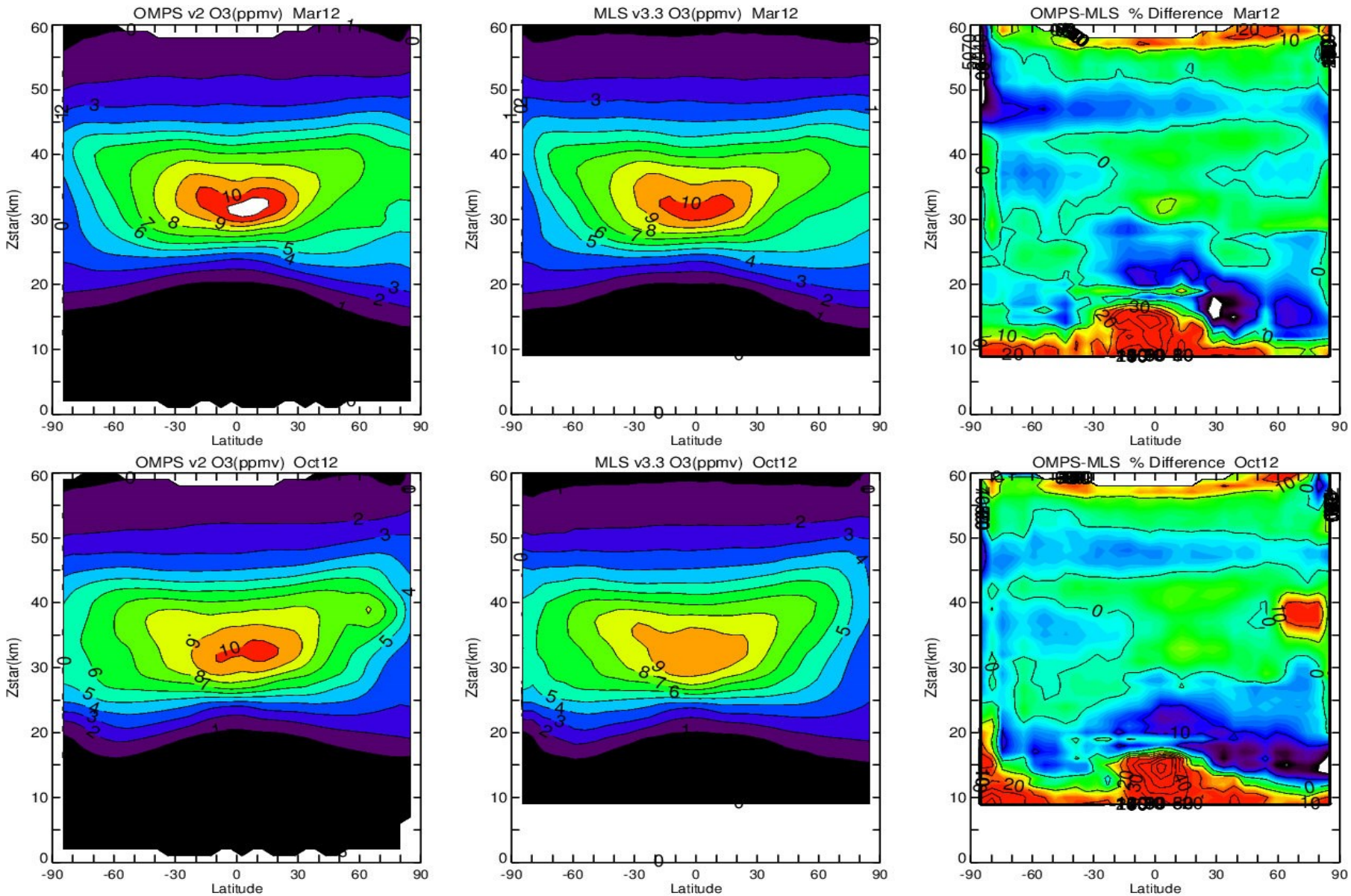
OMPS v2 LP Profile Ozone

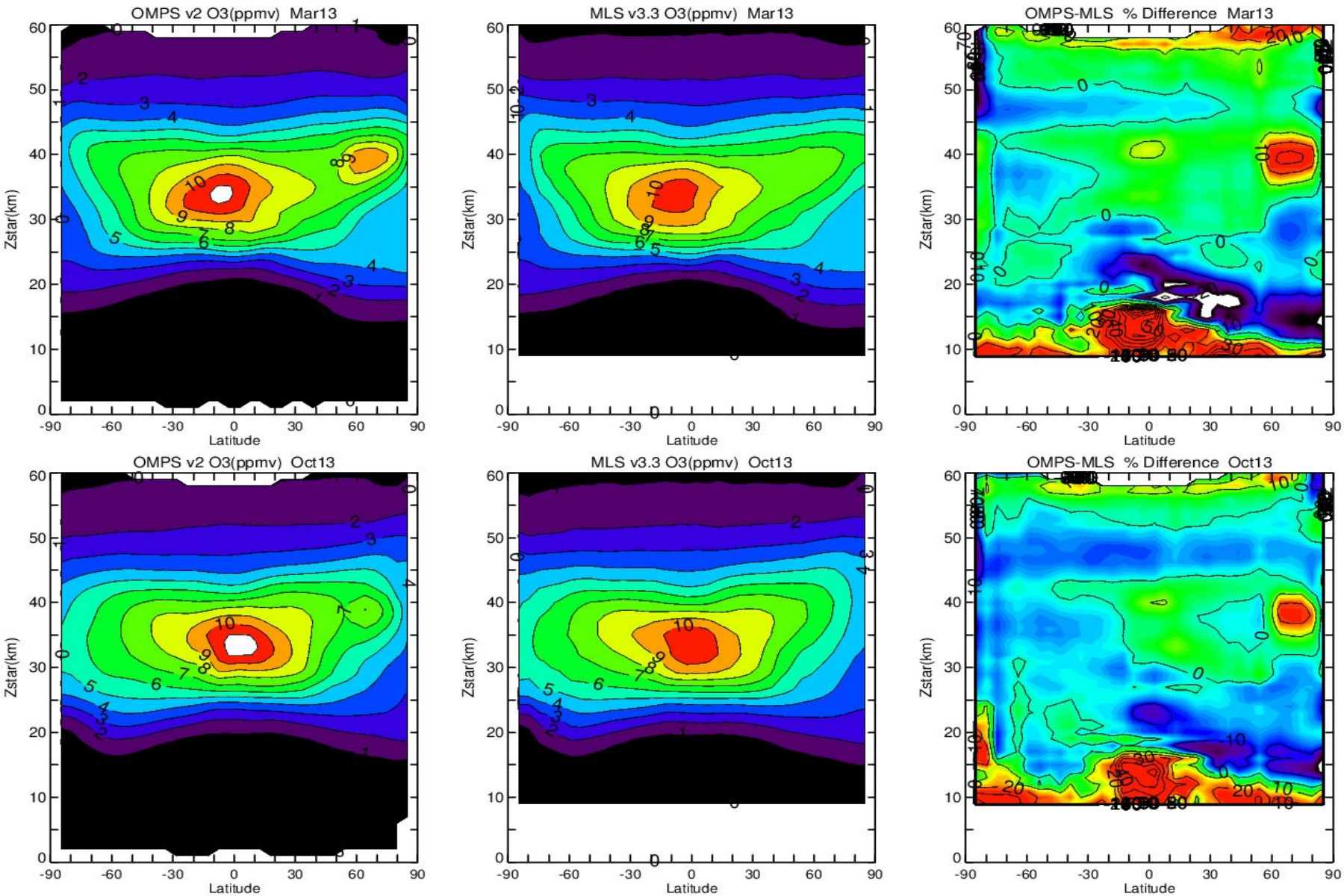
- Use all three slit measurements each day for February 2012 – May 2014
- Grid the daily along-orbit profiles to $5^o \times 5^o$ horizontal bins followed by zonal averaging
- Filter with Quality=1 (i.e., throw away all measurements where Quality is not equal to 1)
- Compare 1-1 with MLS v3.3 profile ozone (MLS is re-mapped vertically to OMPS pressures using log-pressure interpolation)

(29 May 2014)

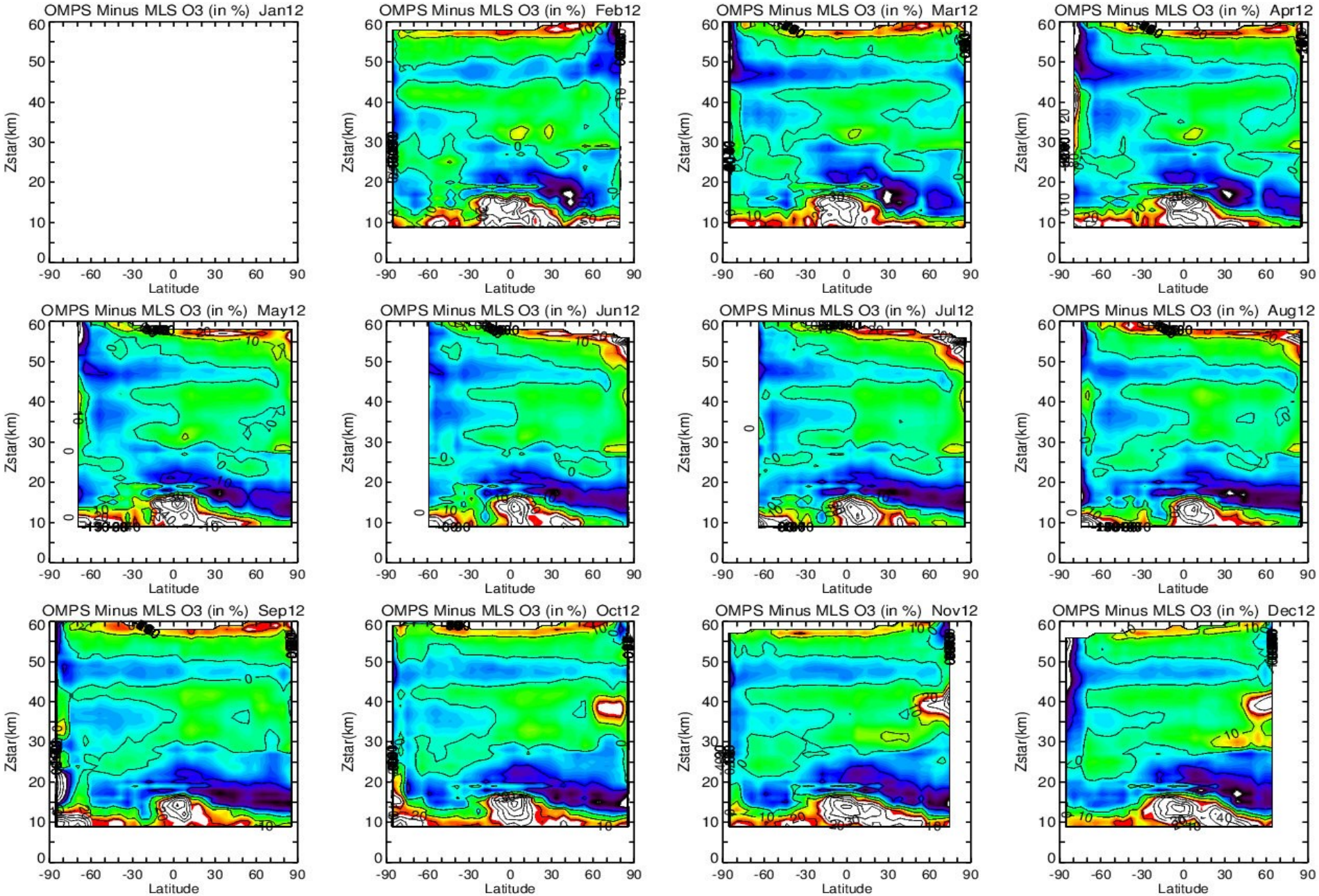
Zonal Mean Ozone (ppmv) During 2012: OMPS (Left Column), MLS (Middle Column), and % Difference (Right Column)



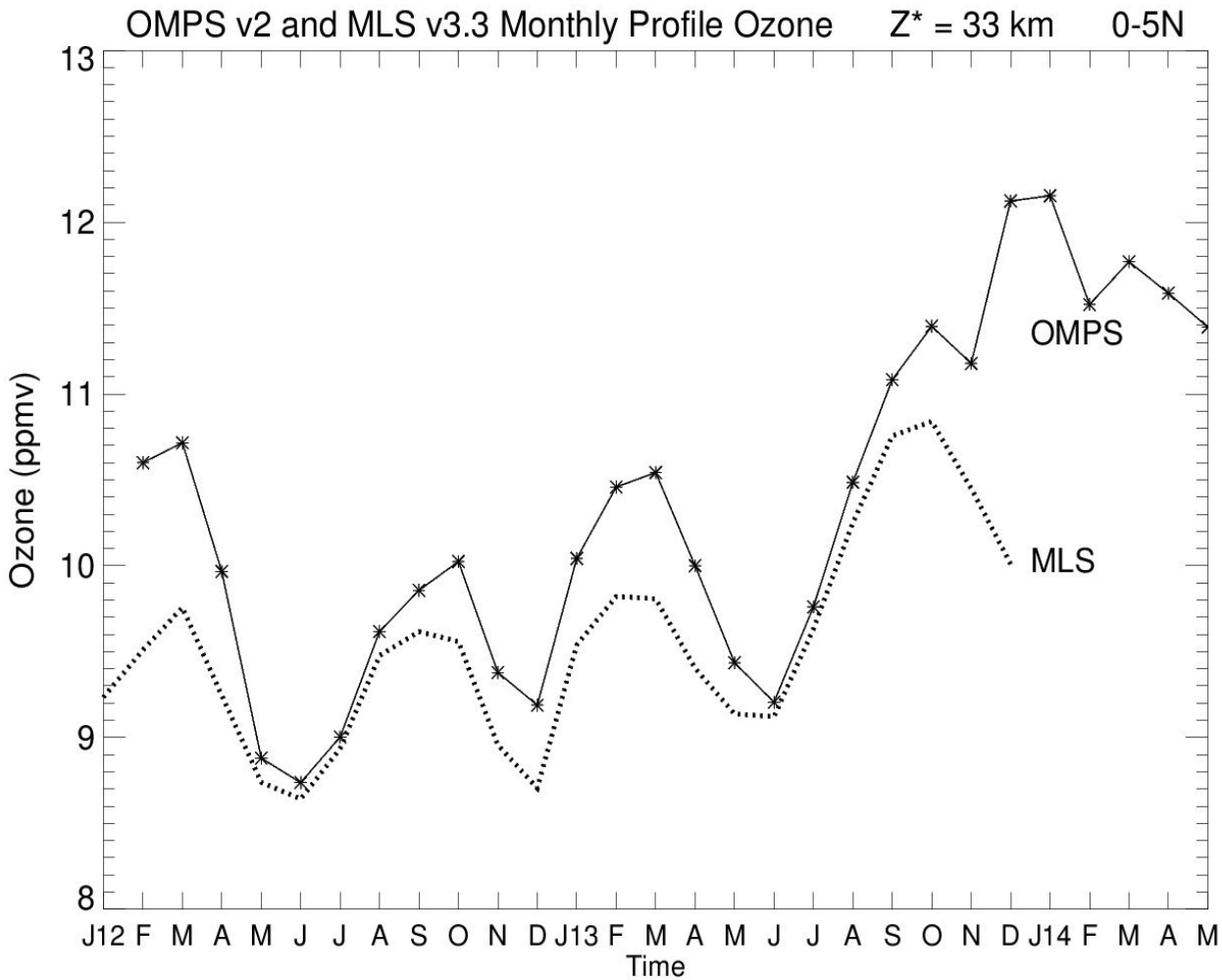
Zonal Mean Ozone (ppmv) During 2013: OMPS (Left Column), MLS (Middle Column), and % Difference (Right Column)



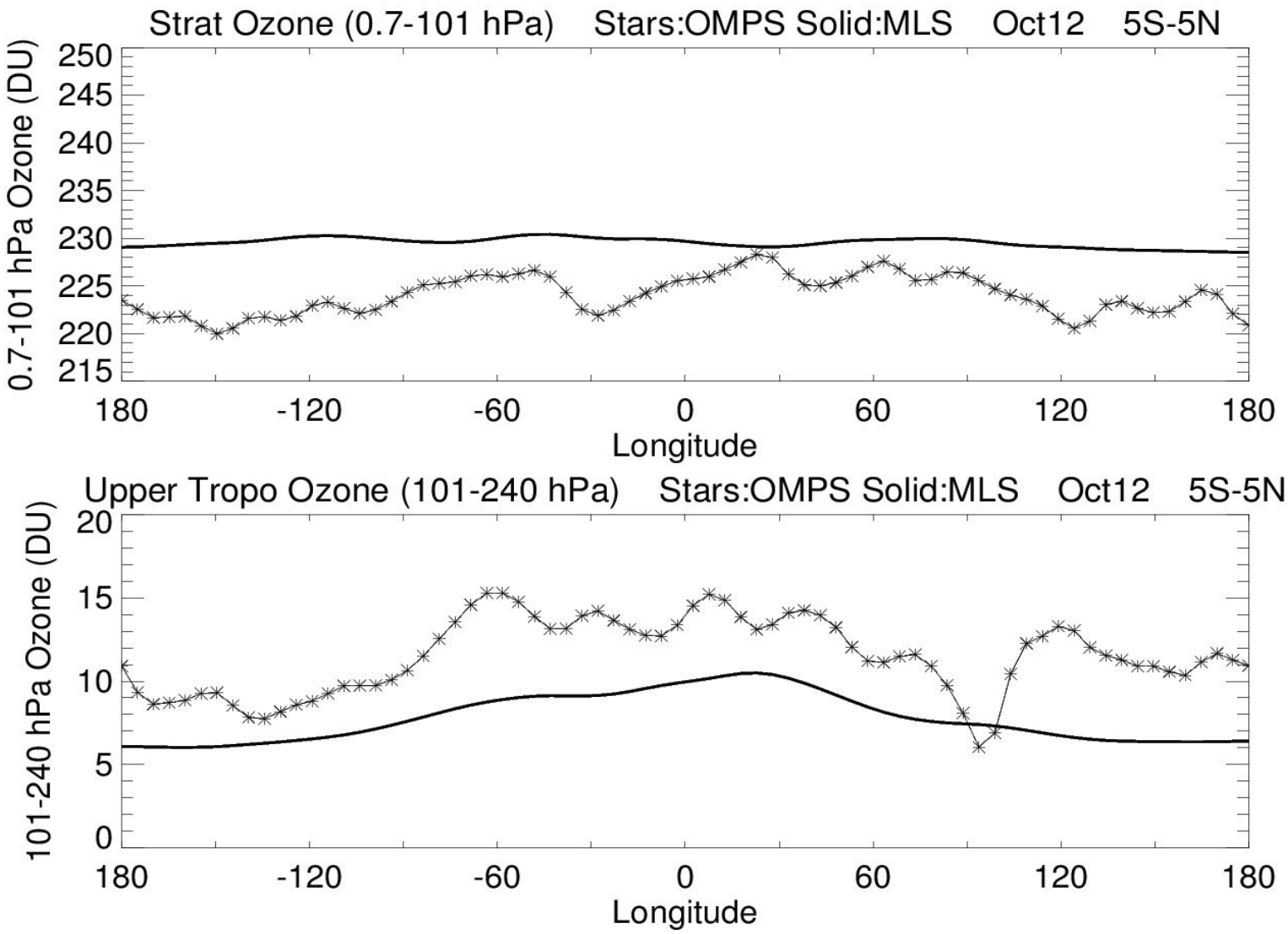
OMPS Minus MLS Ozone Mixing Ratio (in %) for 2012 Zonal Means



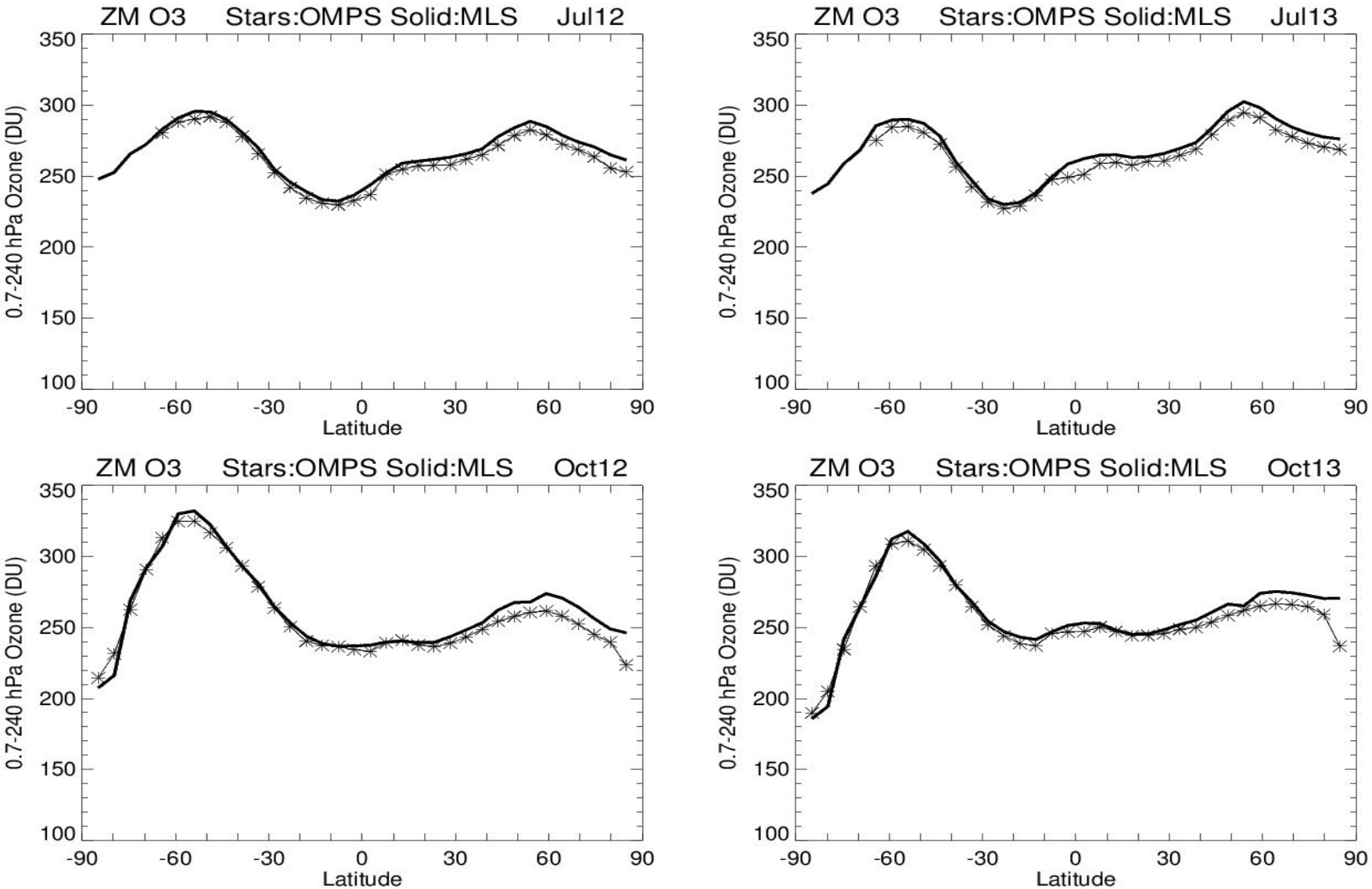
OMPS LP v2 and MLS v3.3 Profile Ozone: Monthly Zonal Means



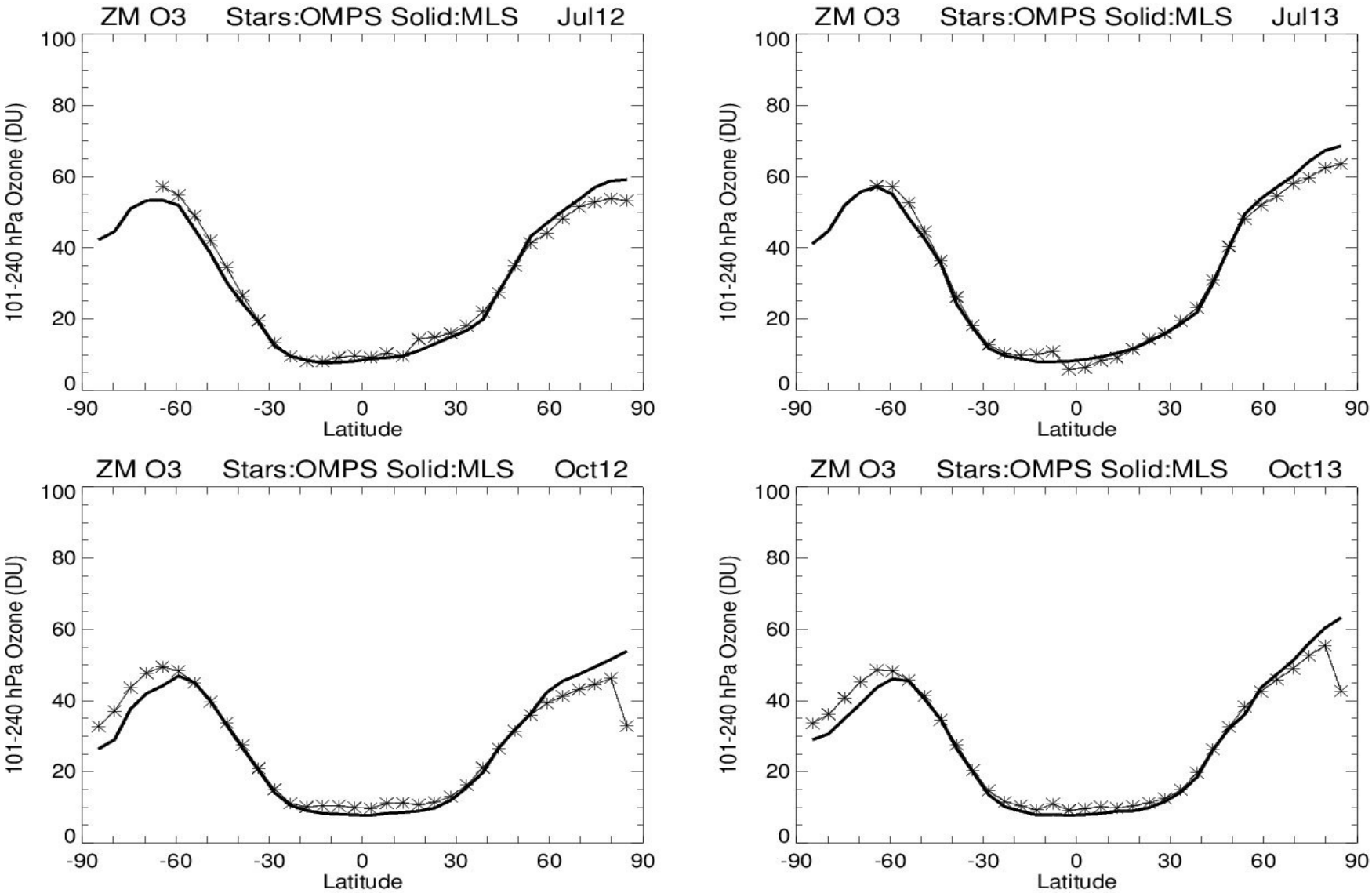
Upper Troposphere has Wave-1 Pattern



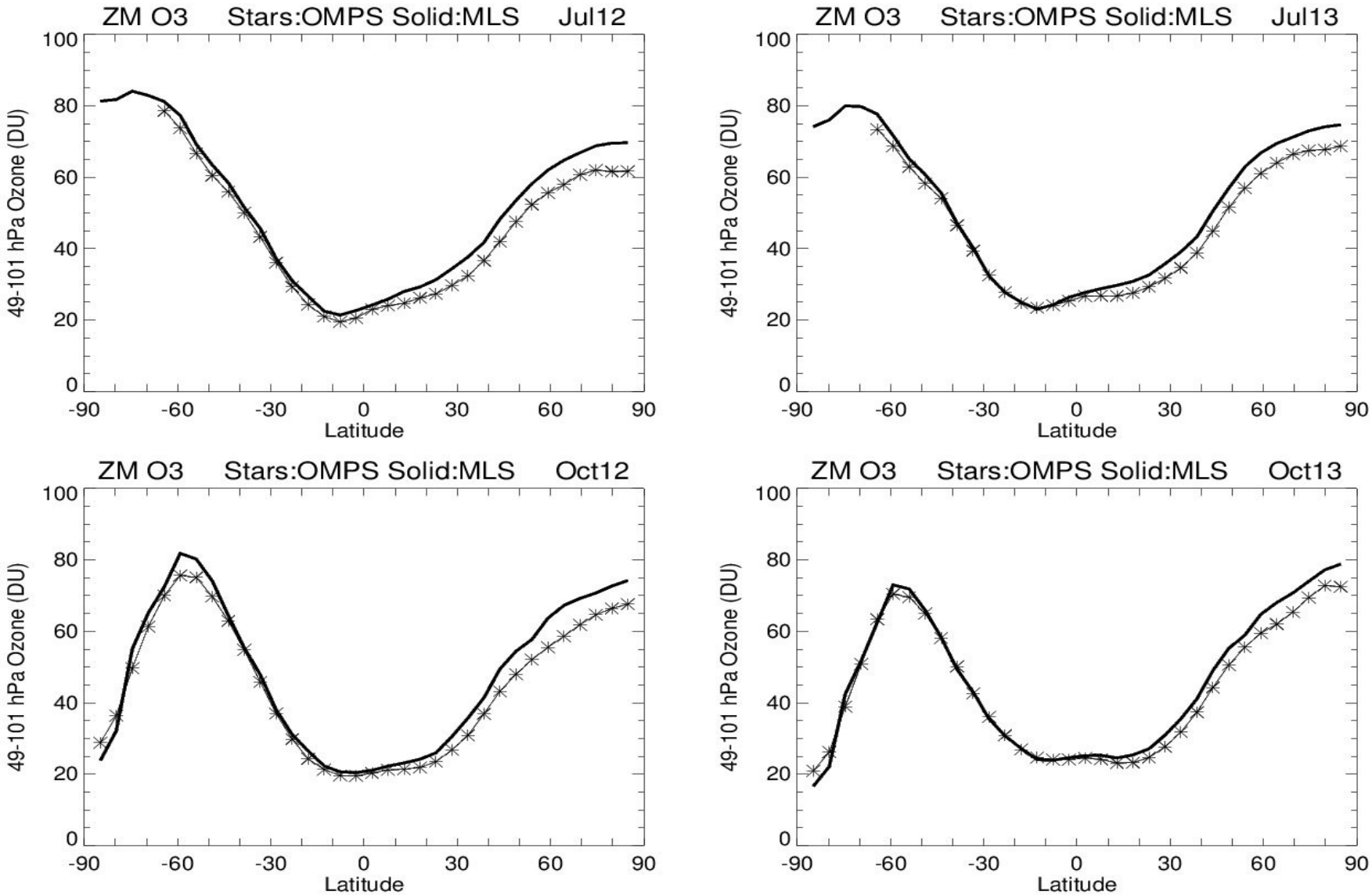
VIS+UV: 0.7-240 hPa Column Ozone
(Simulates Stratospheric Column Ozone)



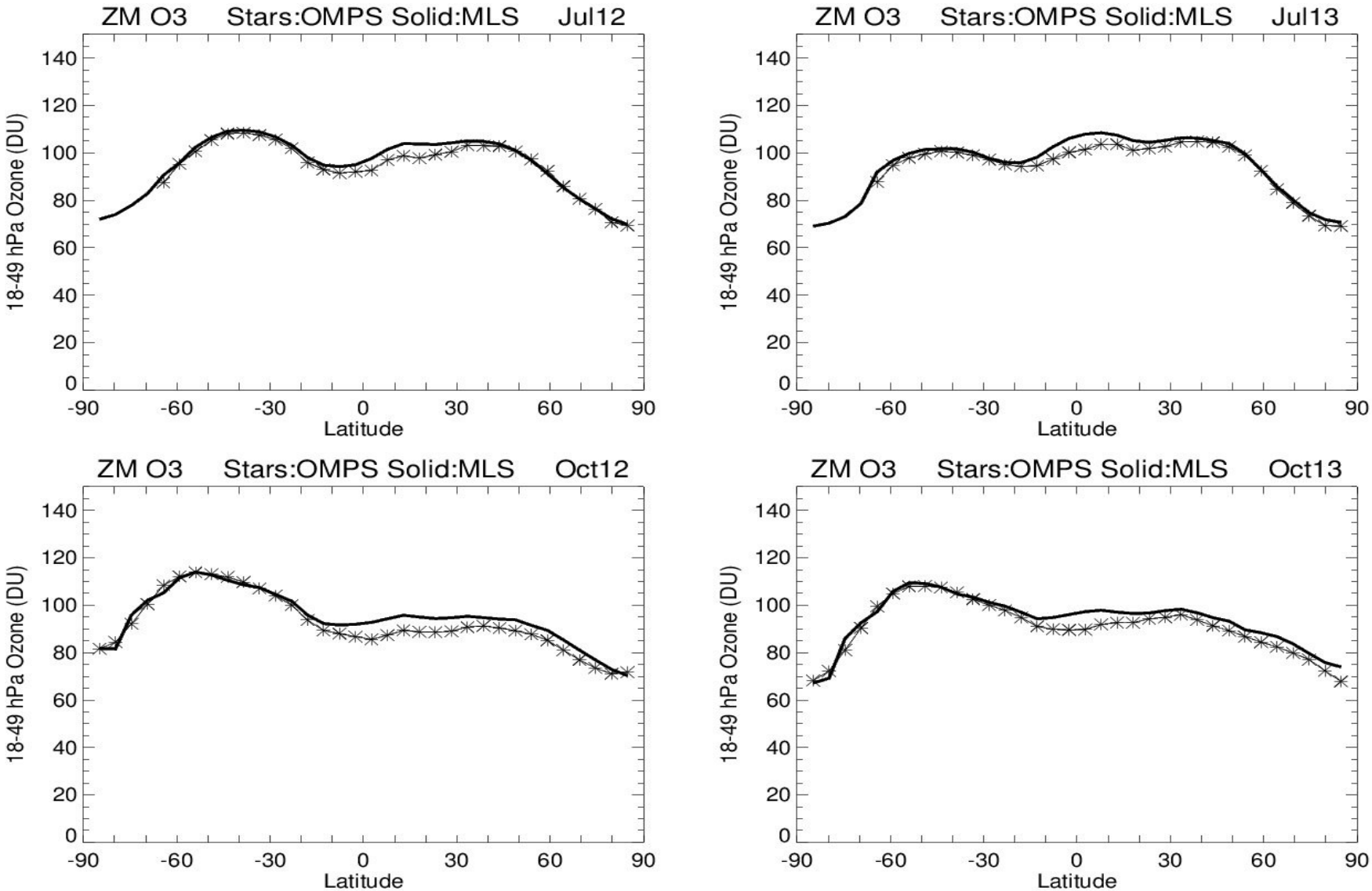
VIS: 101-240 hPa Column Ozone



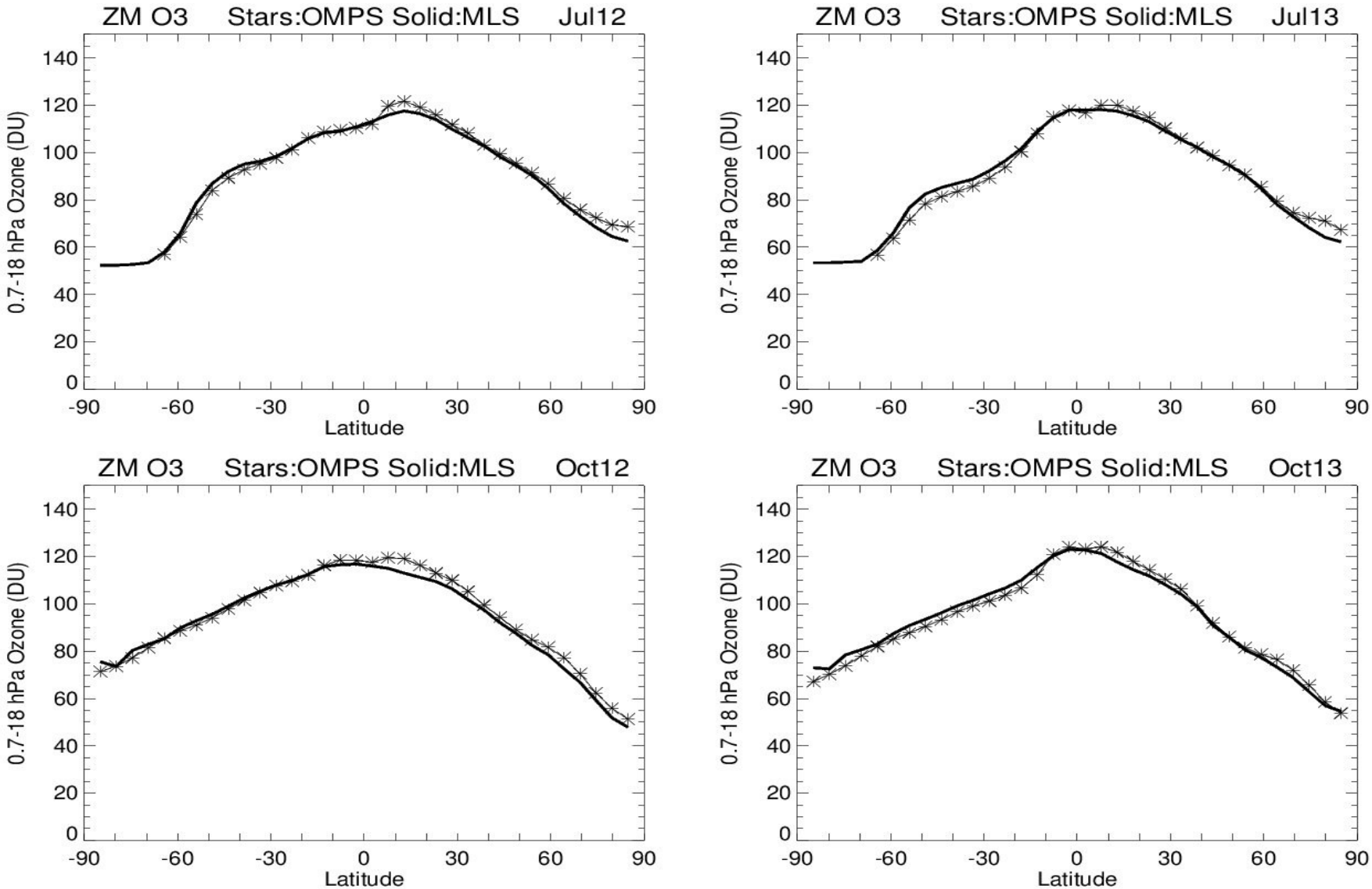
VIS: 49-101 hPa Column Ozone



VIS: 18-49 hPa Column Ozone



UV: 0.7-18 hPa Column Ozone

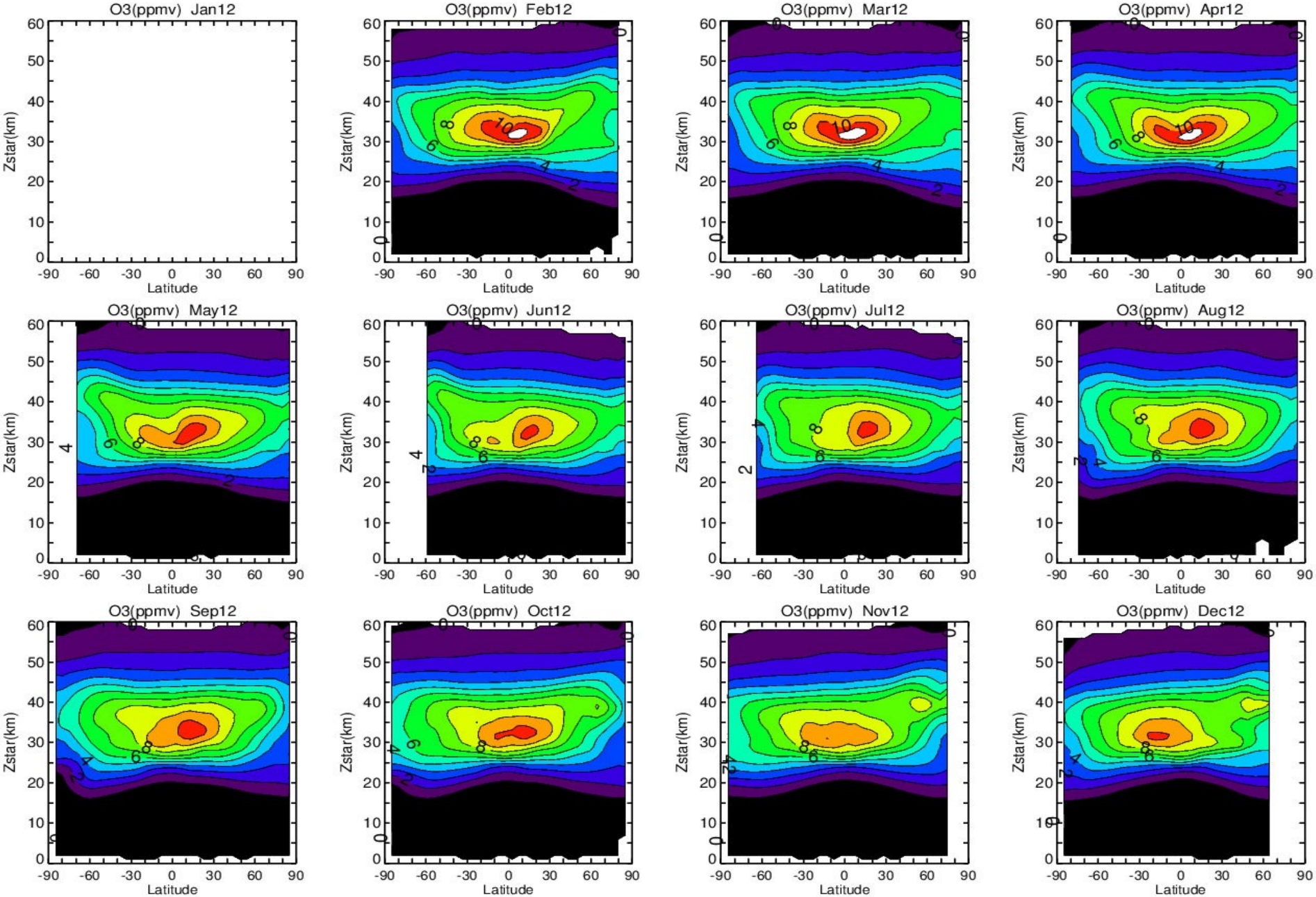


Some Conclusions

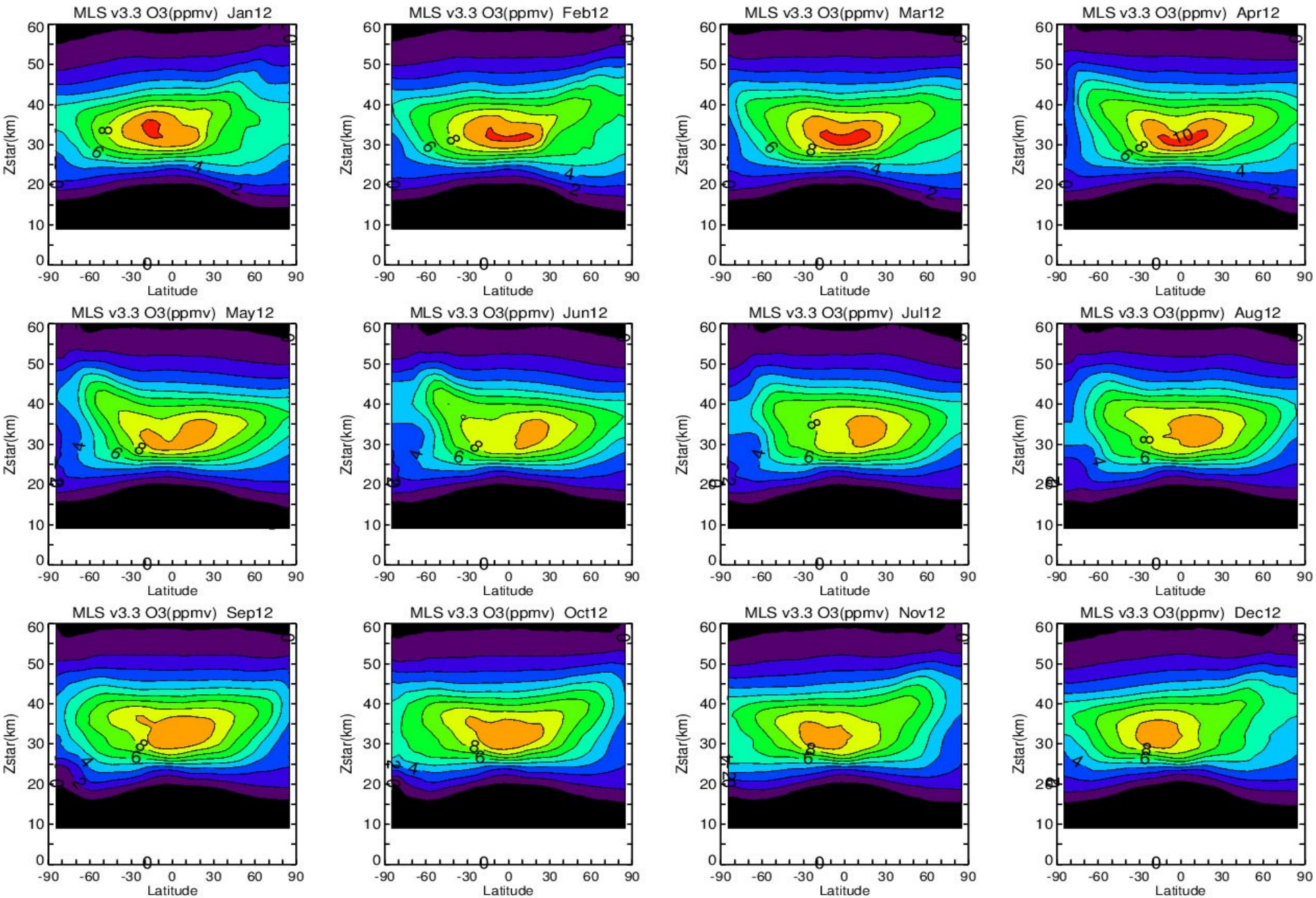
- Large % differences between OMPS VIS and MLS ozone mixing ratio
- OMPS minus MLS bias in stratospheric column ozone is positive, up to about +5 DU to +10 DU and is originating mostly from the lower stratosphere VIS retrieval
- OMPS UV ozone is persistently larger than MLS (up to ~0.5-1.0 ppmv) in vicinity of the tropical stratospheric ozone maximum (Z^* = 33 km)
- OMPS UV ozone mixing ratio is ~10-20% greater than MLS for many months around Z^* = 40 km and 60°N-80°N
- OMPS VIS upper tropospheric ozone has a zonal wave-1 pattern in the tropics (we expect this signature according to ozonesondes and other satellite measurements)

Extra Slides

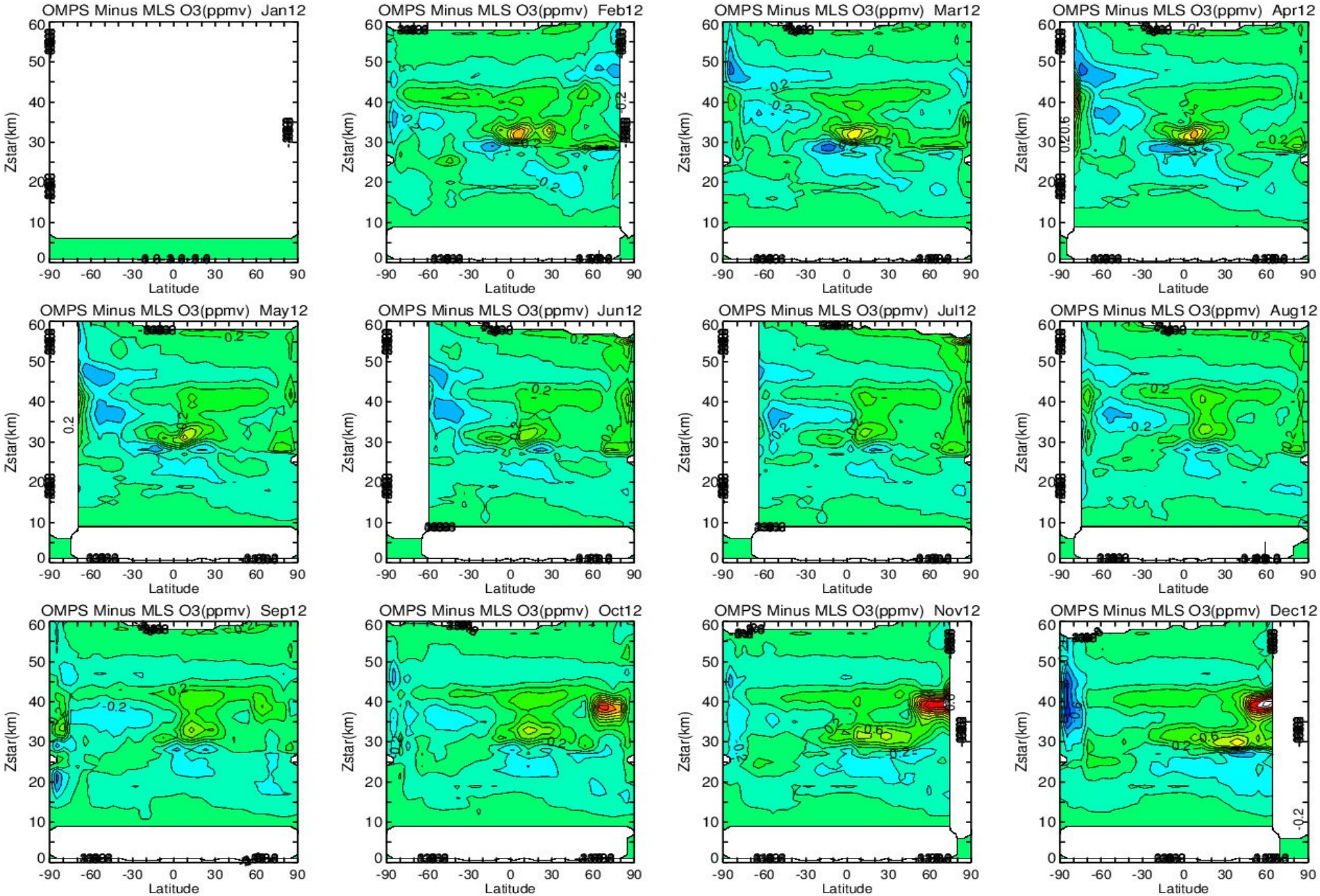
OMPS v2 LP Profile Ozone for 2012 Zonal Means



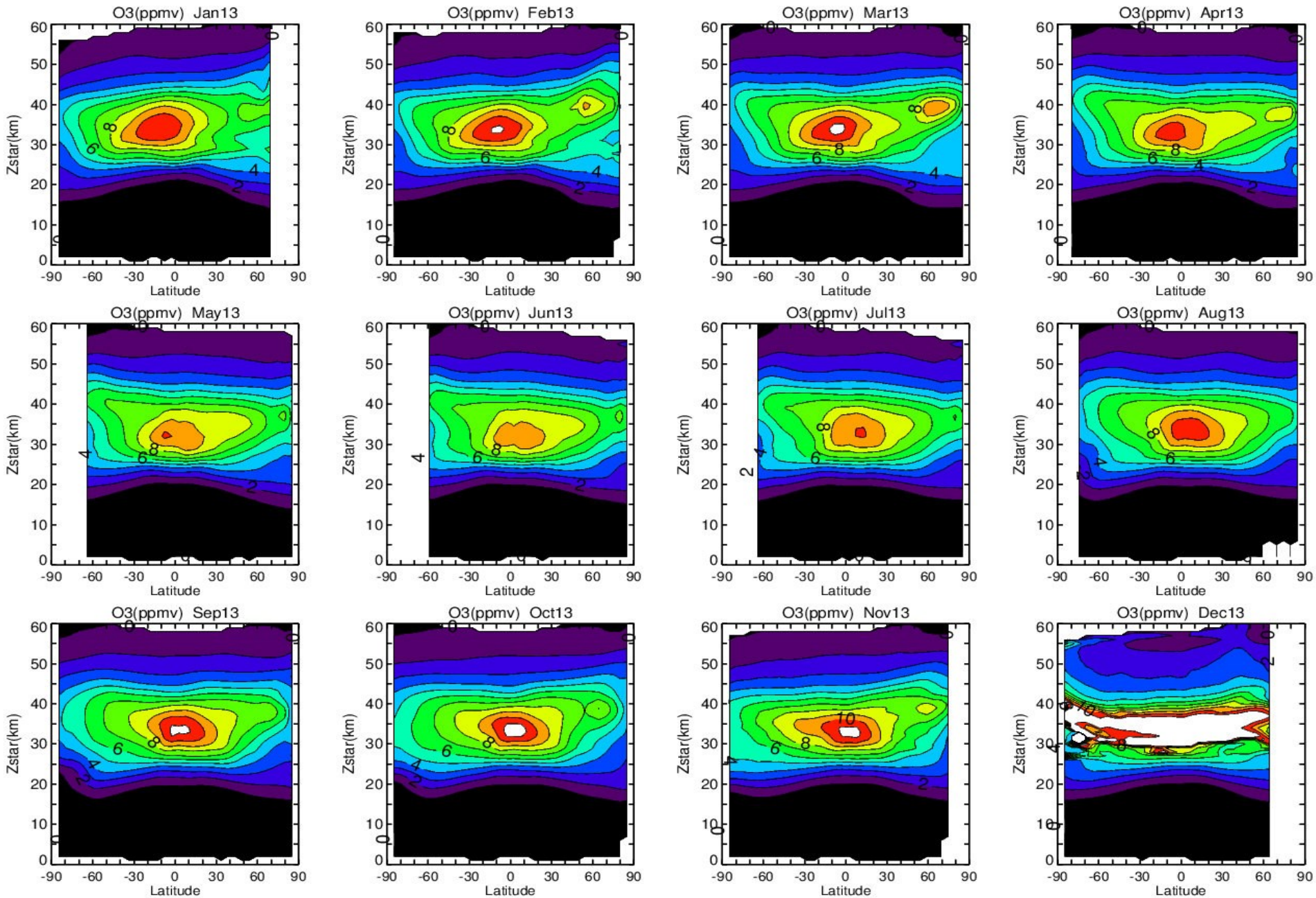
MLS v3.3 Profile Ozone for 2012 Zonal Means



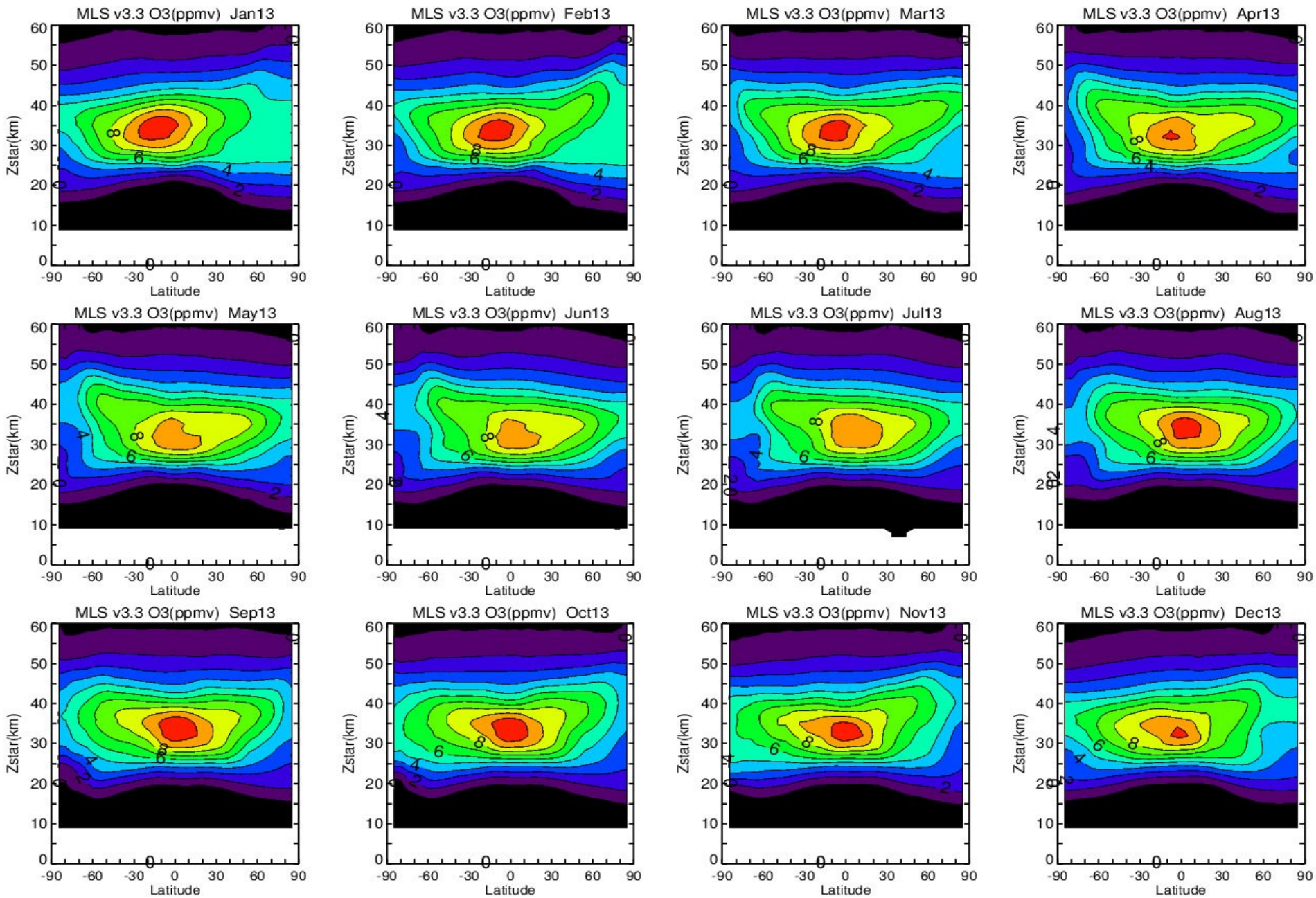
OMPS Minus MLS Profile Ozone for 2012 Zonal Means



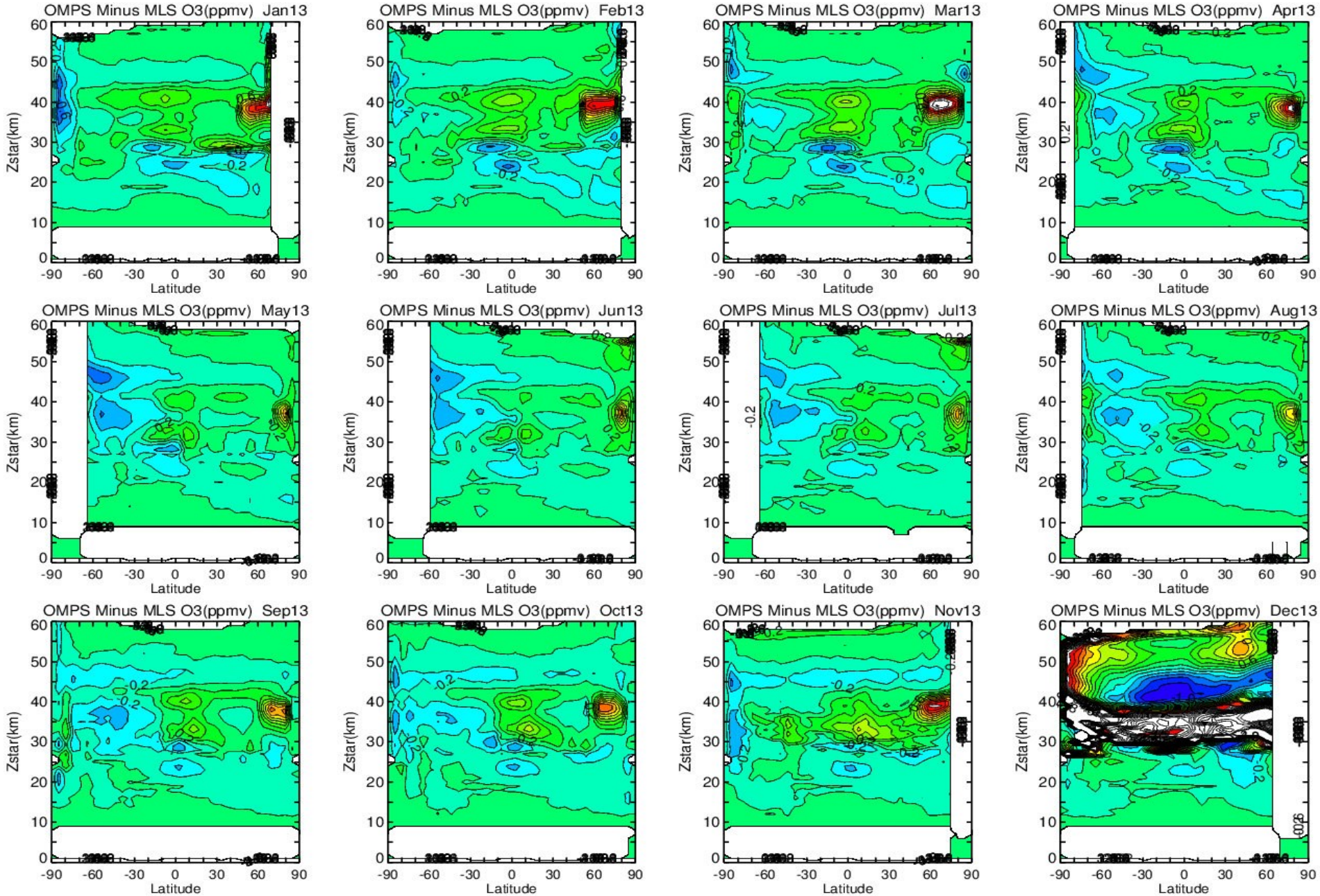
OMPS v2 LP Profile Ozone for 2013 Zonal Means



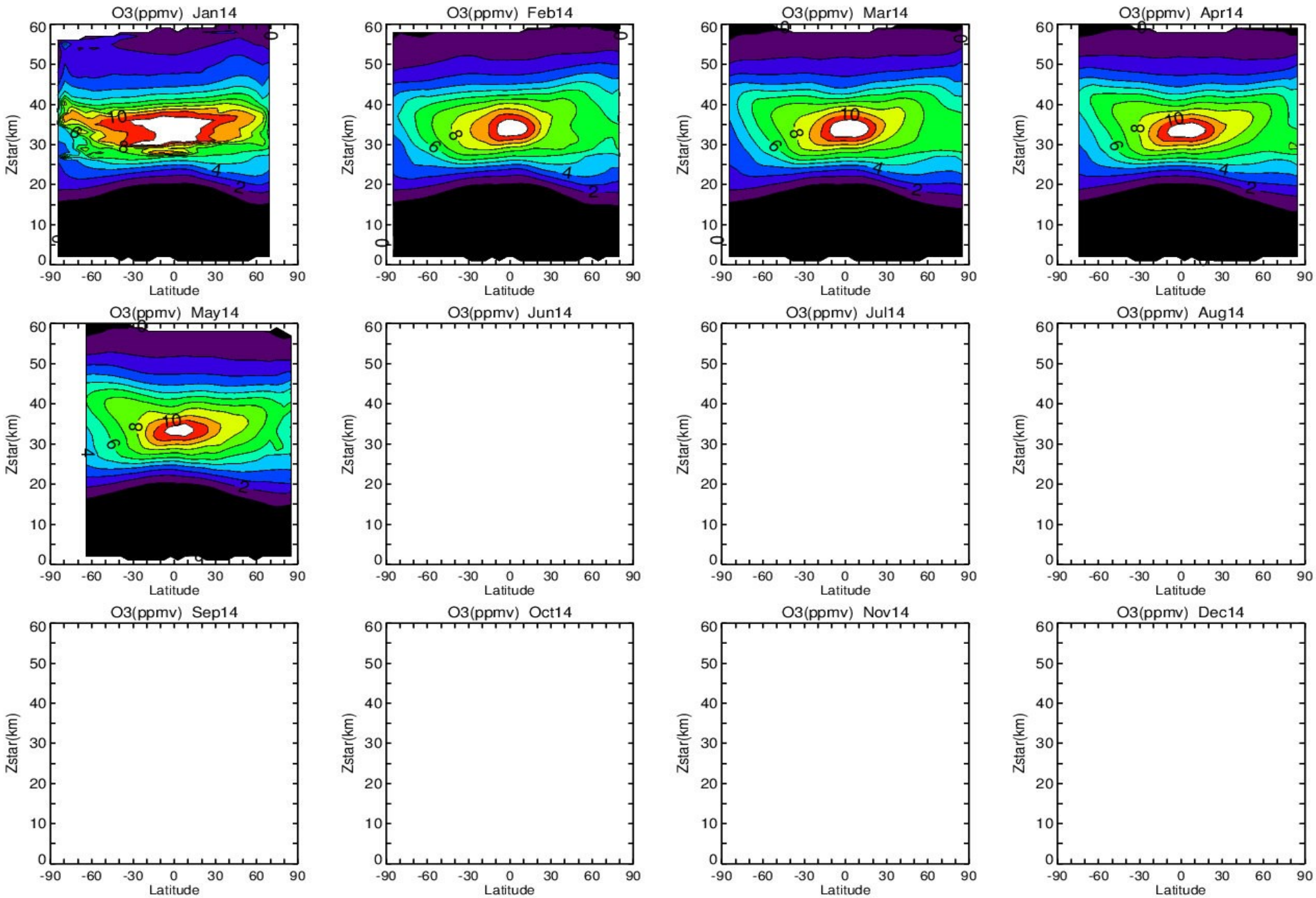
MLS v3.3 Profile Ozone for 2013 Zonal Means



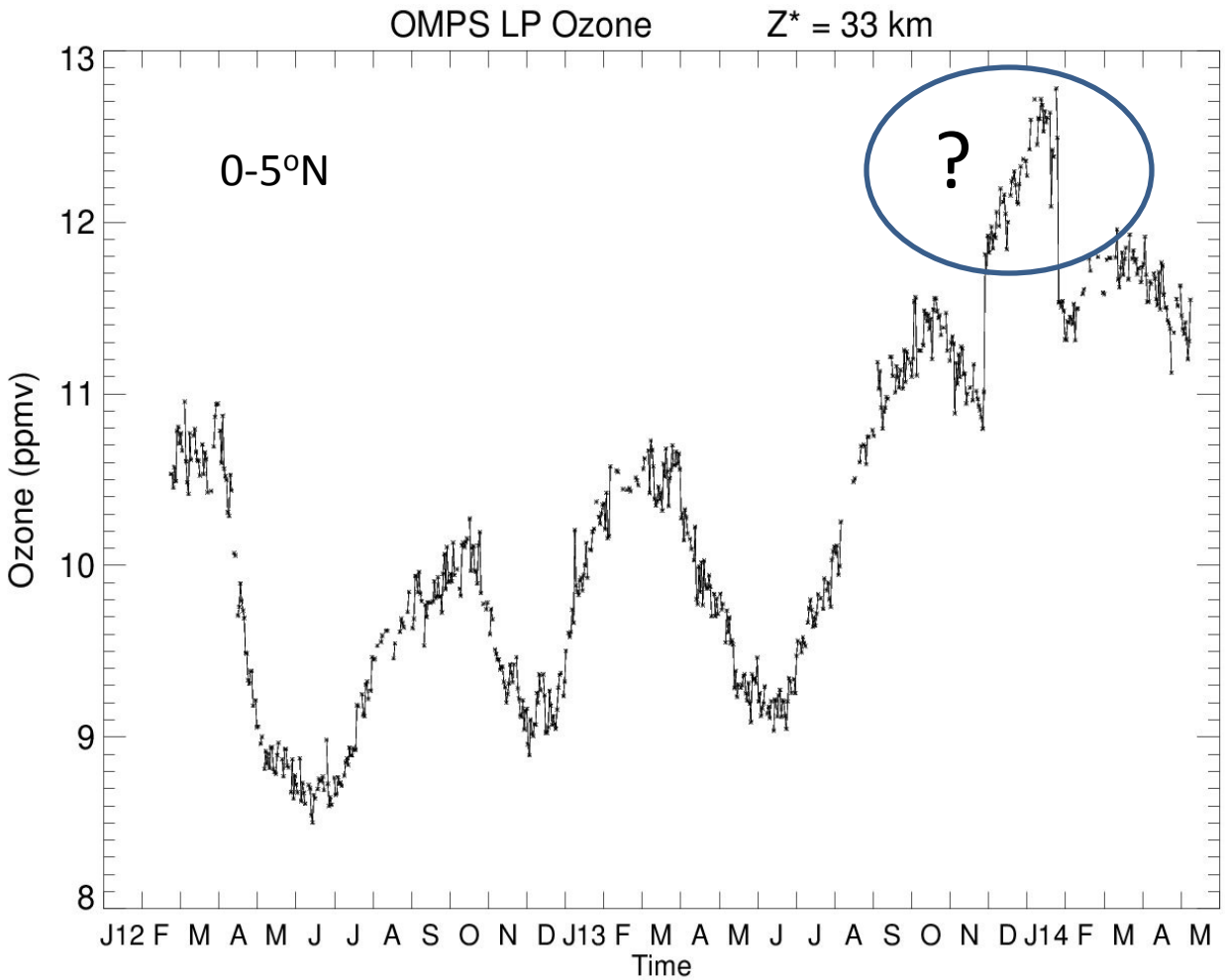
OMPS Minus MLS Profile Ozone for 2013 Zonal Means



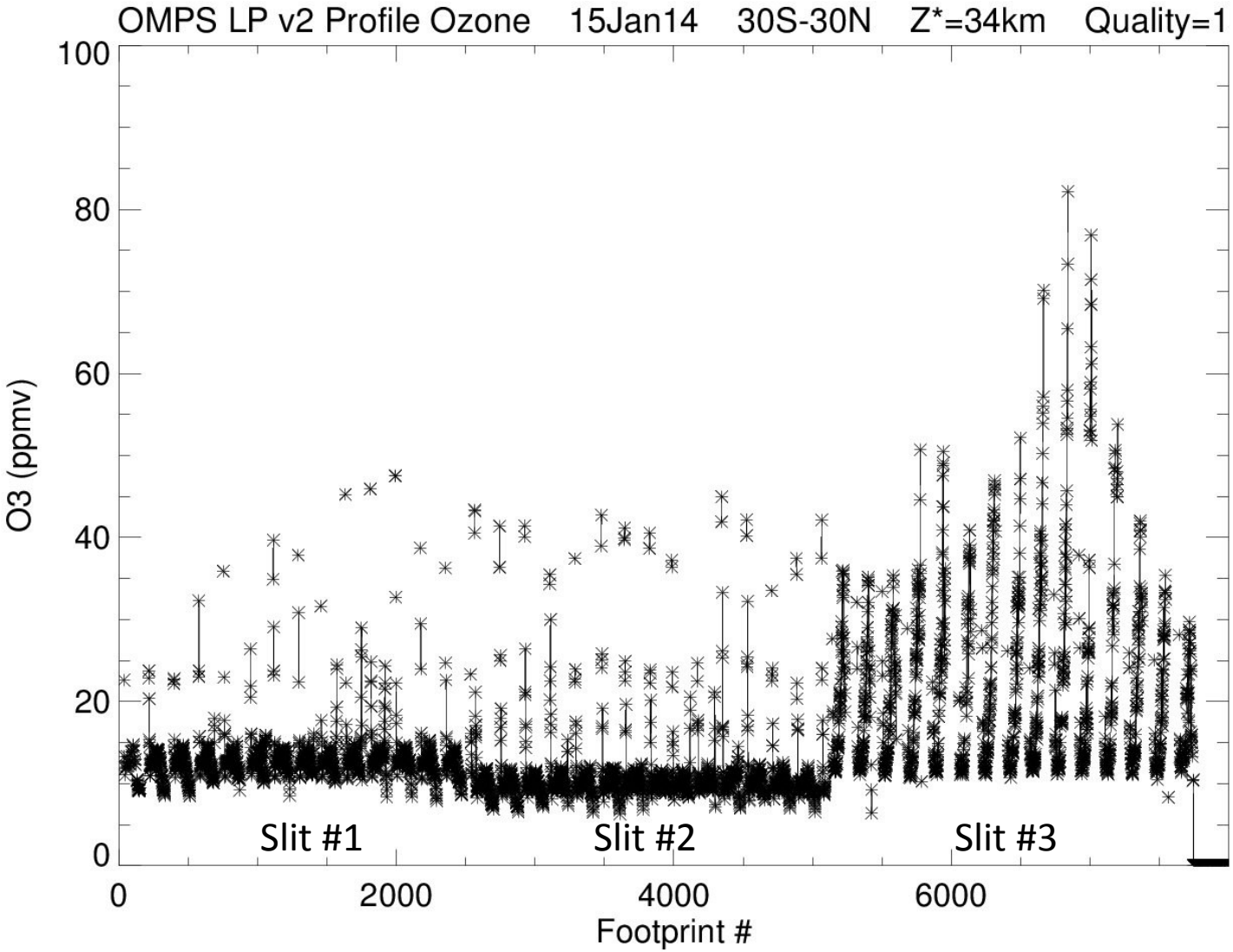
OMPS v2 LP Profile Ozone for 2014 Zonal Means



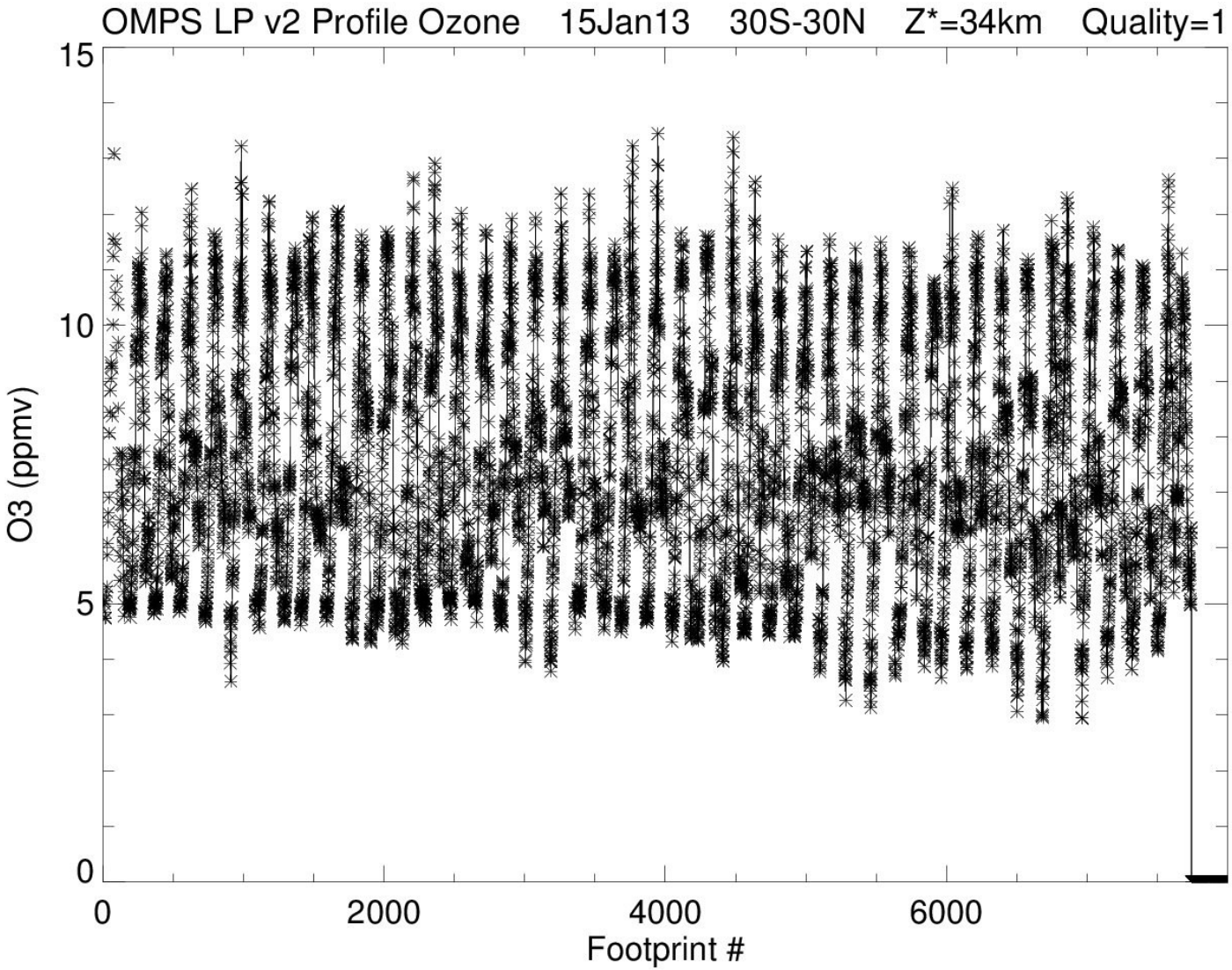
OMPS LP v2 Profile Ozone: Daily Zonal Means

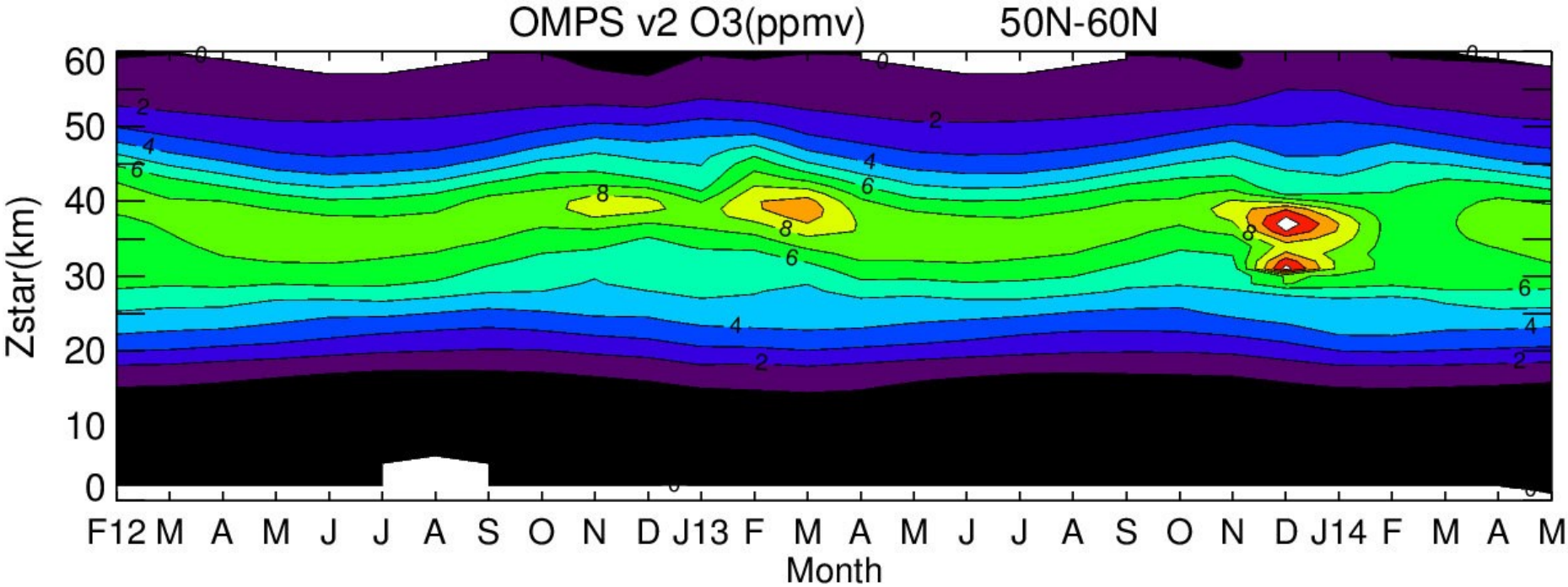


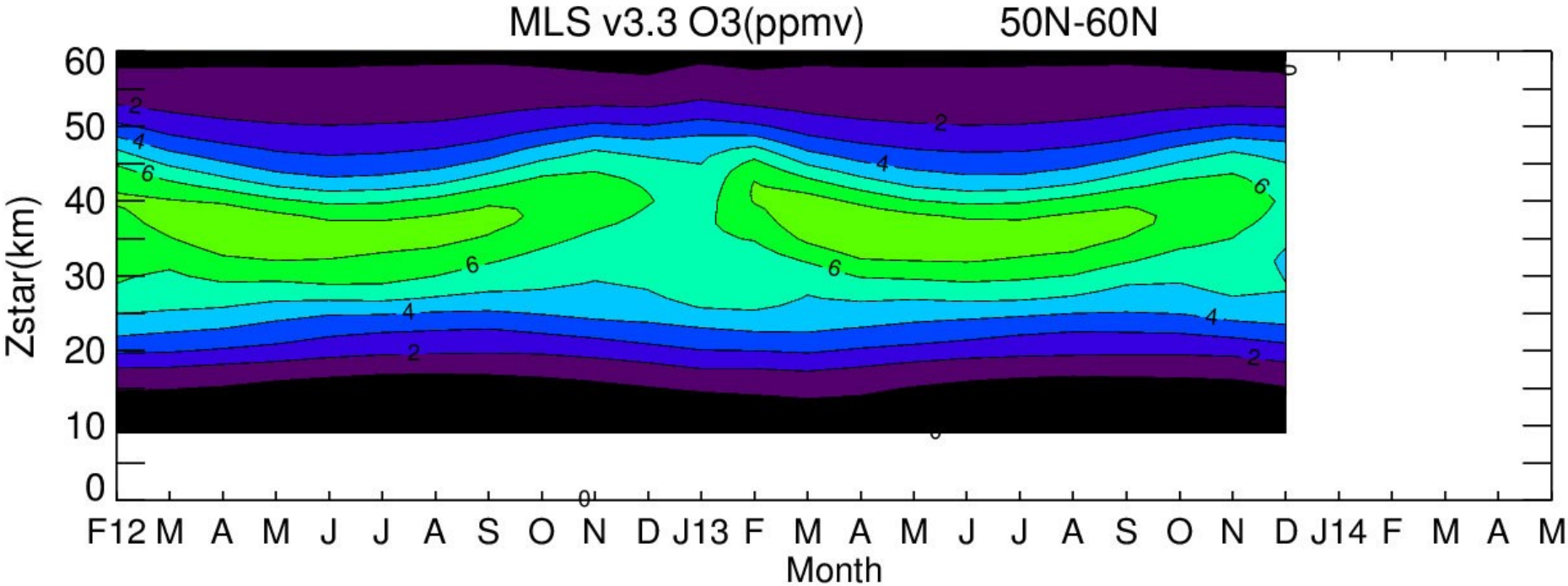
Outliers Present for All Three Slit Measurements, but Mostly for Slit #3 – Also Persistent Offsets Between All Three Slits

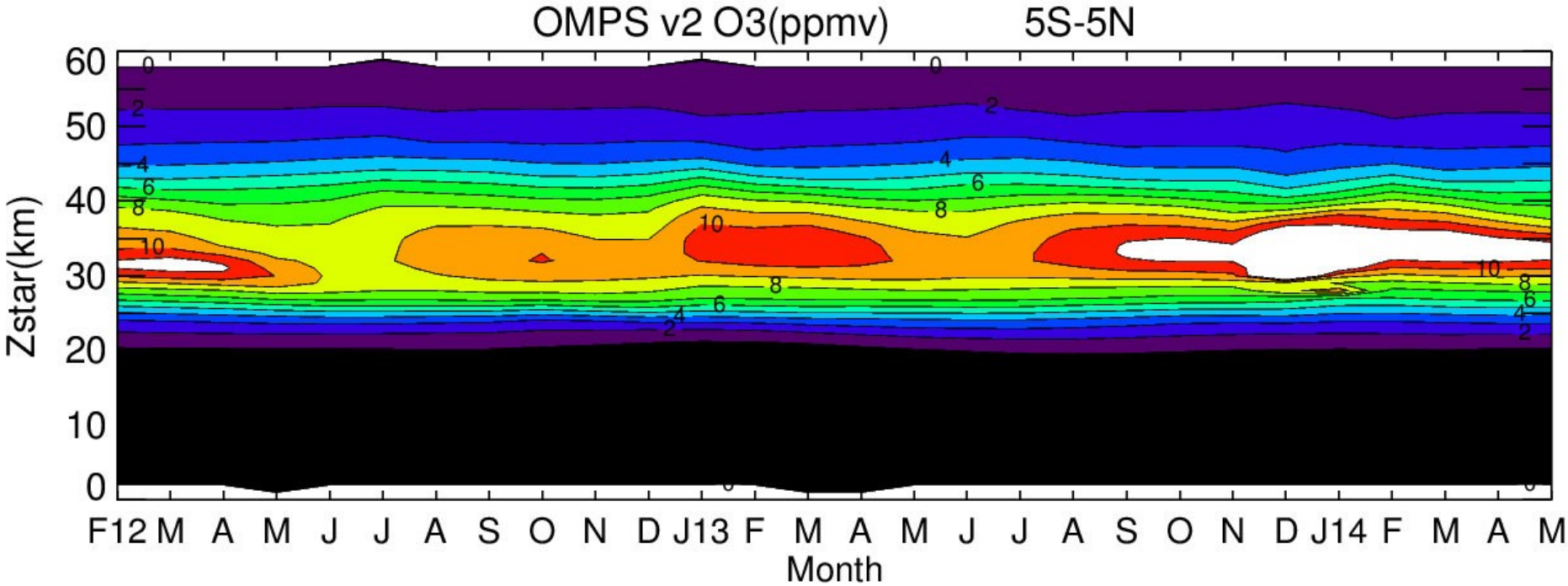


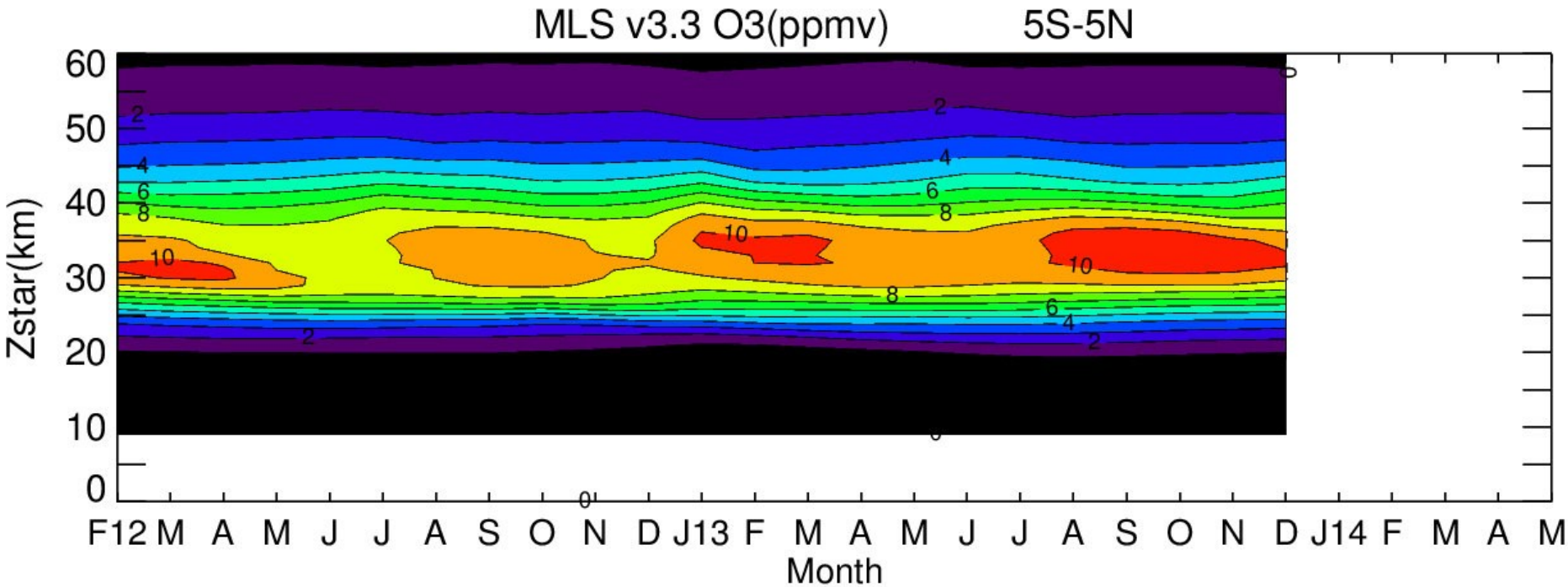
Normal Measurements: Largest Ozone Concentrations < 12-13 ppmv

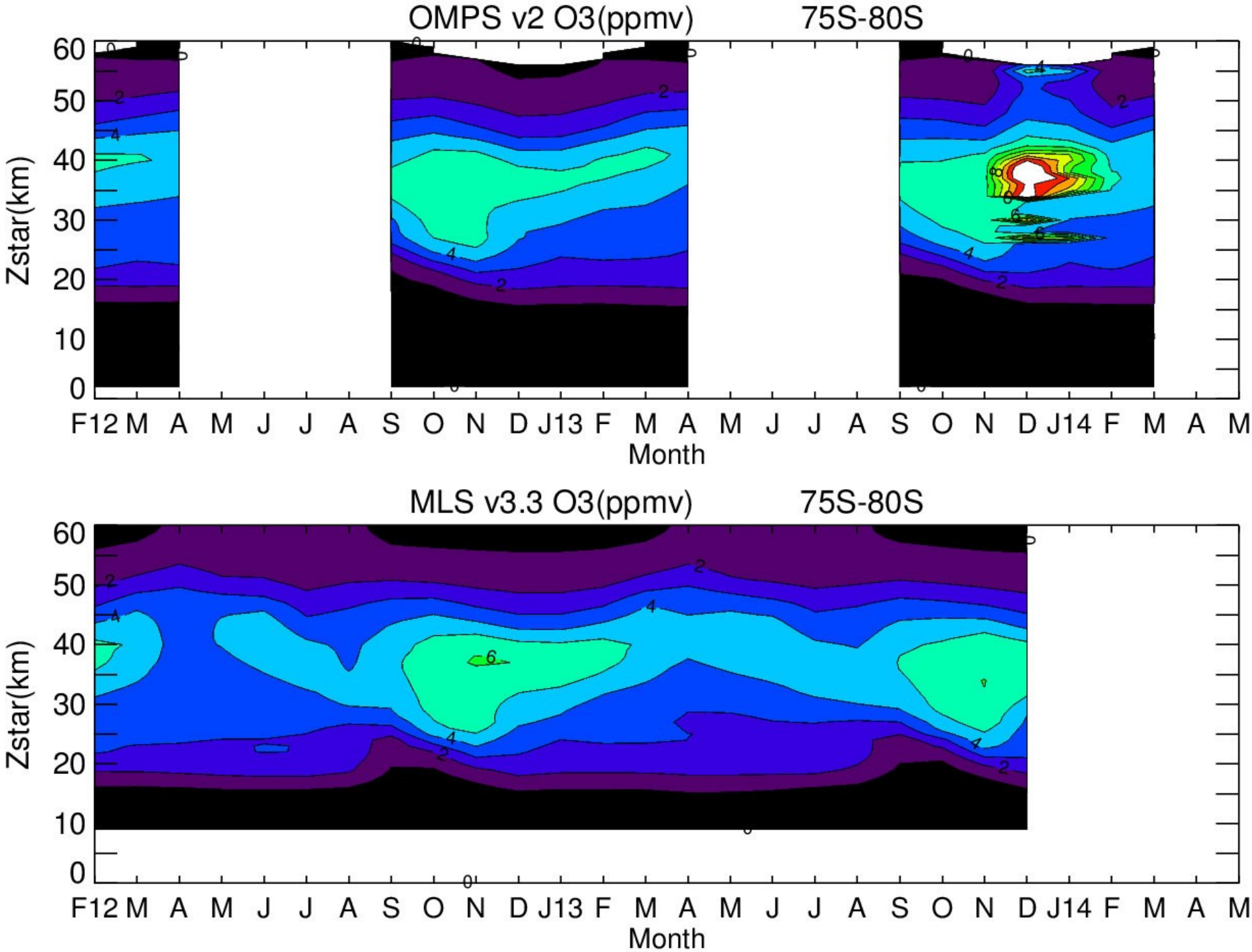


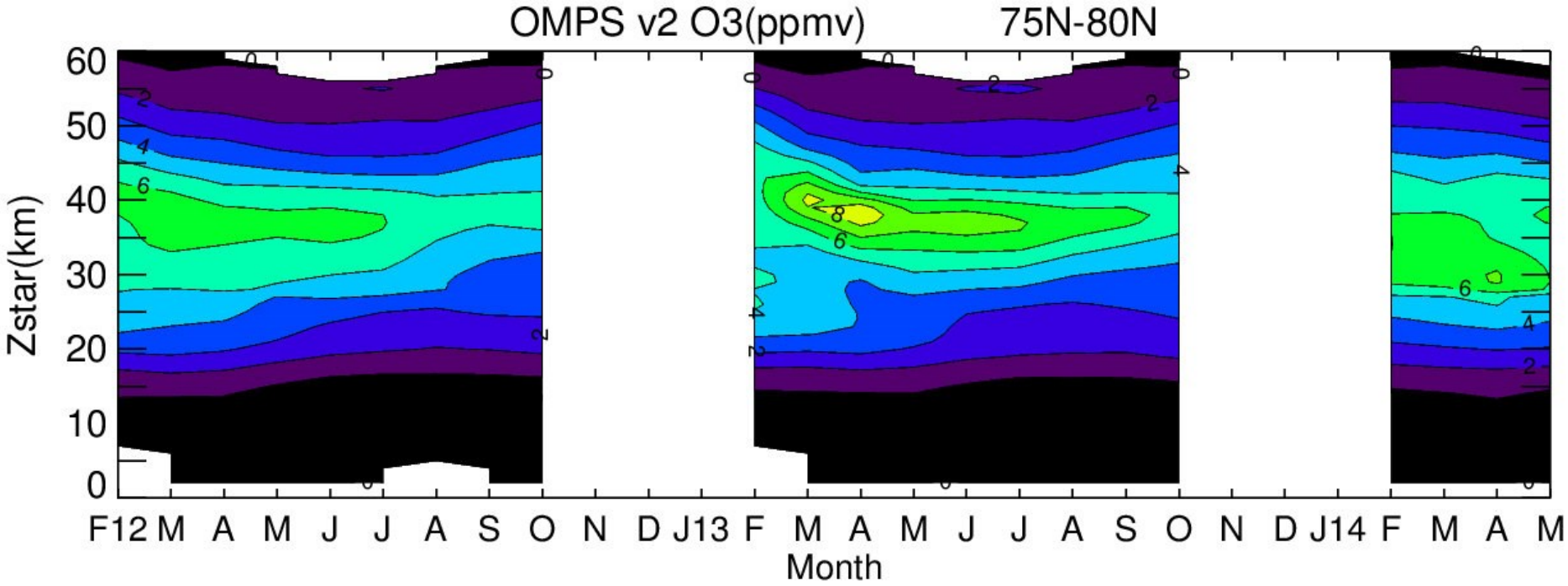

OMPS v2 O3(ppmv)
50N-60N
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M

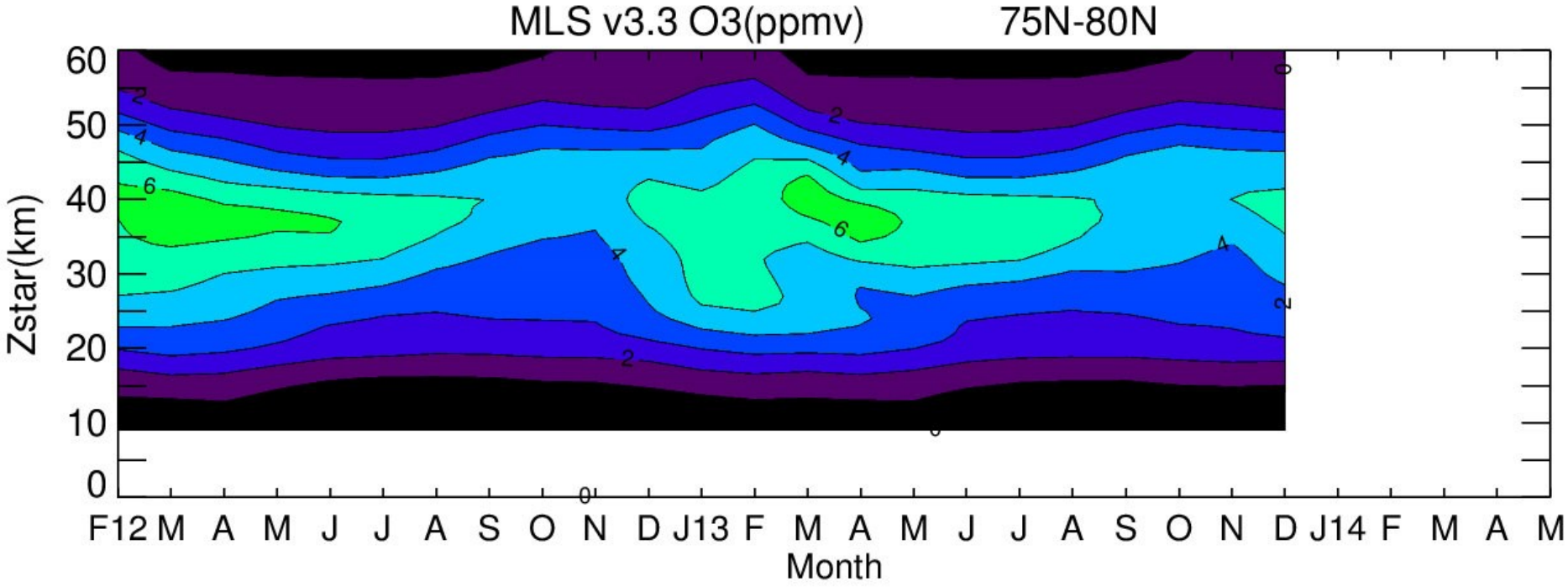

MLS v3.3 O3(ppmv)
50N-60N
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M

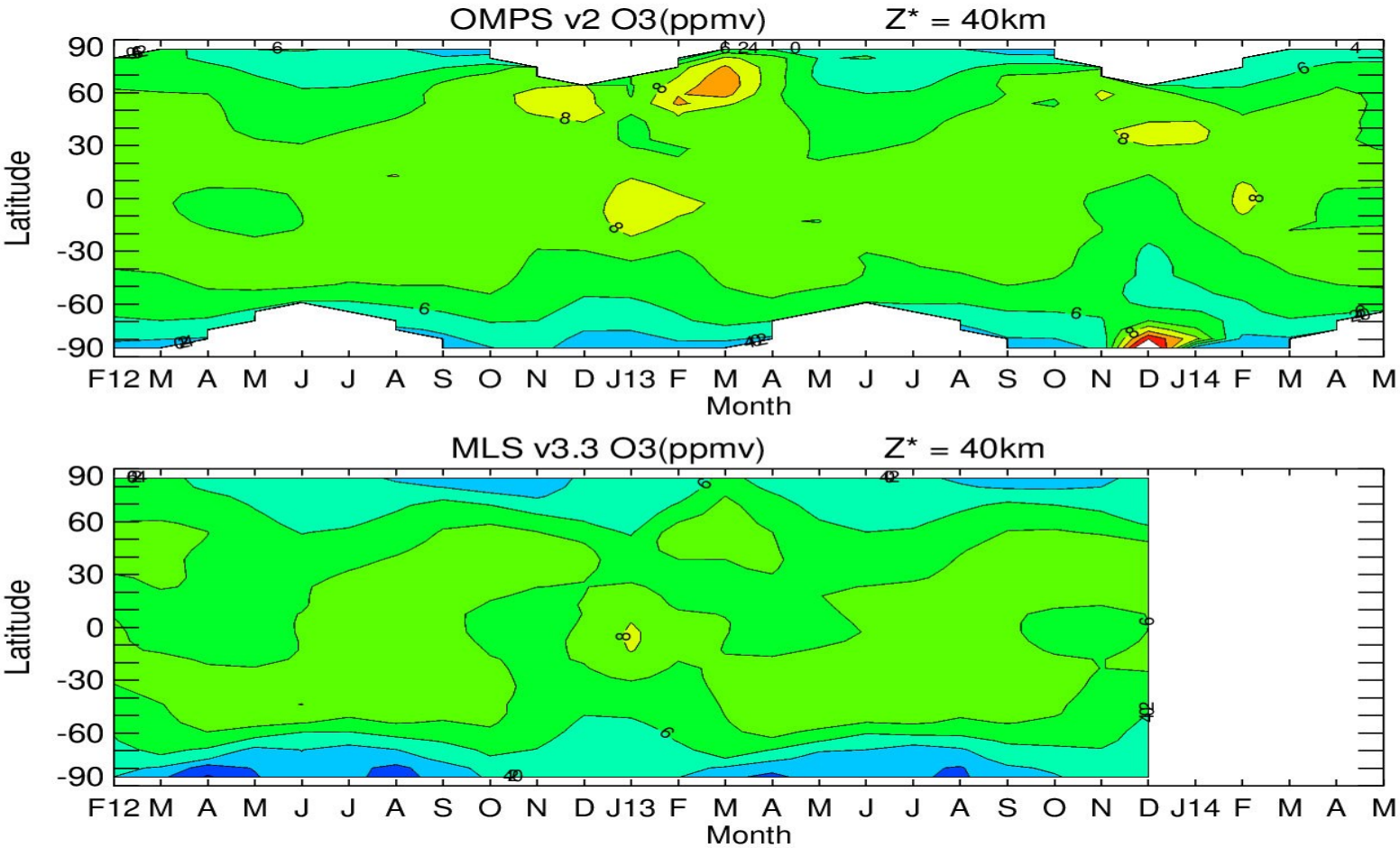

OMPS v2 O3(ppmv) 5S-5N
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M

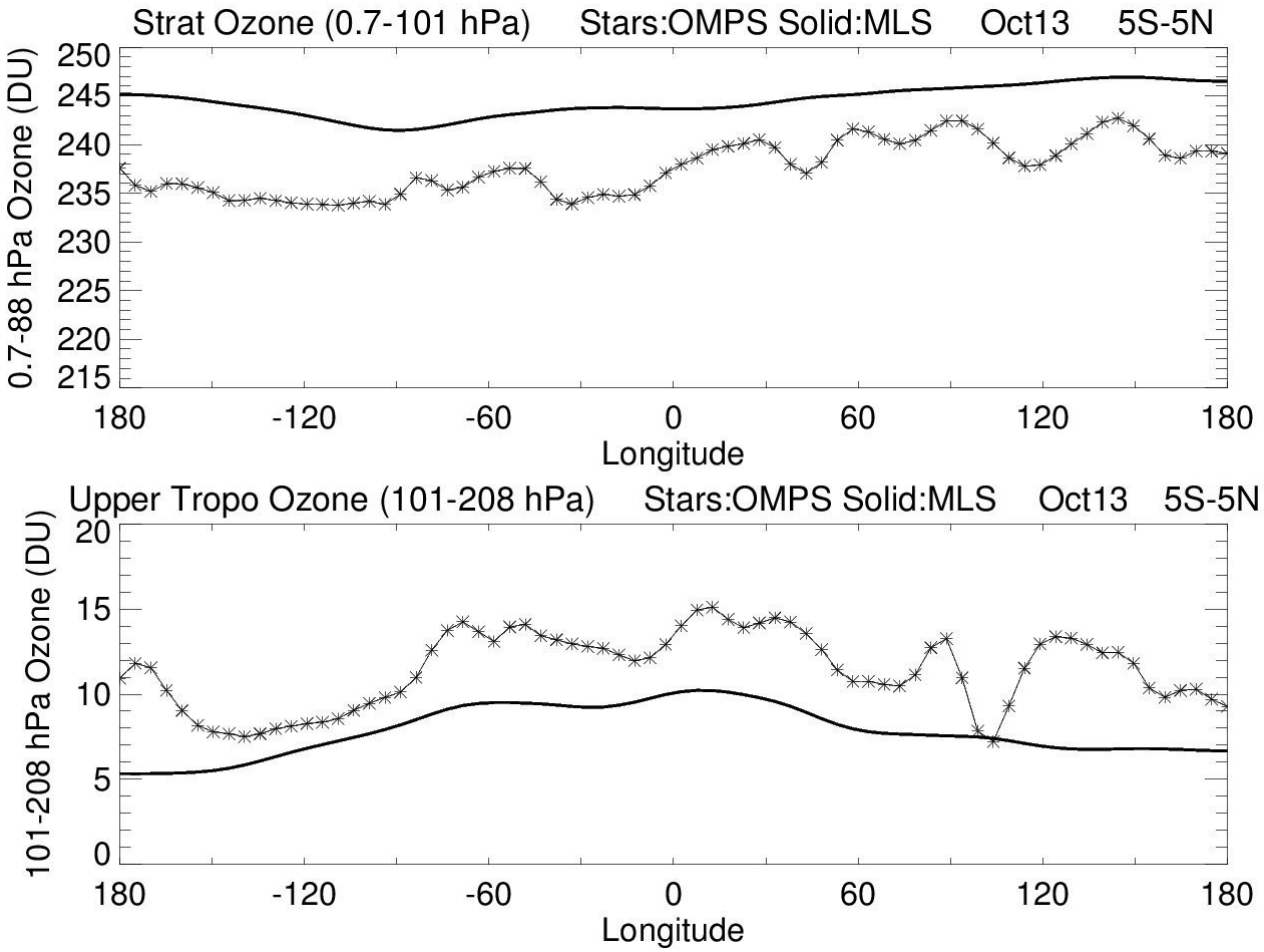

MLS v3.3 O3(ppmv) 5S-5N
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M


OMPS v2 O3(ppmv)
75S-80S
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M
MLS v3.3 O3(ppmv)
75S-80S
Zstar(km)
Month
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M


OMPS v2 O3(ppmv)
75N-80N
Zstar(km)
60
50
40
30
20
10
0
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M
Month


MLS v3.3 O3(ppmv)
75N-80N
Zstar(km)
60
50
40
30
20
10
0
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M
Month


OMPS v2 O3(ppmv)
Z* = 40km
Latitude
90
60
30
0
-30
-60
-90
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M
Month
MLS v3.3 O3(ppmv)
Z* = 40km
Latitude
90
60
30
0
-30
-60
-90
F12 M A M J J A S O N D J13 F M A M J J A S O N D J14 F M A M
Month


Strat Ozone (0.7-101 hPa) Stars:OMPS Solid:MLS Oct13 5S-5N
0.7-88 hPa Ozone (DU)
250
245
240
235
230
225
220
215
180
-120
-60
0
60
120
180
Longitude
Upper Tropo Ozone (101-208 hPa) Stars:OMPS Solid:MLS Oct13 5S-5N
101-208 hPa Ozone (DU)
20
15
10
5
0
180
-120
-60
0
60
120
180
Longitude