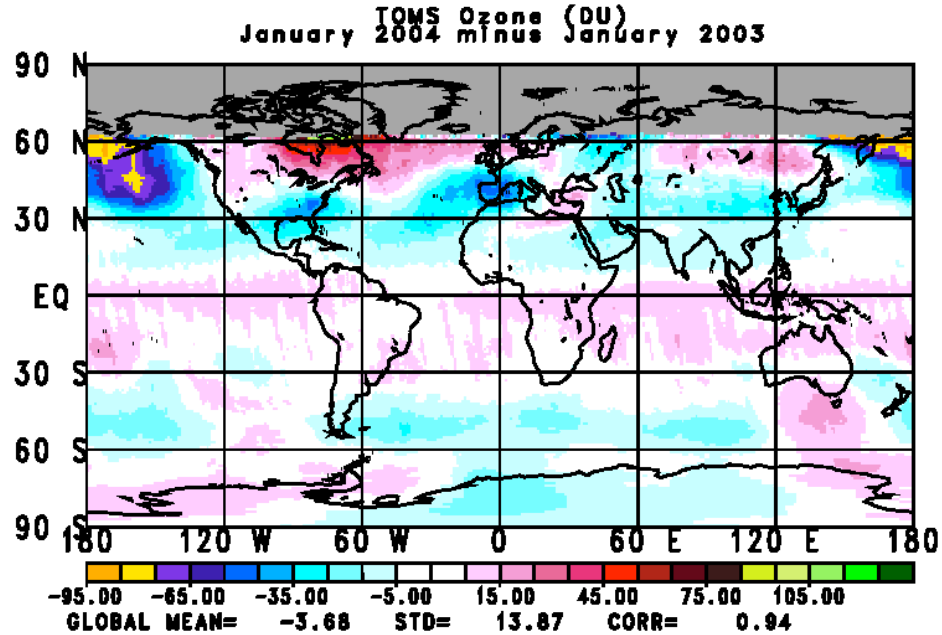
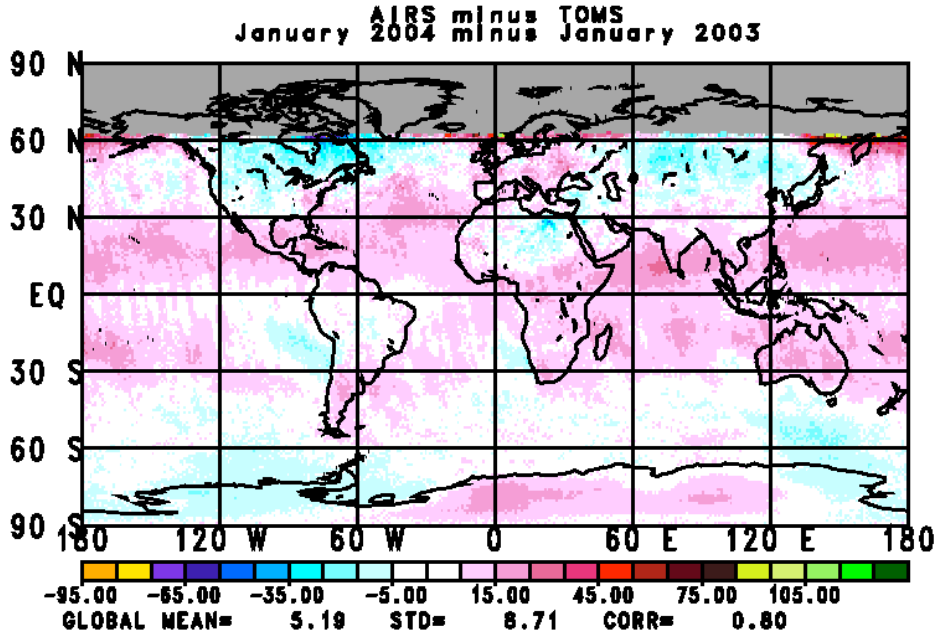
Precipitable Water Above 300 mb (cm*10^{-5})



Ozone (DU)


AIRS Ozone (DU)
January 2004
90 N
60 N
30 N
EQ
30 S
60 S
90 S
180
120 W
60 W
0
60 E
120 E
180
175.00 225.00 275.00 325.00 375.00 425.00 475.00 525.00
GLOBAL MEAN= 286.02 STANDARD DEV= 42.83


TOMS Ozone (DU)
January 2004
90 N
60 N
30 N
EQ
30 S
60 S
90 S
180
120 W
60 W
0
60 E
120 E
180
175.00 225.00 275.00 325.00 375.00 425.00 475.00 525.00
GLOBAL MEAN= 275.63 STANDARD DEV= 38.56


AIRS minus TOMS
90 N
60 N
30 N
EQ
30 S
60 S
90 S
180
120 W
60 W
0
60 E
120 E
180
-95.00 -65.00 -35.00 -5.00 15.00 45.00 75.00 105.00
GLOBAL MEAN= 3.44 STD= 10.09 CORR= 0.97

Ozone (DU)
January 2004 - January 2003