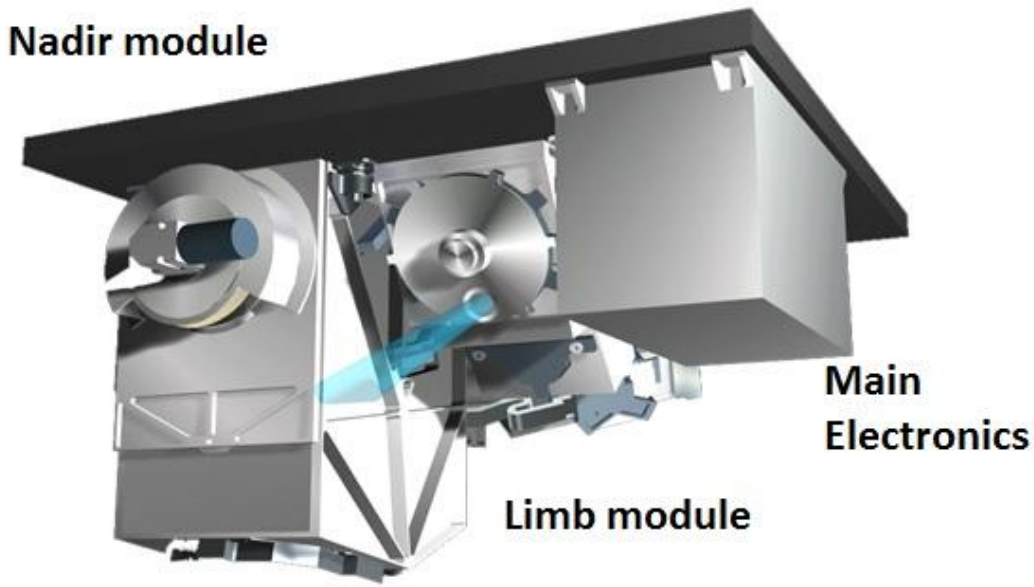
Version 2 ozone validation: results of comparisons against Aura MLS and ACE FTS



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OMPS meeting, January 15, 2015

Validation of LP v2 ozone profiles:

1. Selection of correlative MLS and ACE profiles (matching criteria);
2. Convert MLS and ACE data into number density vs altitude (1 km sampling);
3. Bin data in latitude bins;
4. Compare two data sets (mean differences, std dev, correlations etc.);
5. With MLS data only: a) isolate and compare seasonal patterns; b) vertical ozone distribution inside the Antarctic ozone hole (in terms of amplitude, phase and vertical structure).

The study was focused on middle and lower stratosphere and upper troposphere region. Only data from the central LP slit have been evaluated.

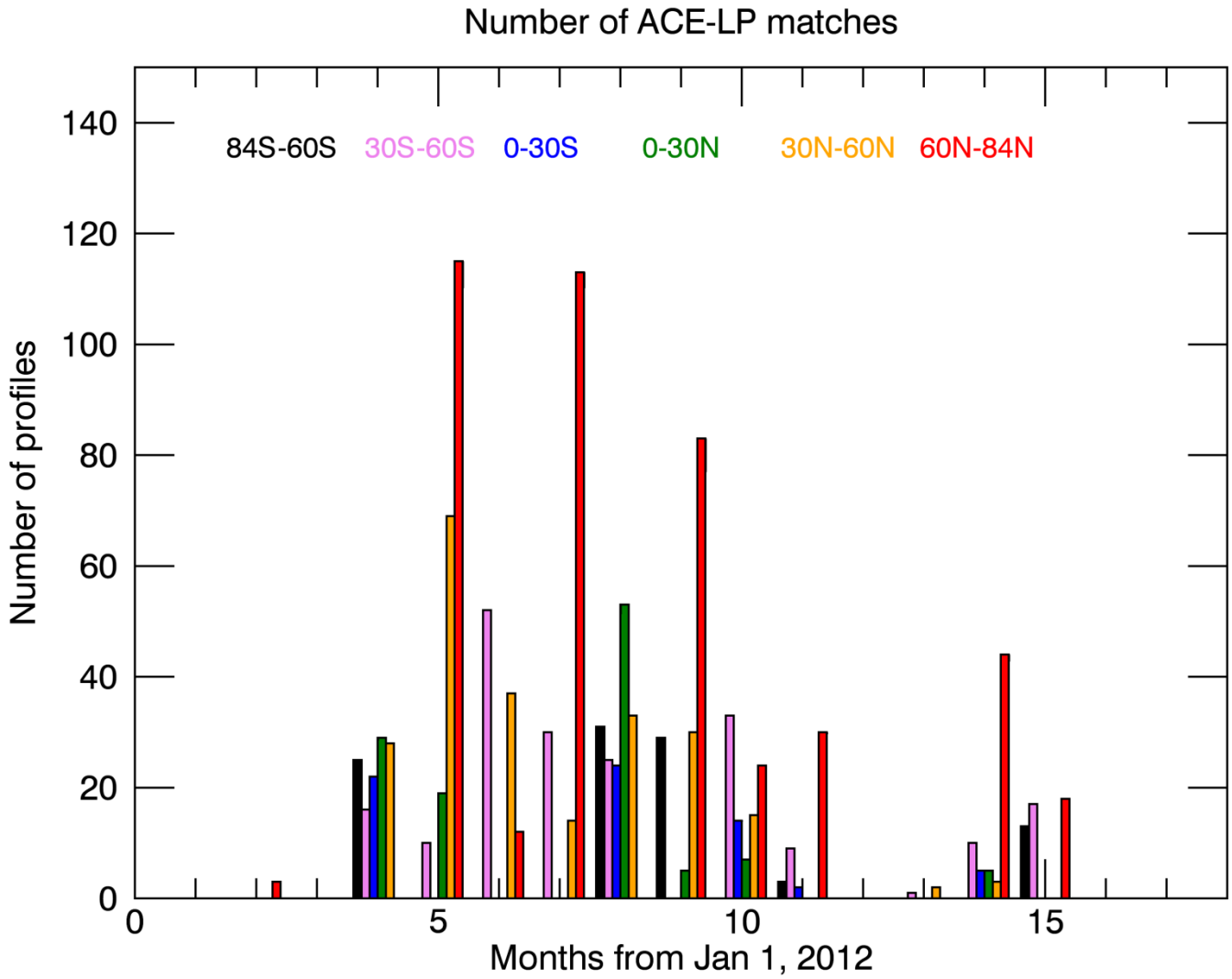
OMPS LP vs ACE-FTS v3.5

Coincidence criteria:
+/-2 degrees lat,
distance +/- 1000 km
(500) km ,
time +/- 24 hours.

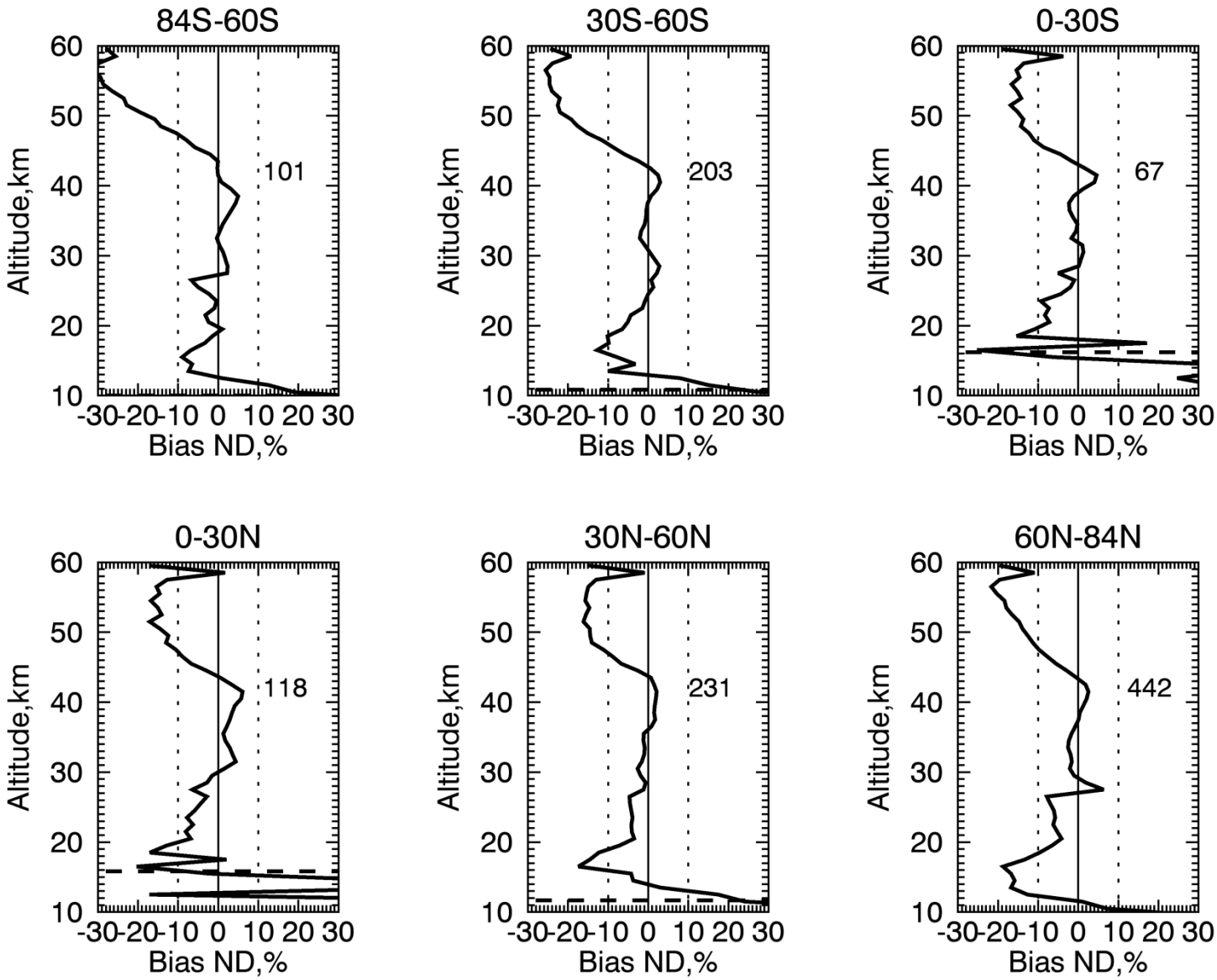
Validation period:
April 2012-April
2013.

Data averaged in **six 30-degree lat bins**.

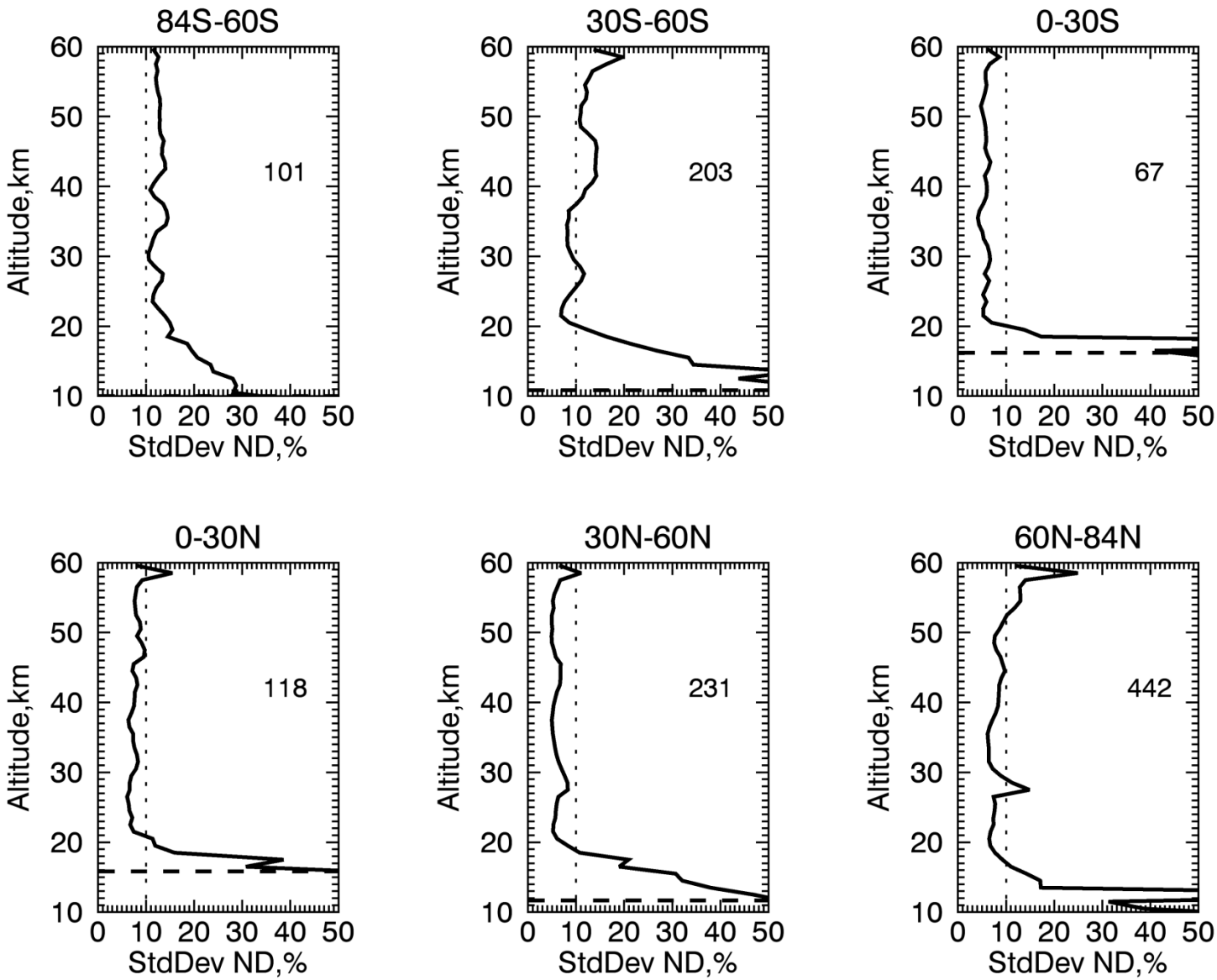
ACE data (vmr vs altitude) have been converted to number density vs altitude using ACE temperature profiles.



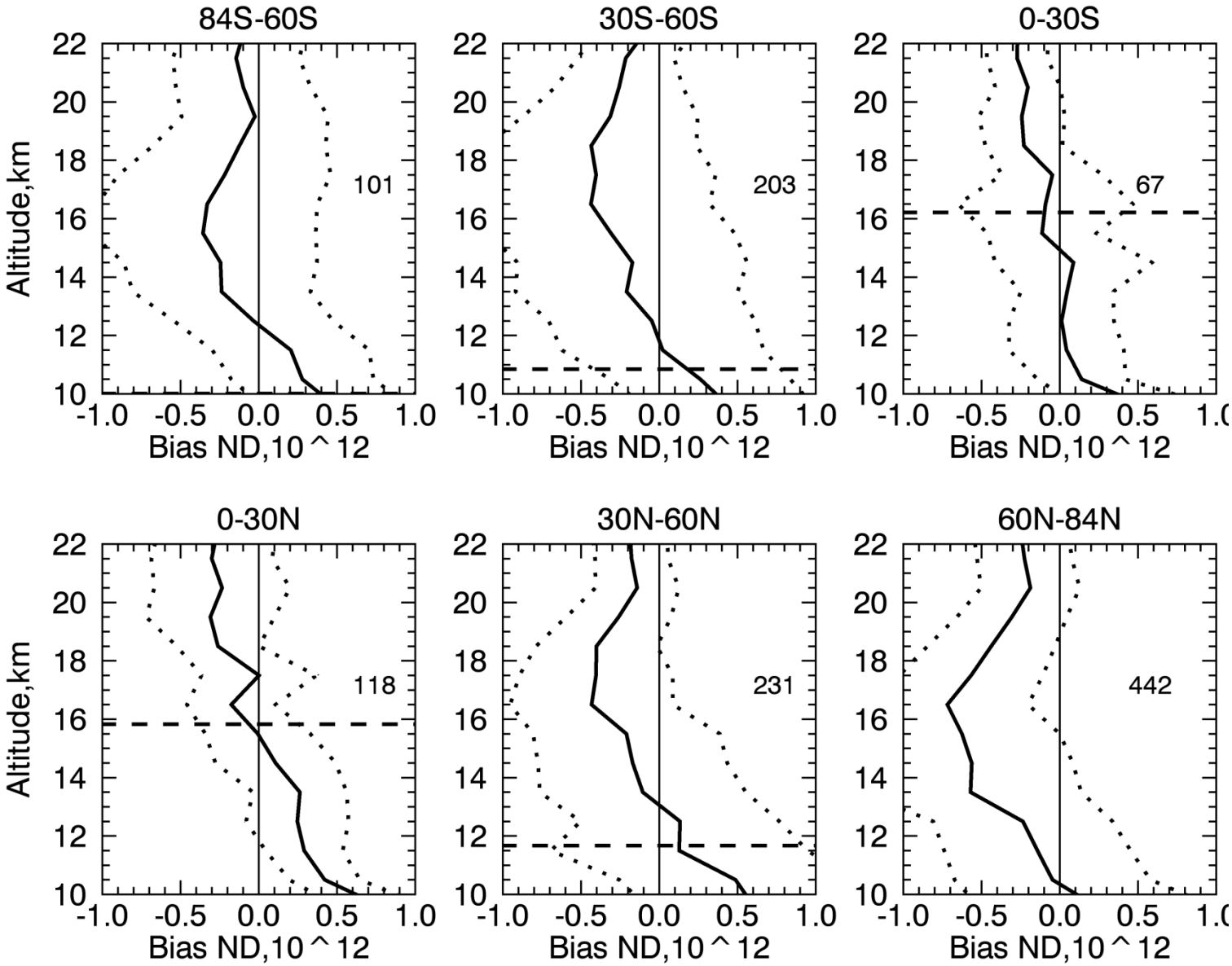
OMPS LP vs ACE-FTS, Biases



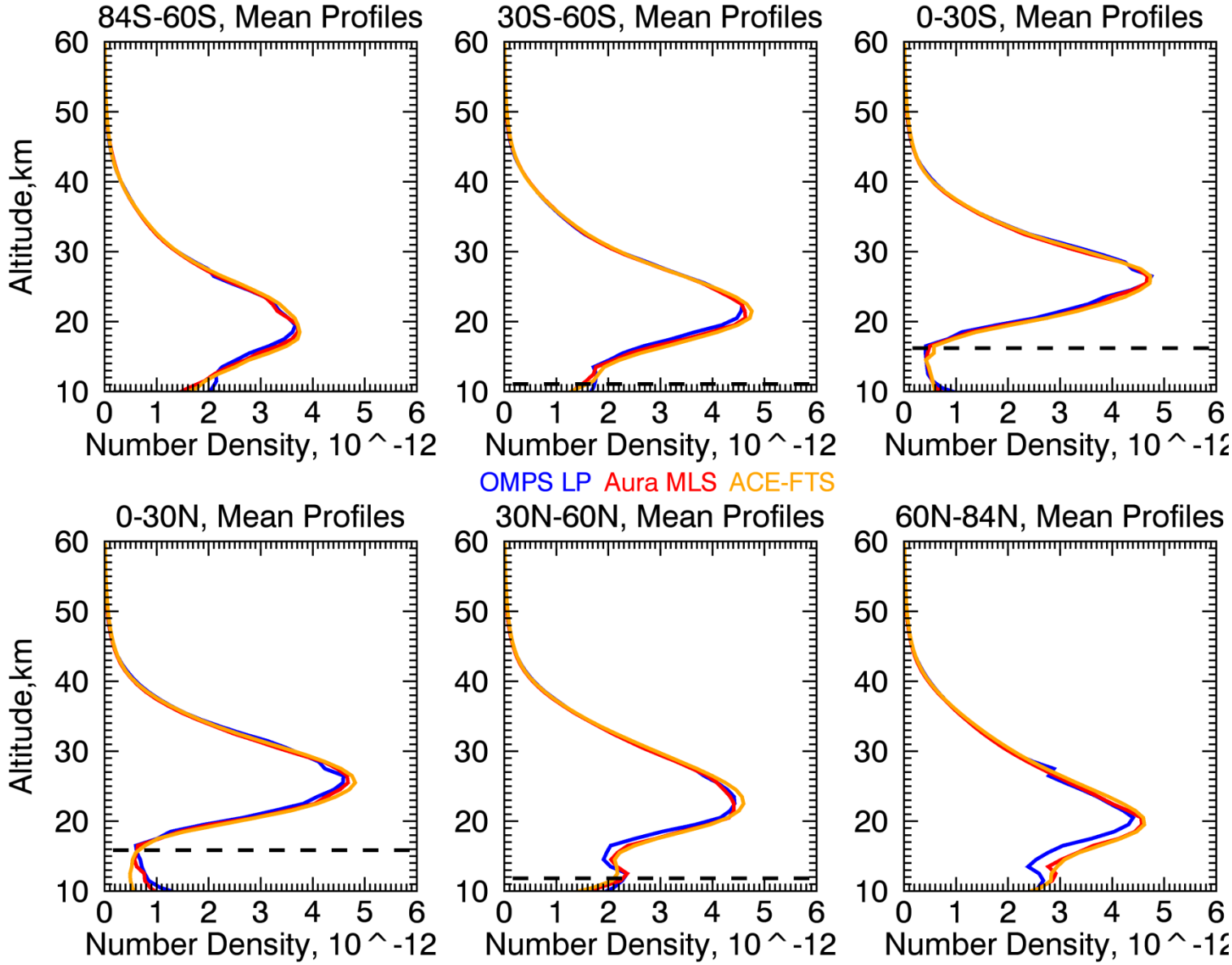
OMPS LP vs ACE-FTS, std dev



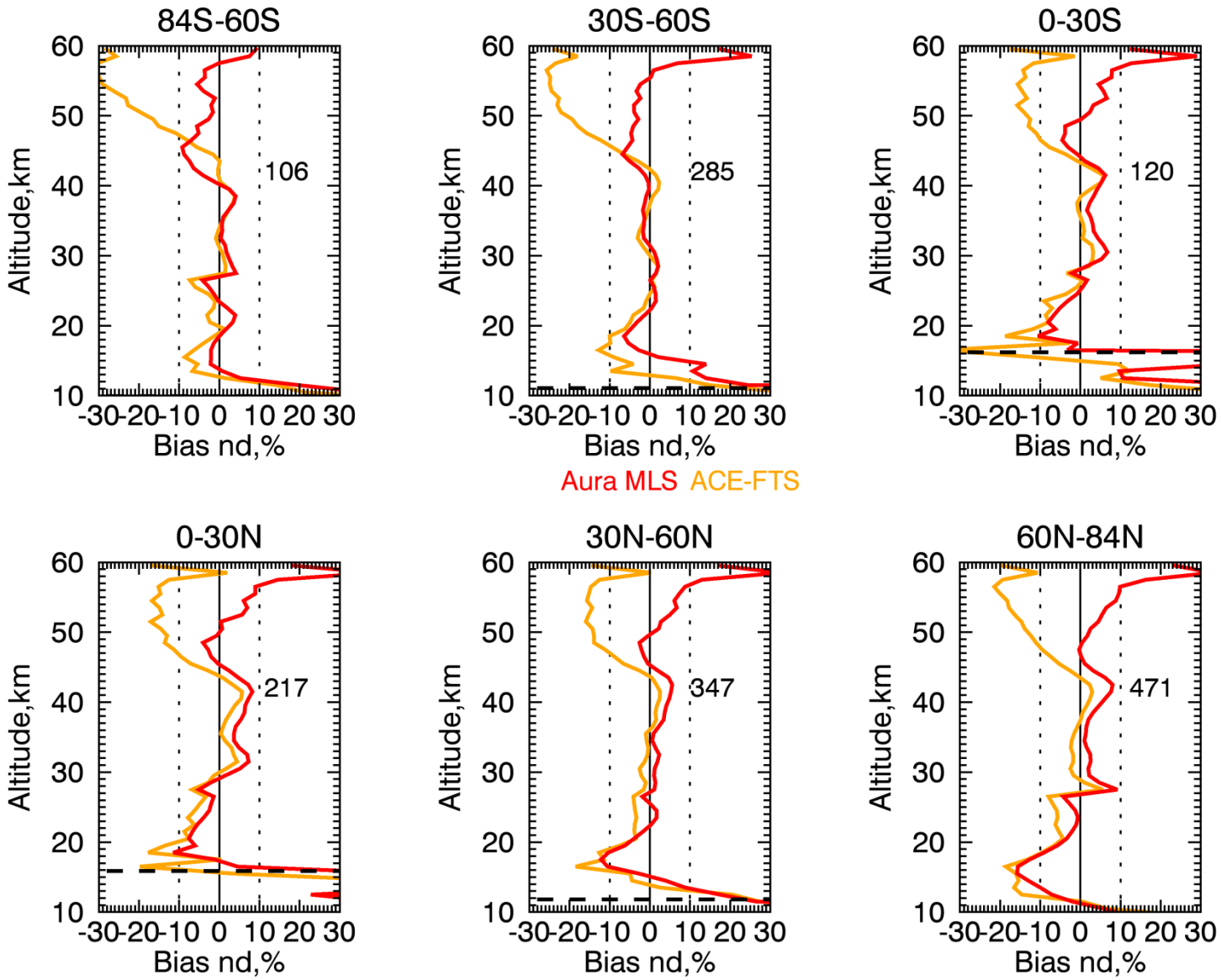
OMPS LP vs ACE-FTS in UTLS



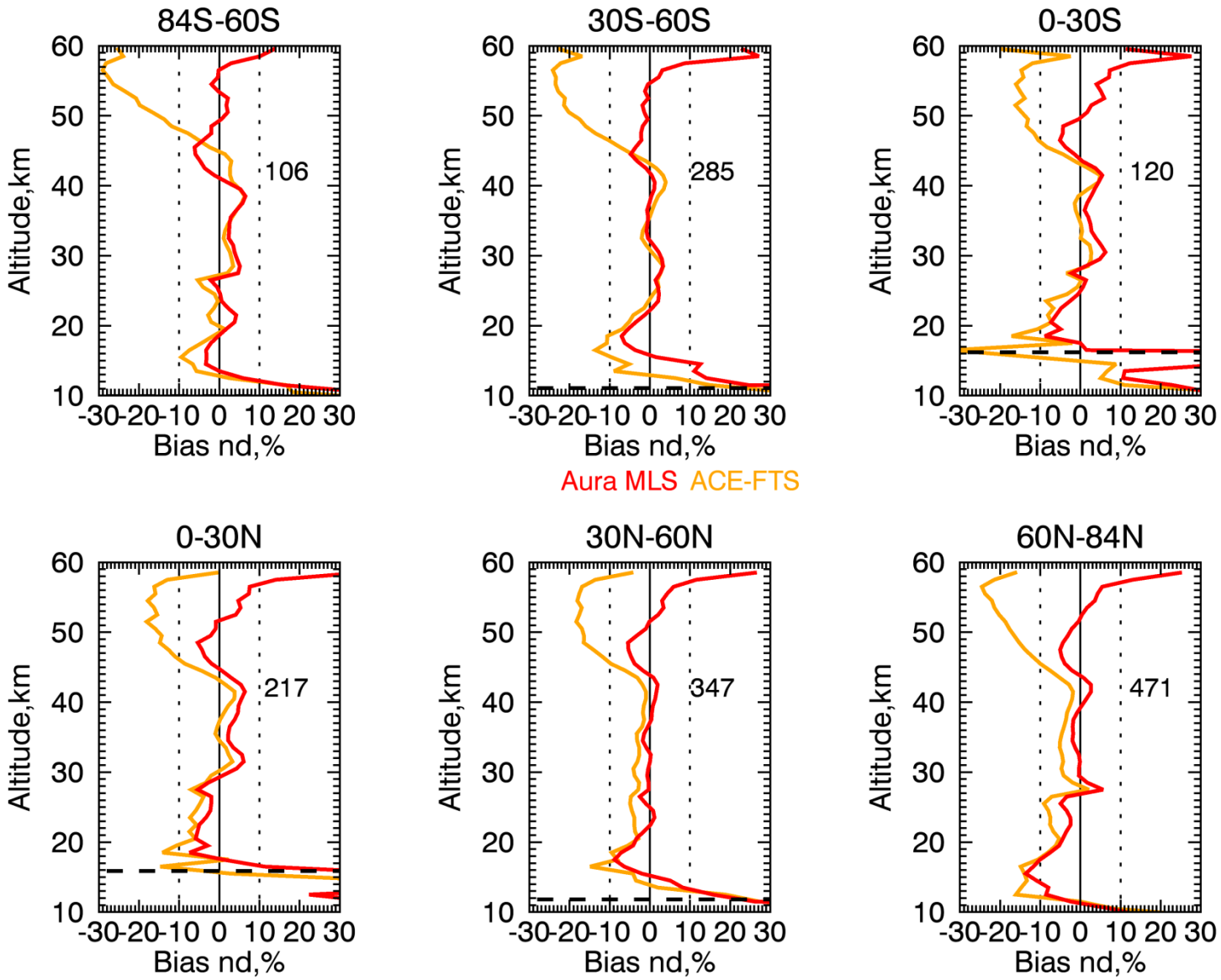
OMPS LP vs ACE-FTS/Aura MLS, zm profiles



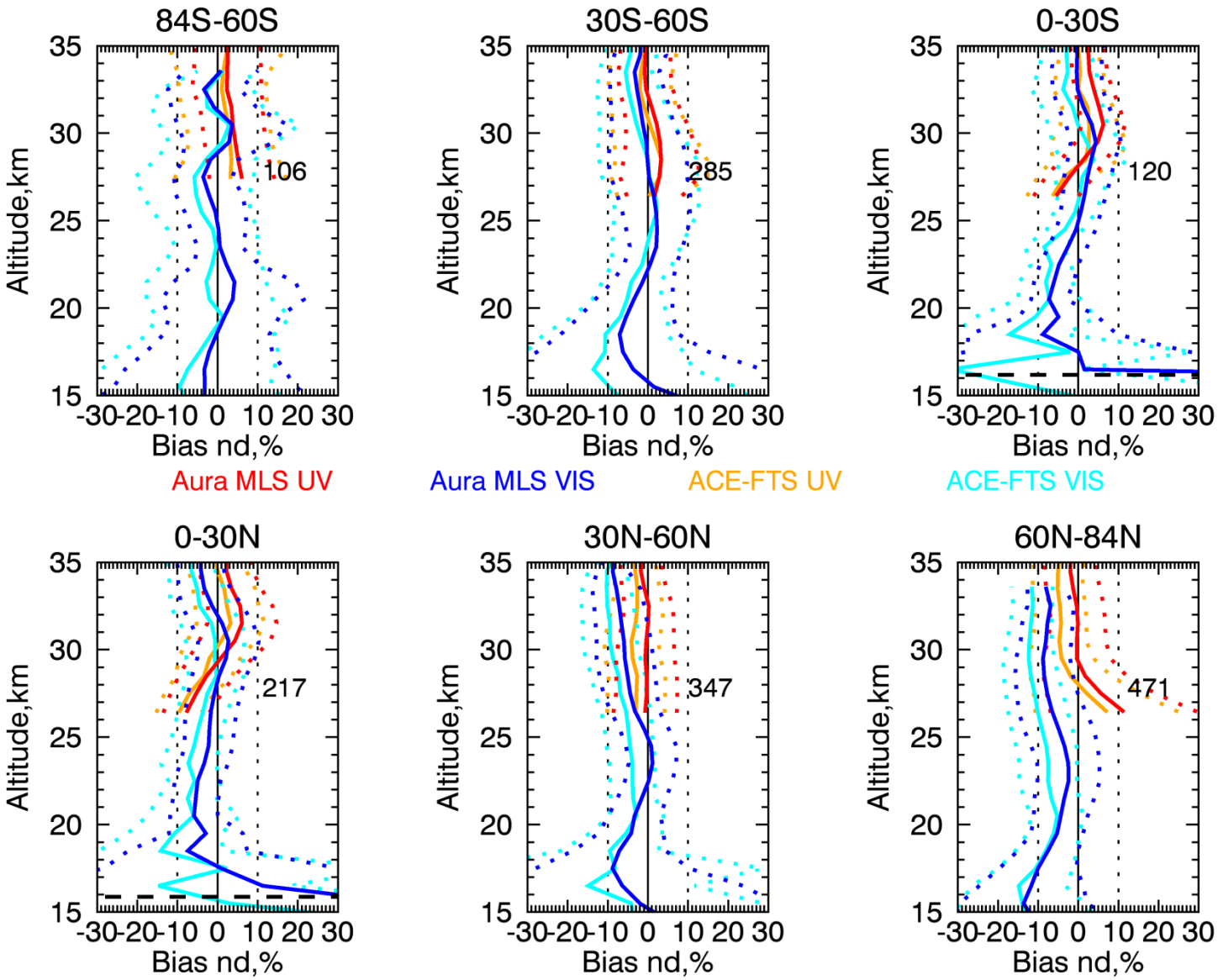
OMPS LP vs ACE-FTS, no TH corrections



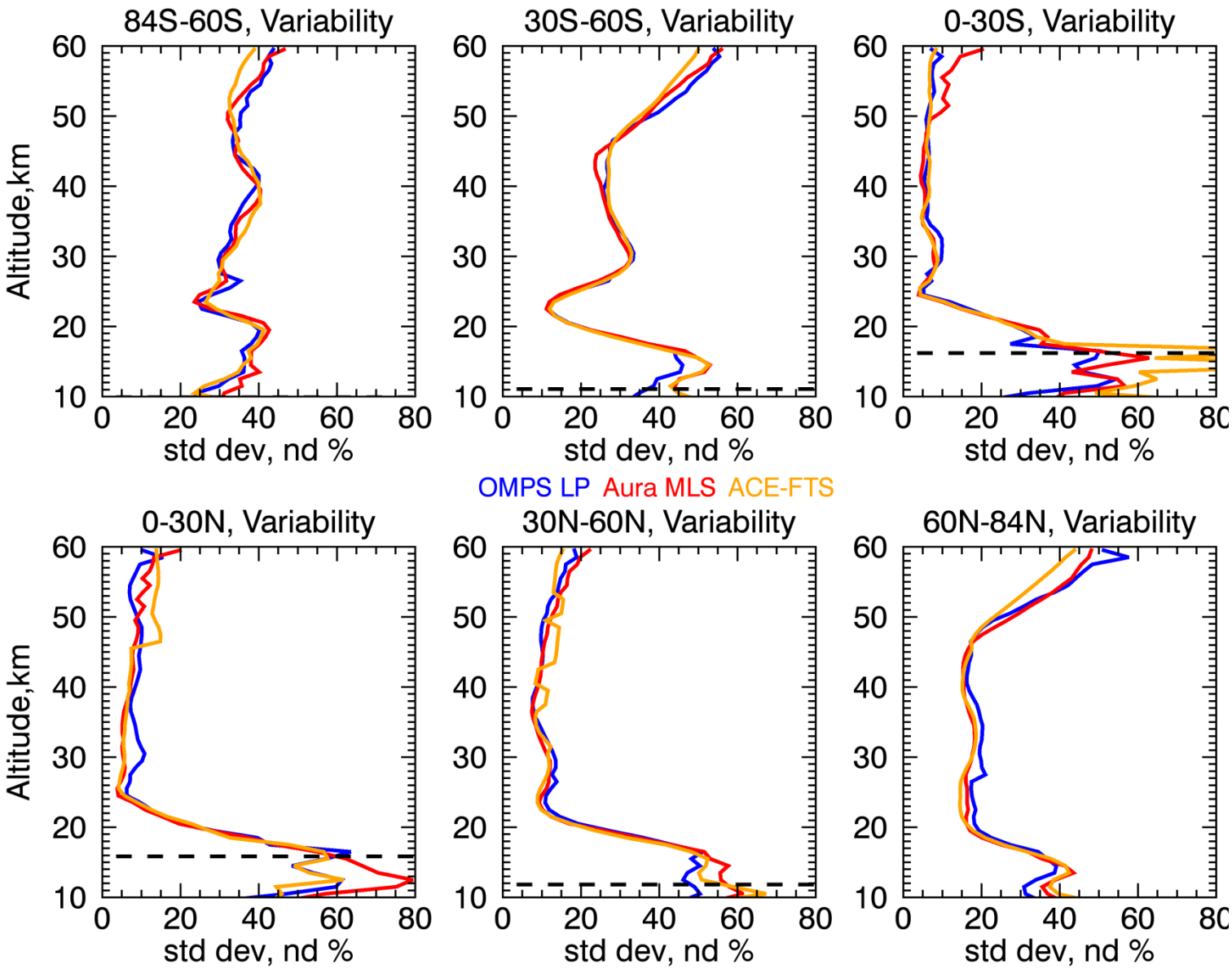
OMPS LP vs ACE-FTS/Aura MLS, TH correction



OMPS LP vs ACE-FTS/Aura MLS, VIS vs UV



OMPS LP vs ACE-FTS/Aura MLS, variability relative the mean



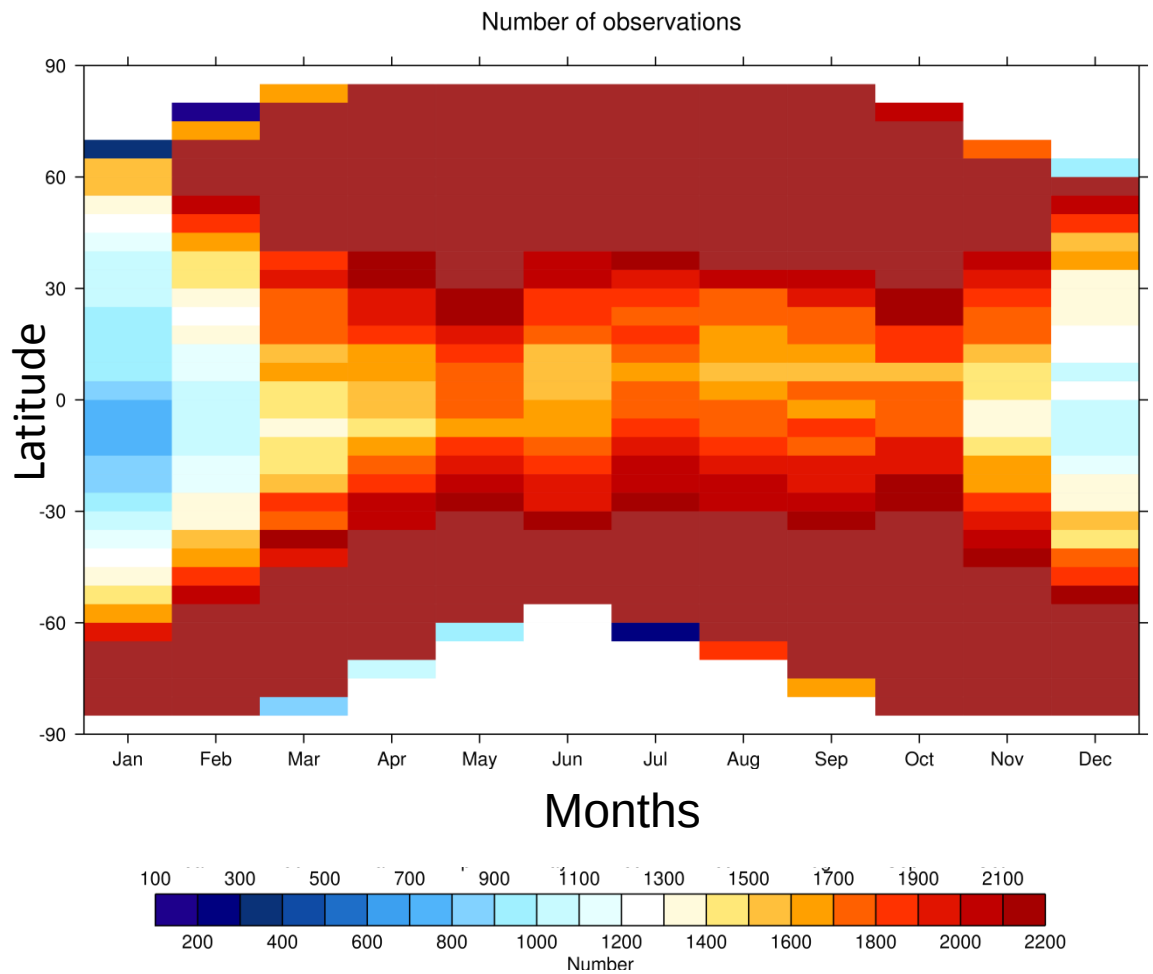
Part 2: OMPS LP vs Aura MLS

Time period:
April 2012 – December 2014
(except 11/25/2013-01/23/2014).

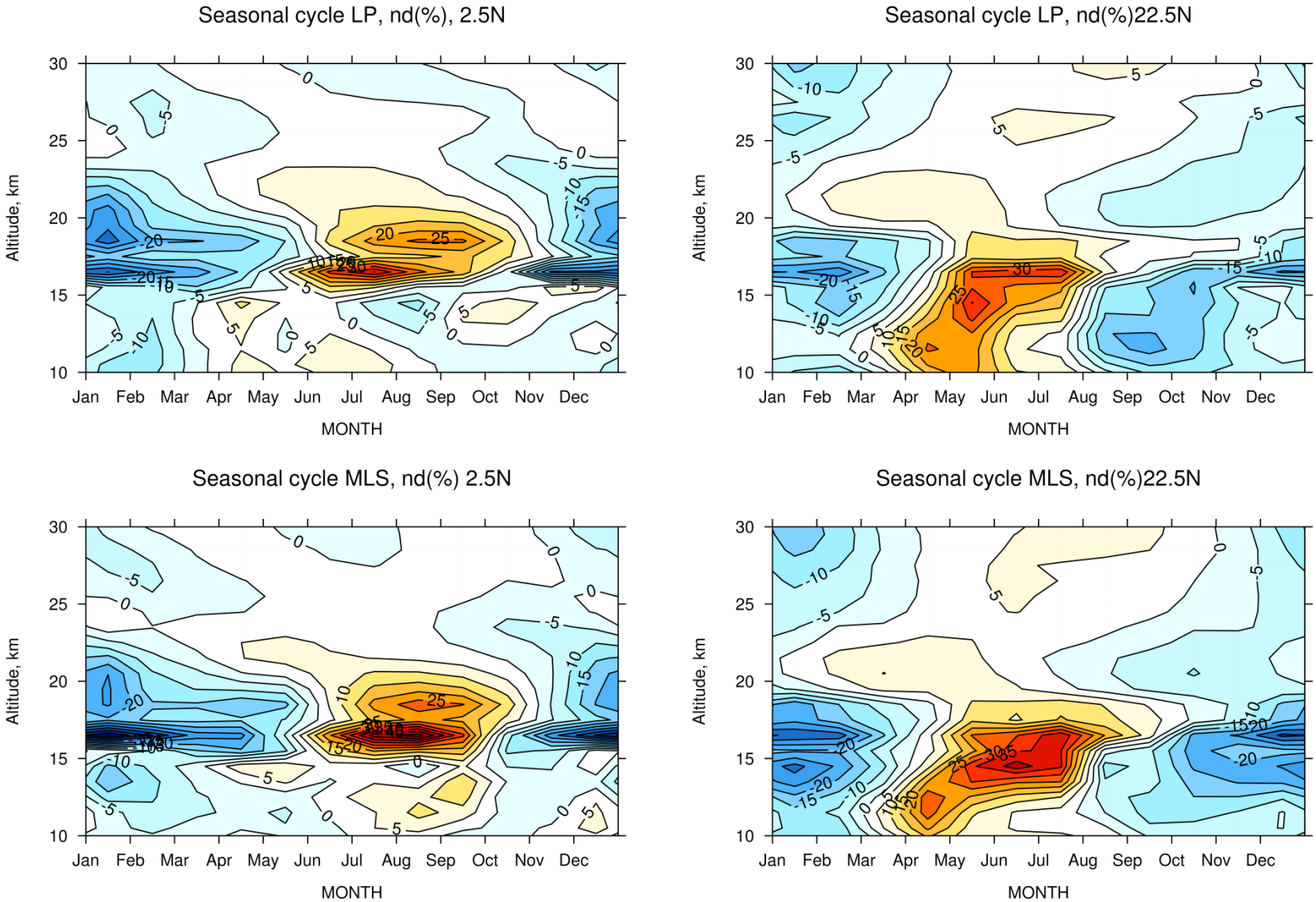
Coincident criteria:
latitude ±2°;
distance less than 500 km;
daytime MLS data only ;
Central LP slit only
Negative MLS values are excluded.

Data conversion:
MLS mixing ratio profiles have been interpolated to LP vertical scale and converted into number density using GMAO P&T profiles reported with LP data.

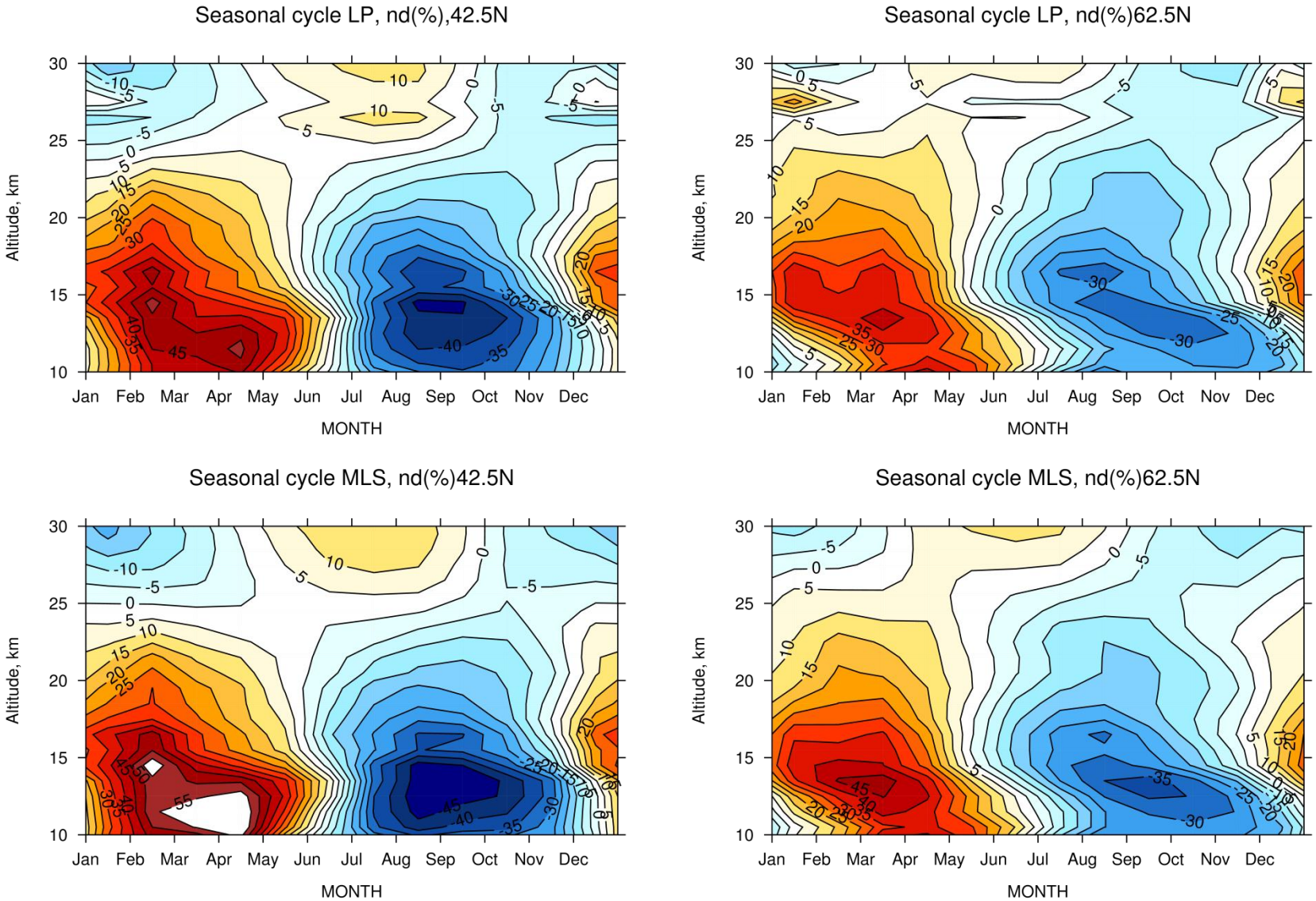
All matching profiles are binned in 5-degree latitude bins and monthly averaged.



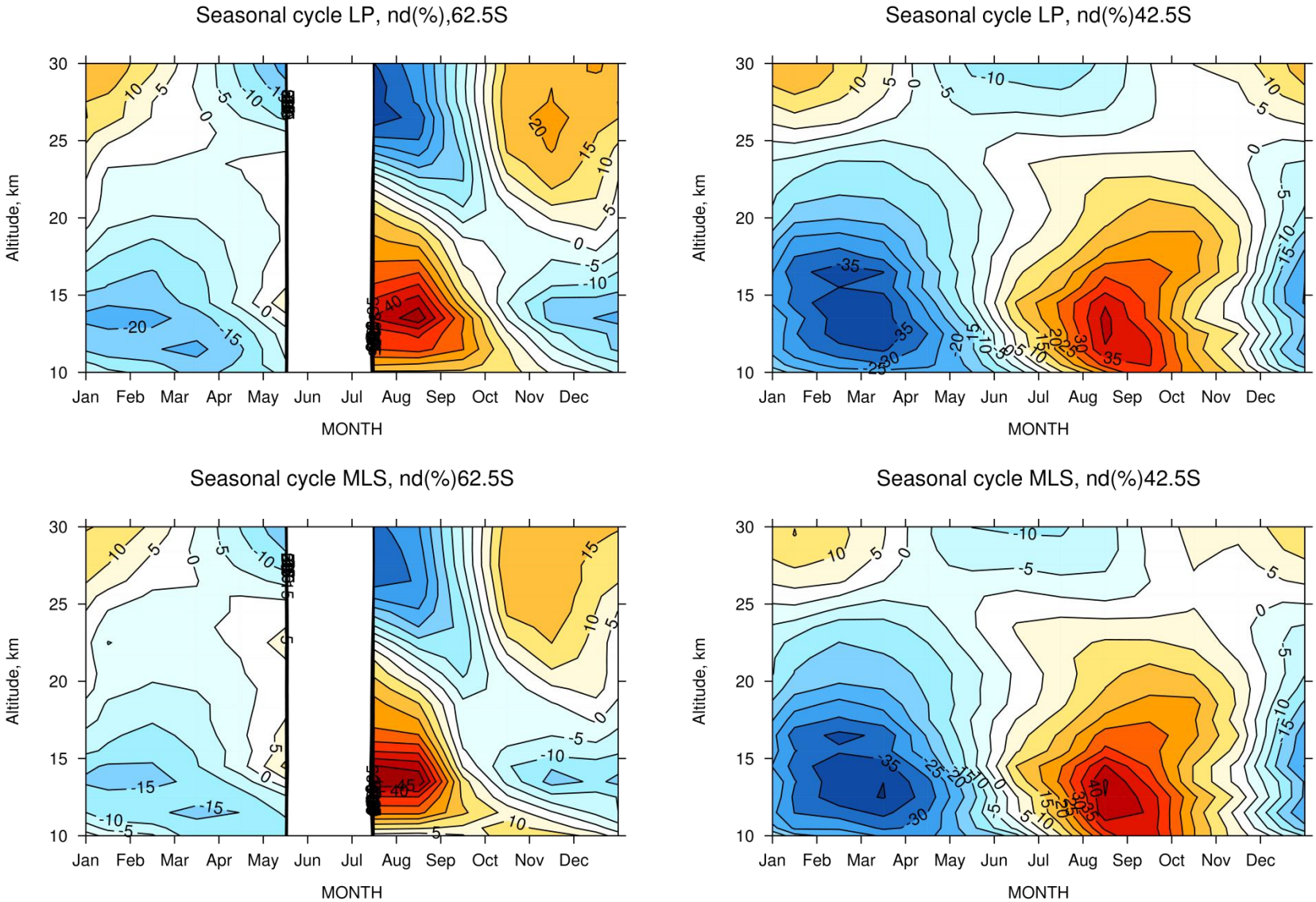
OMPS LP vs Aura MLS



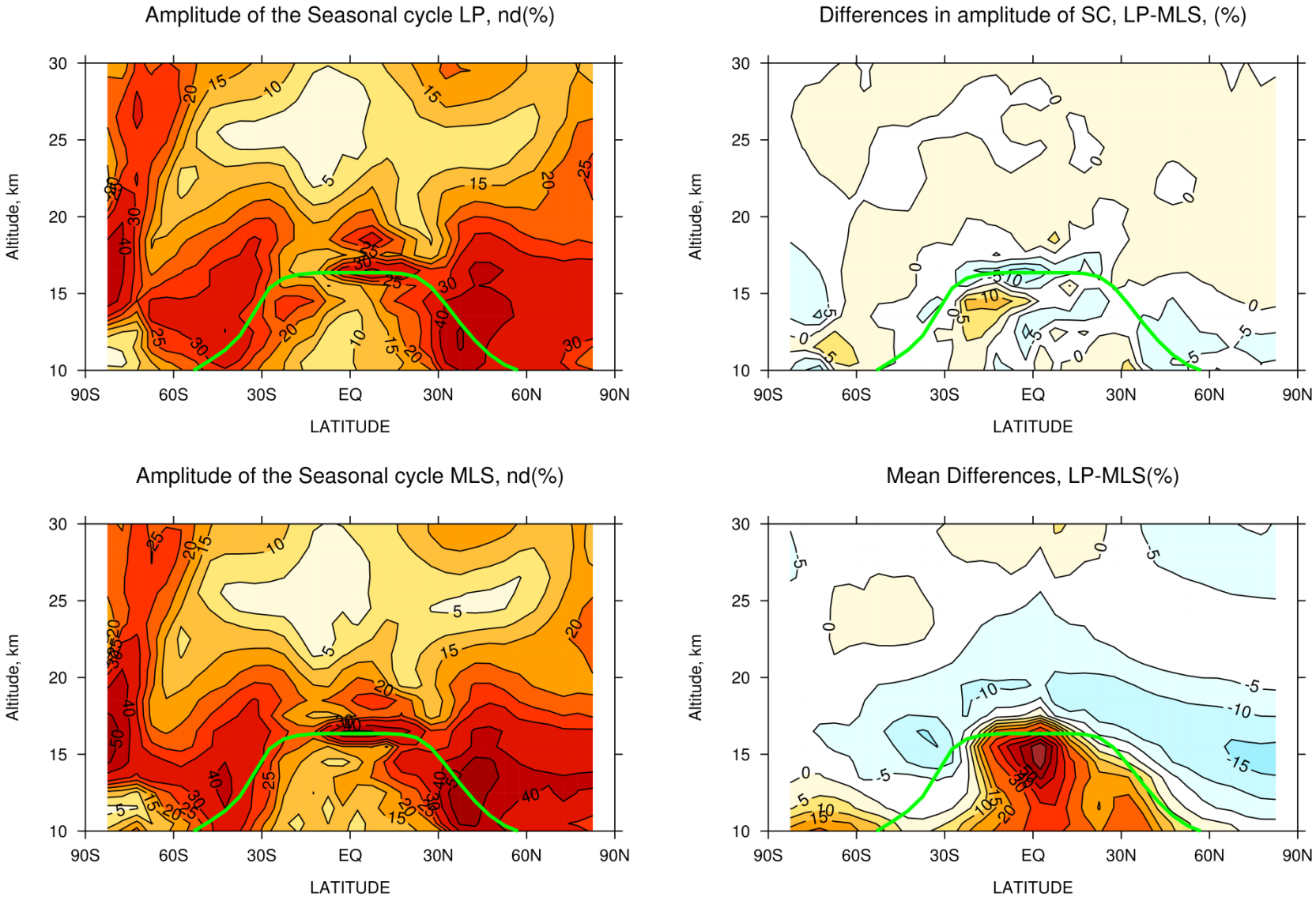
OMPS LP vs Aura MLS



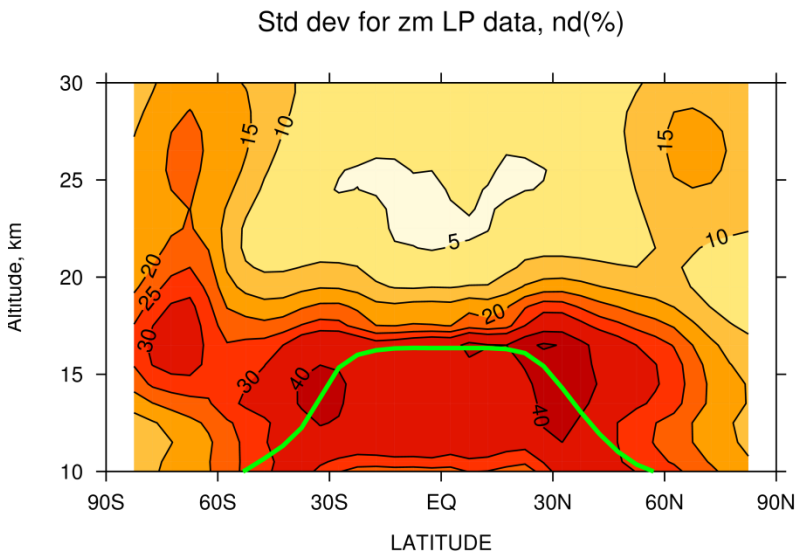
OMPS LP vs Aura MLS

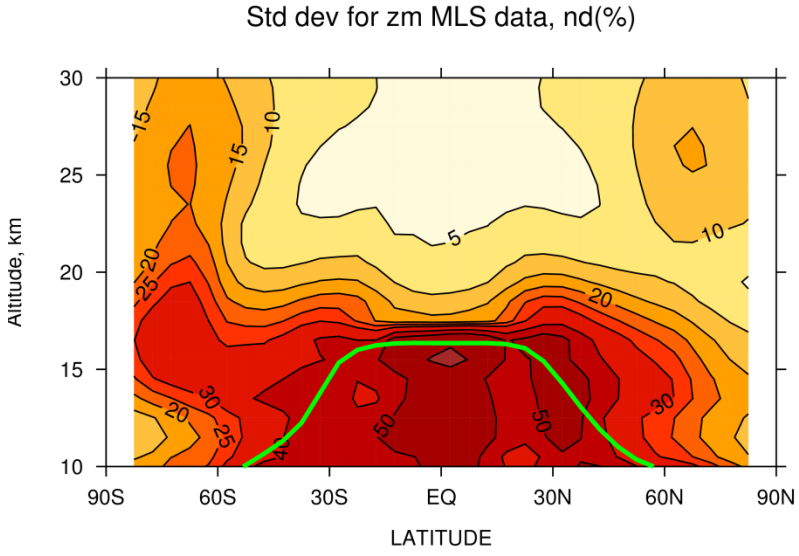


OMPS LP vs Aura MLS

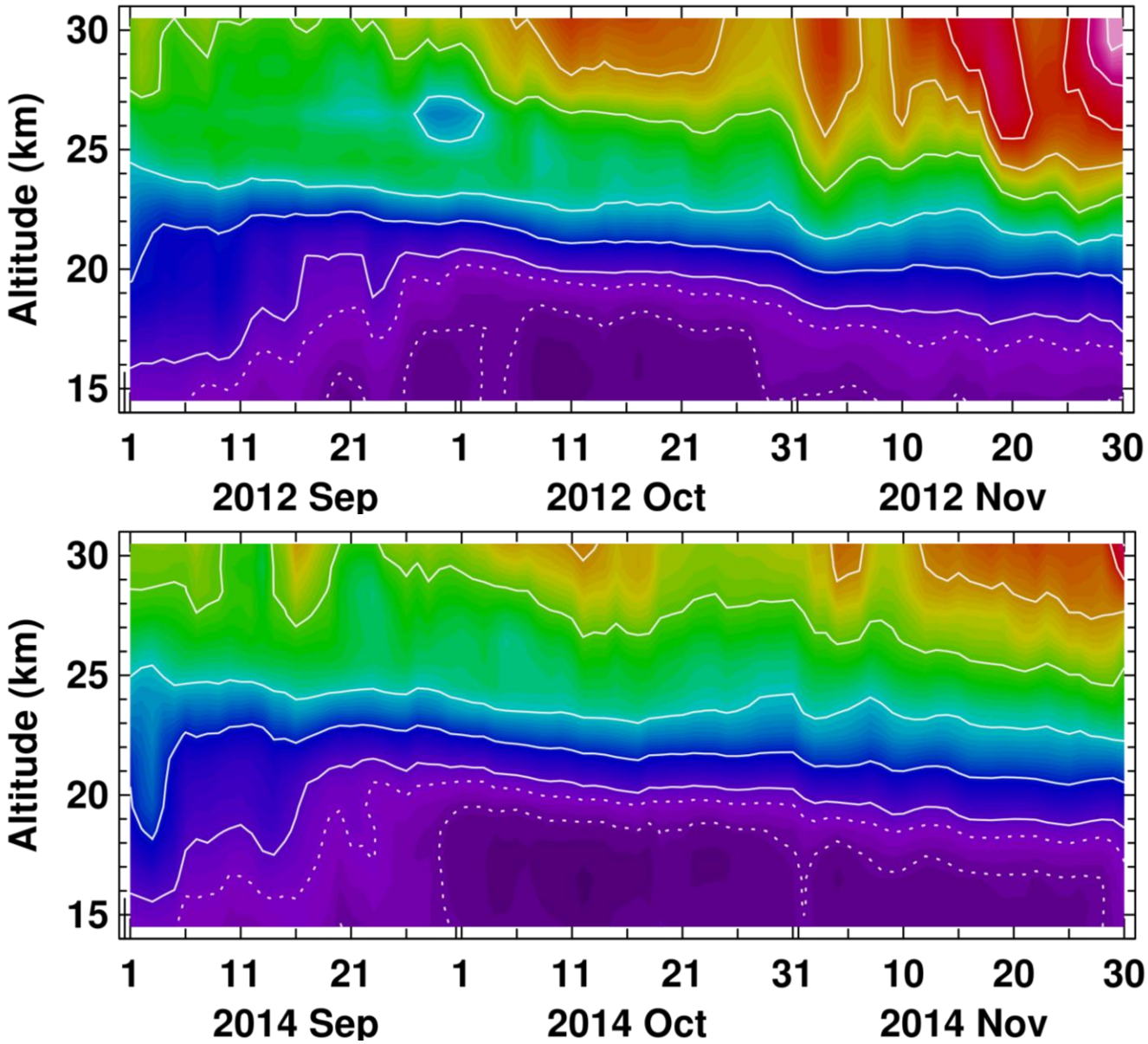


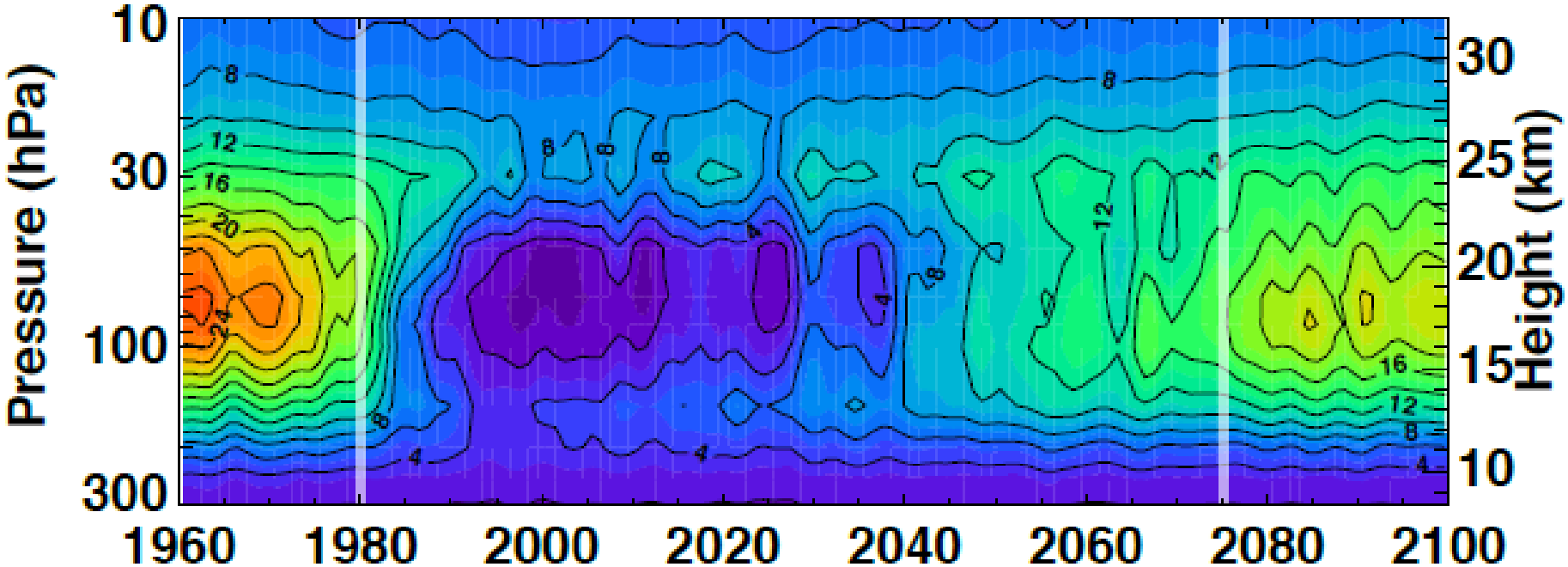
OMPS LP vs Aura MLS





OMPS LP vs Aura MLS, Antarctic ozone hole



Expected recovery of the ozone hole over Antarctica

- The Global Coupled Chemistry Climate Model (GEOS CCM) simulations show that ozone minimum values over Antarctica are controlled by the level of Cl and slightly depend on climate changes due to increasing level of greenhouse gases (GHG);
- The GEOS CCM model predicts that ozone changes due to decreasing level of Cl will be most prominent in the altitude range between 10-25 km. These results emphasize the importance of continuation of highly-resolved vertical ozone observations.