REPORT ABOUT ENVISAT GOMOS NRT PRODUCTS (GOM_RR__2P) FOR JANUARY 2012

Rossana Dragani

ECMWF, Shinfield Park, Reading, RG2 9AX, United Kingdom,
Emails: Rossana.Dragani@ecmwf.int, Tel: 0044 118 9499259

February 13, 2012

1. Key points for January 2012

- The status of the GOMOS instrument is still very weak, and during January only a few days of measurements were performed as test using a fictive star inserted in front of each real star to track. In this way, GOMOS could successfully track up to two stars per orbit.
- Bacause of the instrumental problems and the operations interruptions, the number of observations was in general too low to be considered statistically significant, so that the results discussed in this brief report only provide an indication of the quality of the GOMOS retrievals to support the cal/val activities and anomaly investigation studies.
- Ozone data were only available at midlatitudes in the NH (around 40°N) and in the tropics, in the ratio of about two third and one third of the received data volume, respectively. An insignificant number of observations was found at latitudes southern than 30S.
- The ozone first guess and analysis departures from GOMOS observations were typically negative (ozone analyses larger than GOMOS retrievals) at all levels and available latitudes.
- The ozone first guess and analysis departures varied from -20 to +12% at most levels in the mesosphere and upper stratosphere ($0.2 < p < 60$ hPa). Larger, negative values of the GOMOS-model departures (up to -50% in places) were found in the lower stratosphere and upper troposphere. The standard deviations of the ozone first-guess and analysis departures were larger than 10% at most levels and at both latitudinal bands.
- No water vapour observation passed the quality check implemented in the PDS2BUFR filter.
- The monitoring statistics for January were produced with the operational ECMWF model, CY37R3.

2. Quality and amount of received data

GOMOS instruments continues having serious problems in performining nominal operations, and the data coverage and amount of received data during January 2012 were extremely low and limited to just a few days of measurements in the tropics and in a channel around 40°N. In addition, even when the instrument could be operated, no water vapour observation passed the quality check implemented in the PDS2BUFR filter. Ozone data coverage and amount of received data are shown in figures 1 and 2 in the ozone report. Overall, up to about 160 (good) observations were available for ozone. The largest number of observations were sampled in the mid stratosphere (see figure 3 in the ozone report). There were no observations at high latitudes in the northern hemisphere and hardly any at latitudes southern than 30S.

3. GOMOS ozone data

The profile plots (ozone report: Figures 3-5) show that both the ozone first guess and analyses were normally within the observation one-standard deviation range in the mesosphere and upper stratosphere, but residuals normally larger than the observation one standard deviation were found in the lower stratosphere.

The first-guess and analysis departures from GOMOS ozone profiles were negative (observation values smaller than their model equivalent) at all vertical levels and available latitudes, with relative residuals as large as 50% in the UTLS region.

The standard deviations of the analysis and first guess departures were larger than 10% at all levels and both available latitudinal bands.

The scatter plots (ozone report: Figures 7-13), timeseries (ozone report: Figure 14-17) and the Hovmoeller plots (ozone report: Figure 18-19) generally confirm the above analysis.

4. Water vapour data

There were no available water vapour observations in the BUFR files during this month.

5. Remarks

This monitoring report was produced with the operational ECMWF model (CY37R3). Ozone layers from SBUV/2 on NOAA-17, NOAA-18, and NOAA-19, and MIPAS ozone profiles were actively assimilated. In addition, SCIAMACHY total column ozone (produced by KNMI), and OMI total column ozone were also used. MERIS total column water vapour (TCWV) has been assimilated since September 2009. Ozone sensitive IR radiances from IASI, AIRS and HIRS have also been assimilated since November 2011.

A variational bias correction for retrieved products became operational in September 2009 in the ECMWF model CY35R3. All the assimilated ozone products (with the only exception of the SBUV/2 and MIPAS data) and the MERIS TCWV were bias corrected.

The results presented in this report made use of only the observations acquired in dark-limb conditions as implemented in the PDS2BUFR converter in May 2007.

All ozone values are in Dobson Units (DU).

REPORT ABOUT ENVISAT GOMOS NRT OZONE DATA (GOM_RR__2P) FOR JANUARY 2012

Rossana Dragani

ECMWF, Shinfield Park, Reading, RG2 9AX, United Kingdom,
Emails: Rossana.Dragani@ecmwf.int, Tel: 0044 118 9499259

February 10, 2012

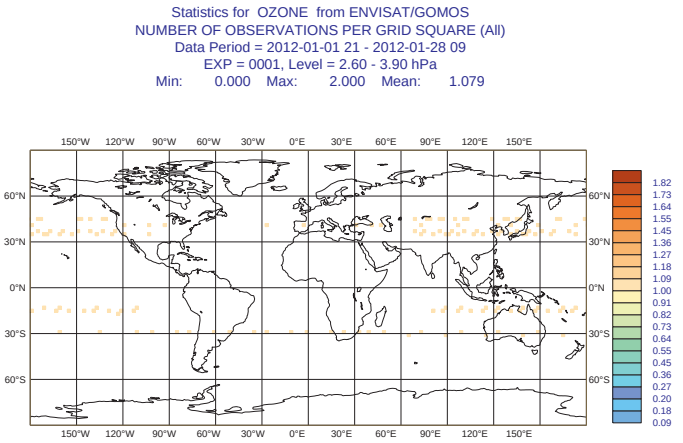

Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT ozone data for layer 7 (2.60-3.90 hPa) for January 2012.

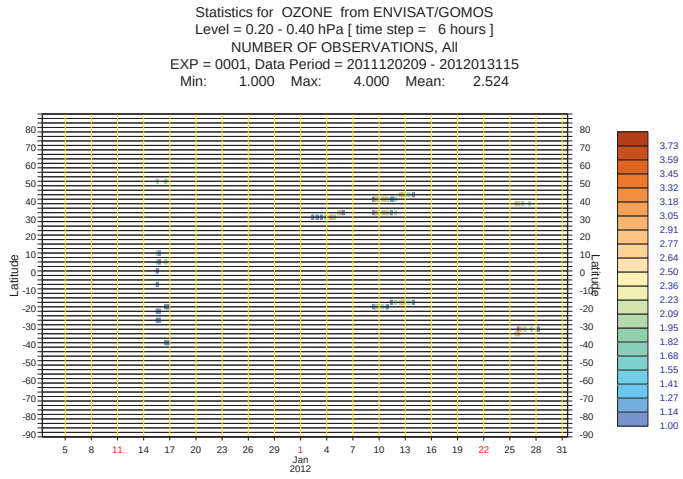

Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT ozone data per 6-hour cycle for layer 7 (2.60-3.90 hPa) for January 2012.

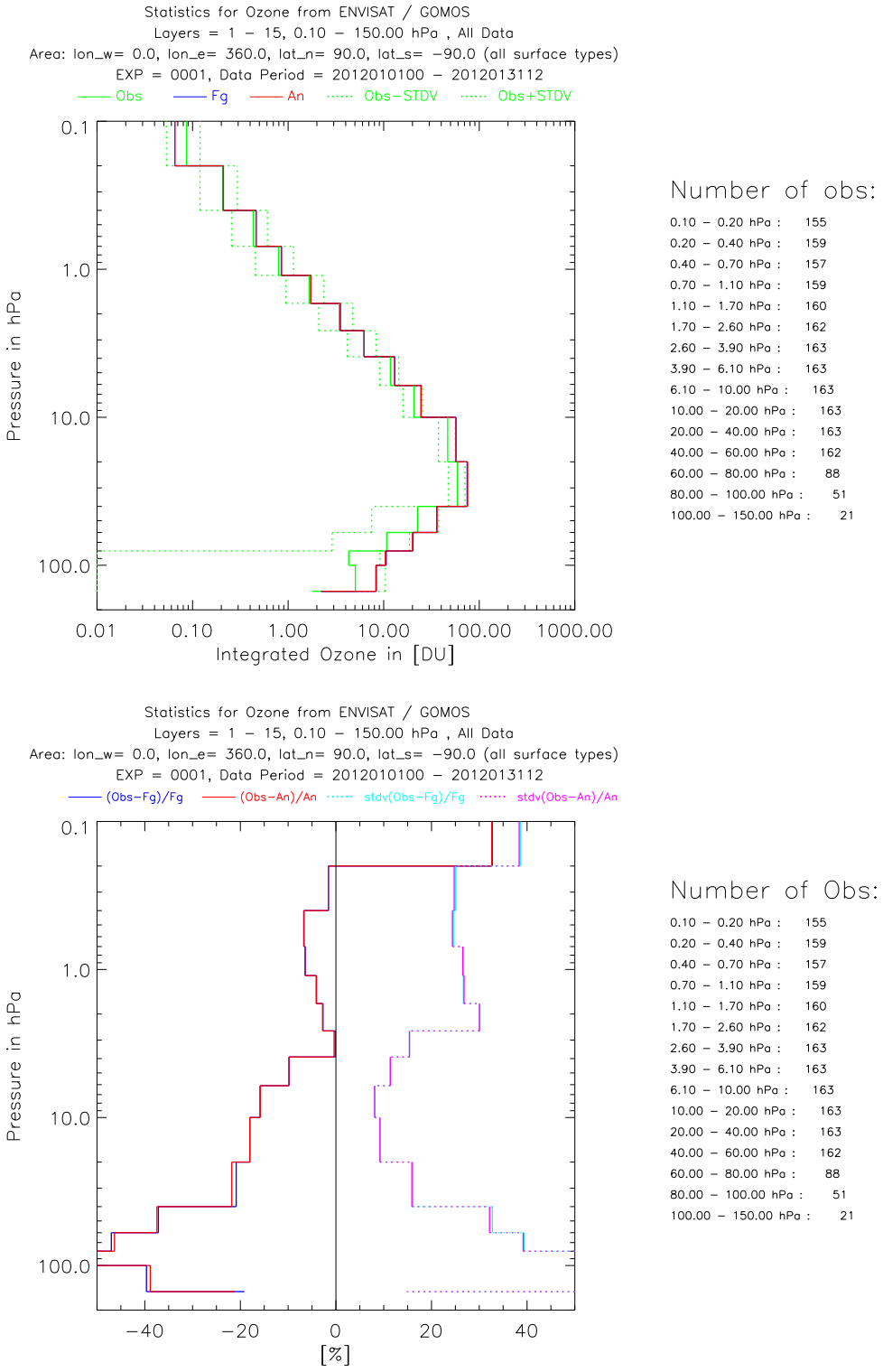

Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT ozone data in DU for January 2012 (global mean). The top plot shows the mean analysis values (red), the mean first-guess (blue), the mean observation (red), and the mean observation (green) +/- 1 standard deviation (green dotted lines). The bottom plot shows the departures and the standard deviation of the departures in %. Plotted are the partial columns for the 15 layers listed to the right of the diagrams.

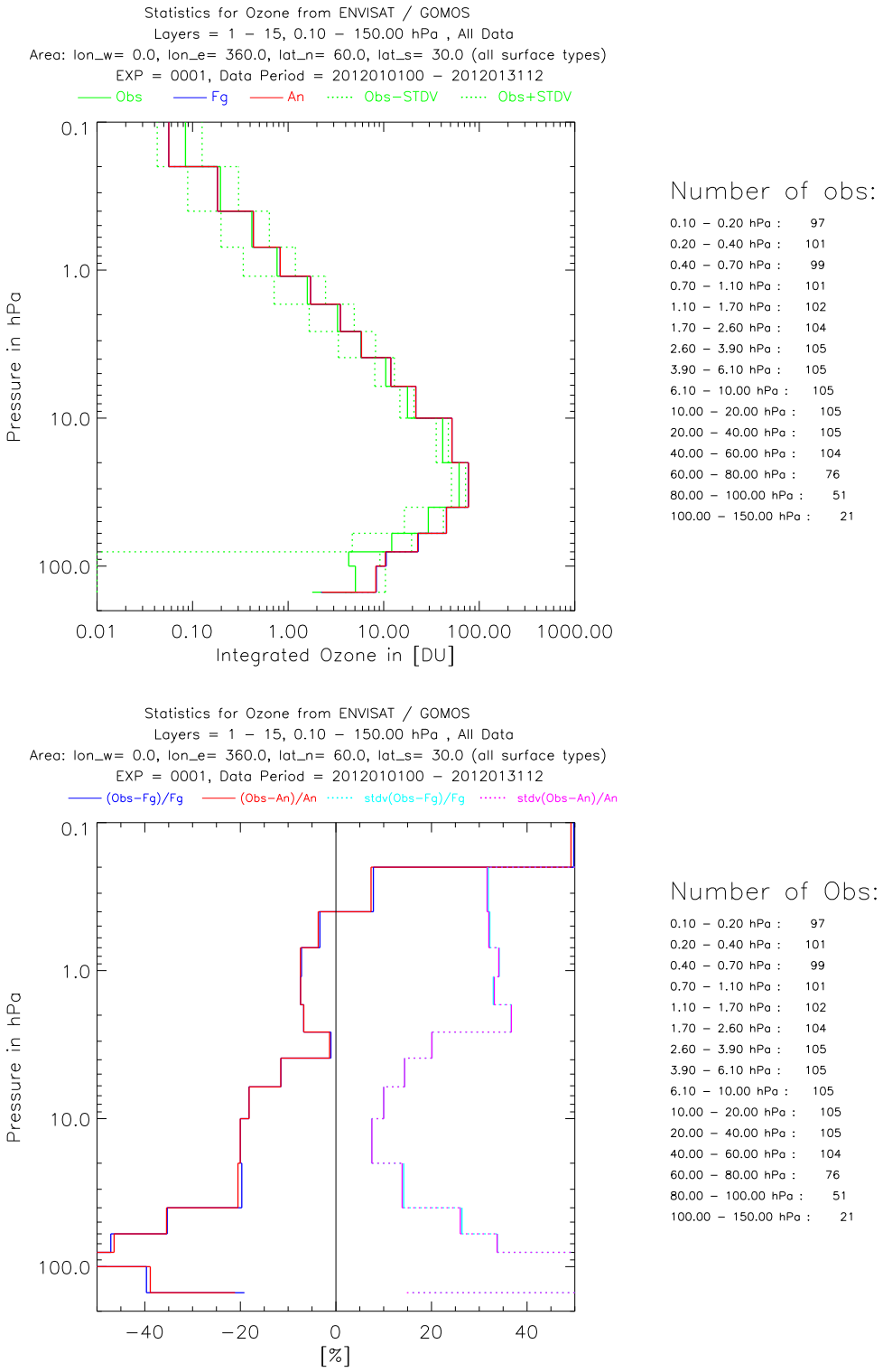

Fig. 4. As Fig. 3 but for 60-30N.

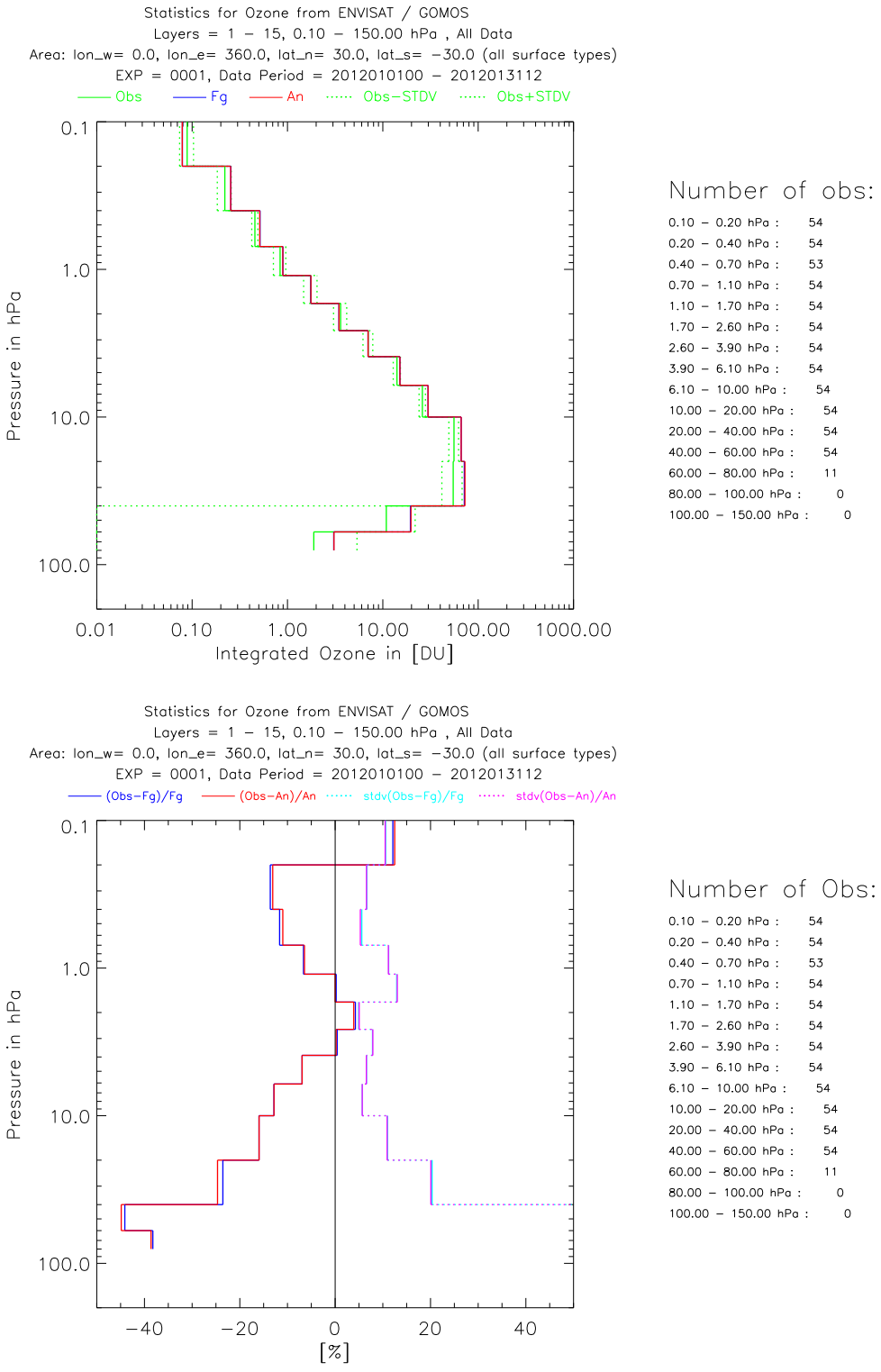

Fig. 5. As Fig. 3 but for 30N-30S.

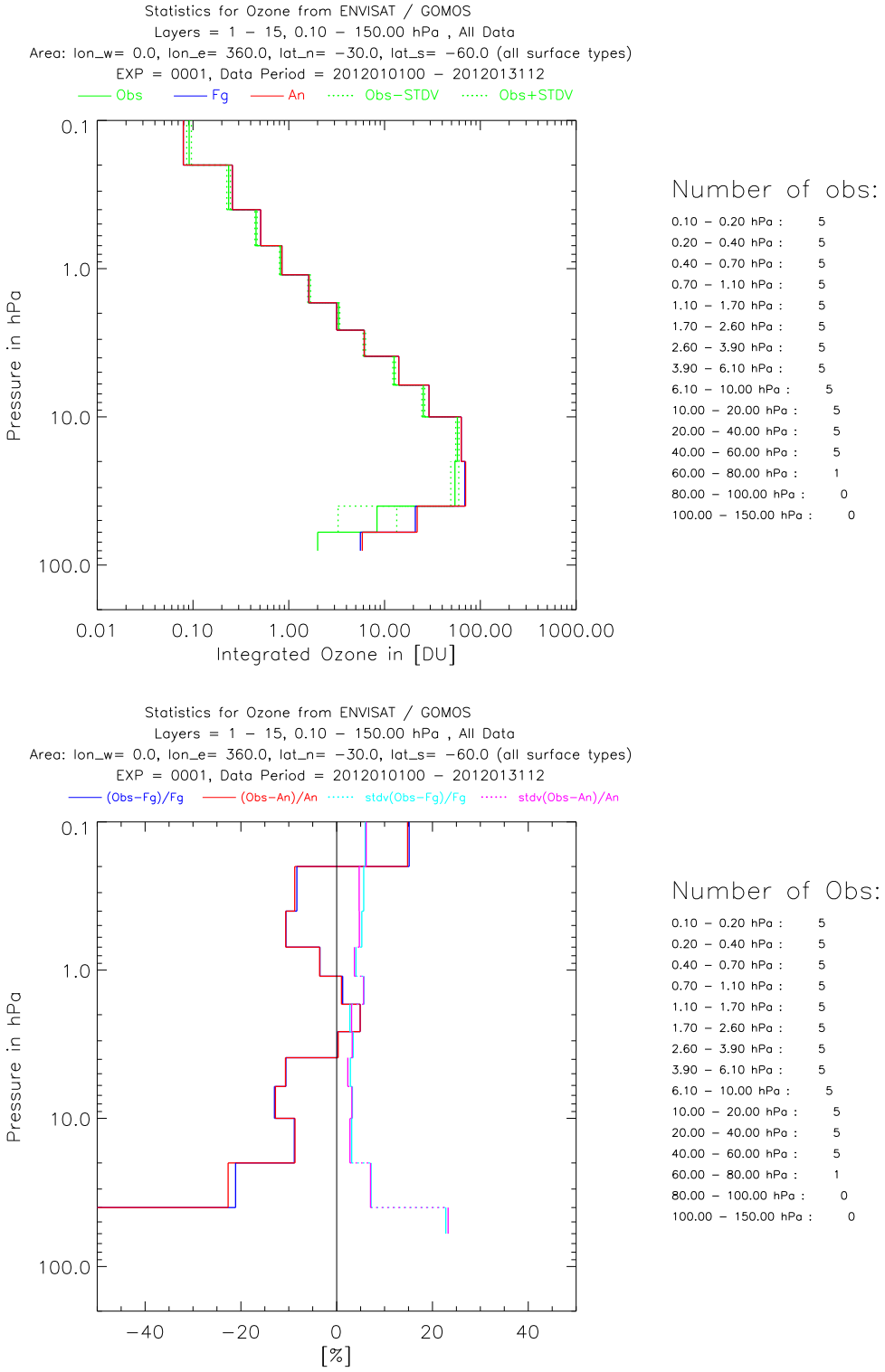

Fig. 6. As Fig. 3 but for 30S-60S.

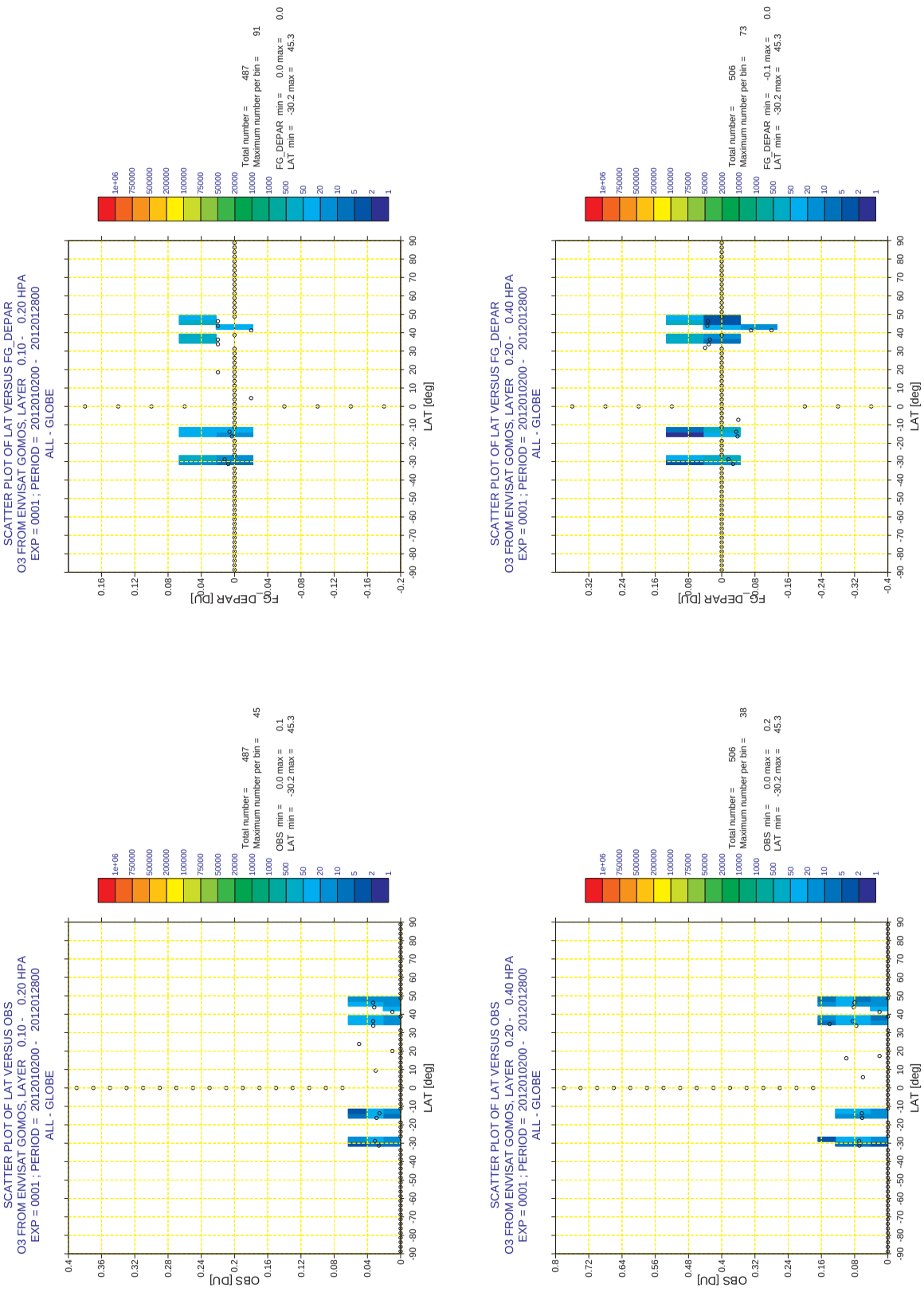

Fig. 7. Scatter plot of ENVISAT GOMOS NRT ozone data against latitude (left) and scatter plot of first-guess departures of ENVISAT GOMOS NRT ozone data against latitude (right) for January 2012 for layer 1 (0.1-0.2 hPa) and layer 2 (0.2-0.4 hPa). The colours show the number of data per bin, the black dots the mean value per bin.

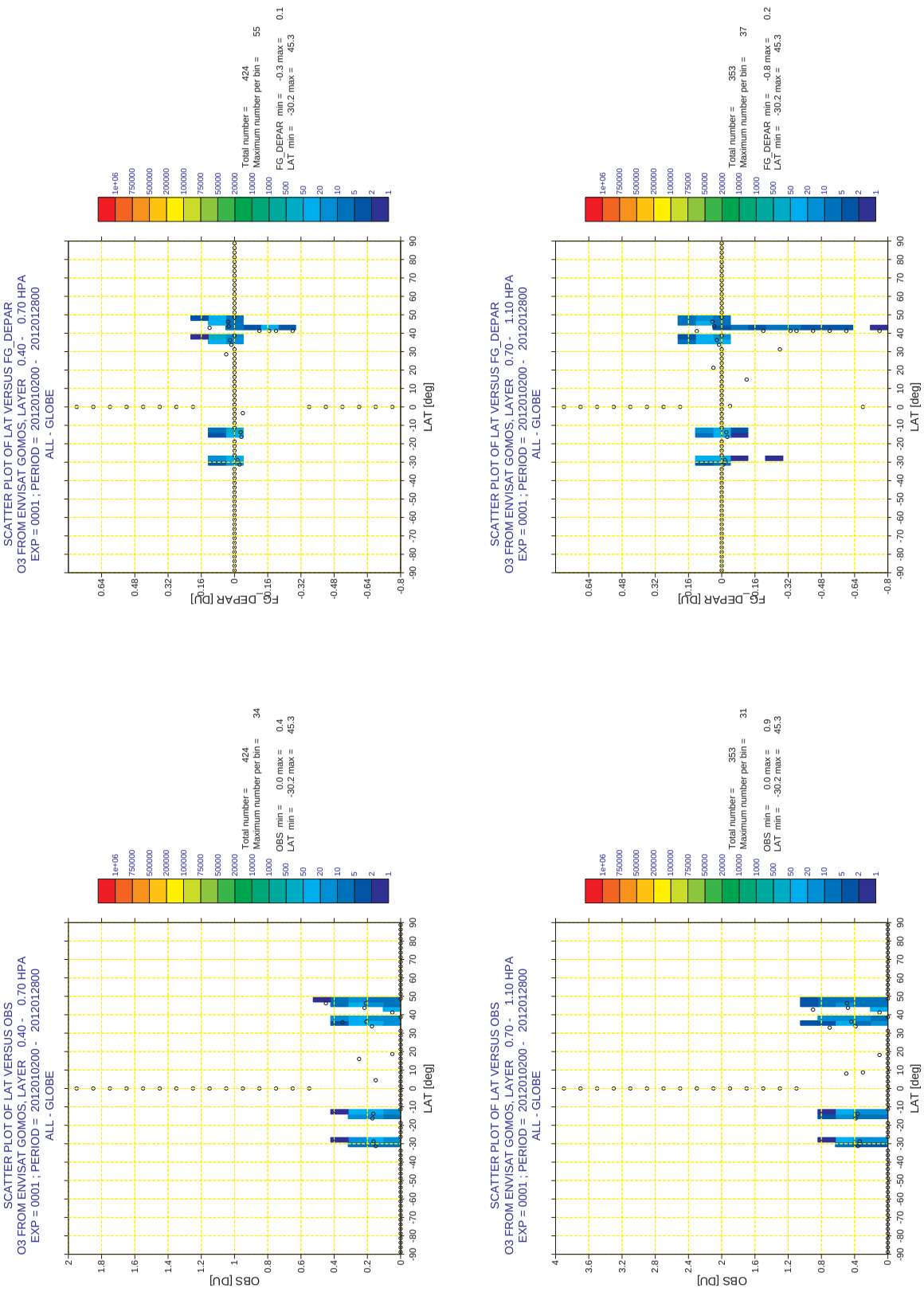

Fig. 8. As Fig. 7 but for layer 3 (0.4-0.7 hPa) and layer 4 (0.7-1.1 hPa).

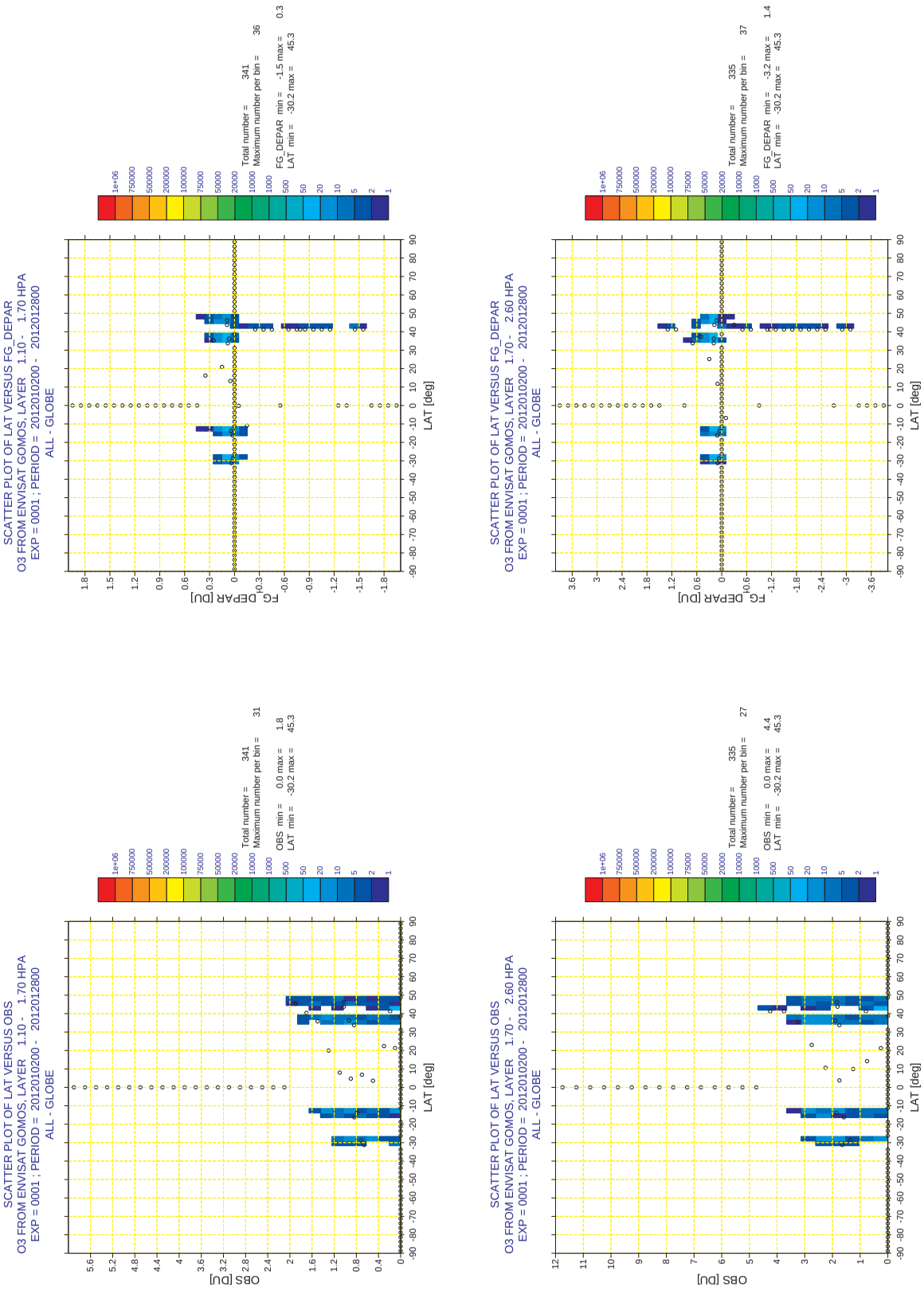

Fig. 9. As Fig. 7 but for layer 5 (1.1-1.7 hPa) and layer 6 (1.7-2.6 hPa).

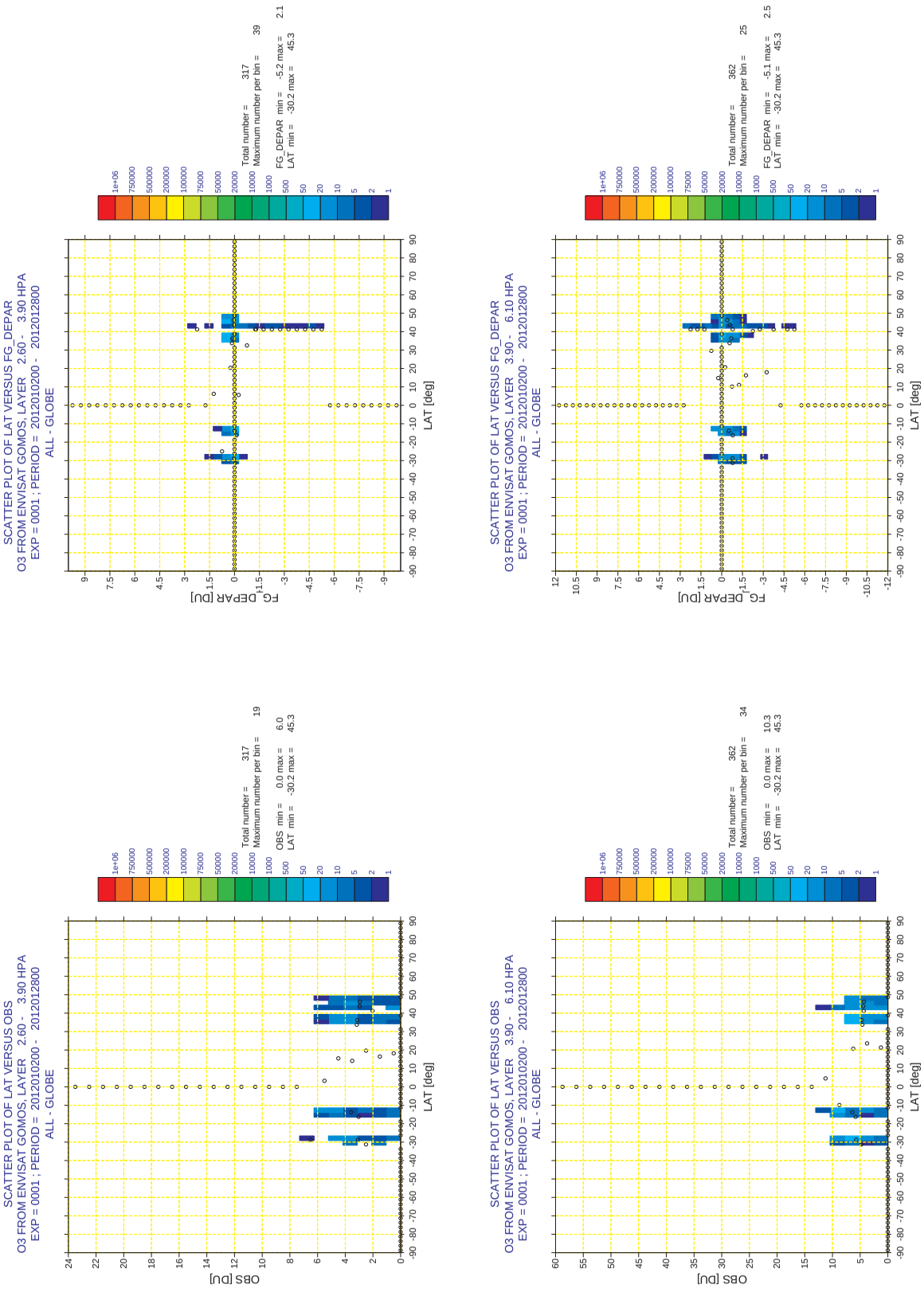

Fig. 10. As Fig. 7 but for layer 7 (2.6-3.9 hPa) and layer 8 (3.9-6.1 hPa).

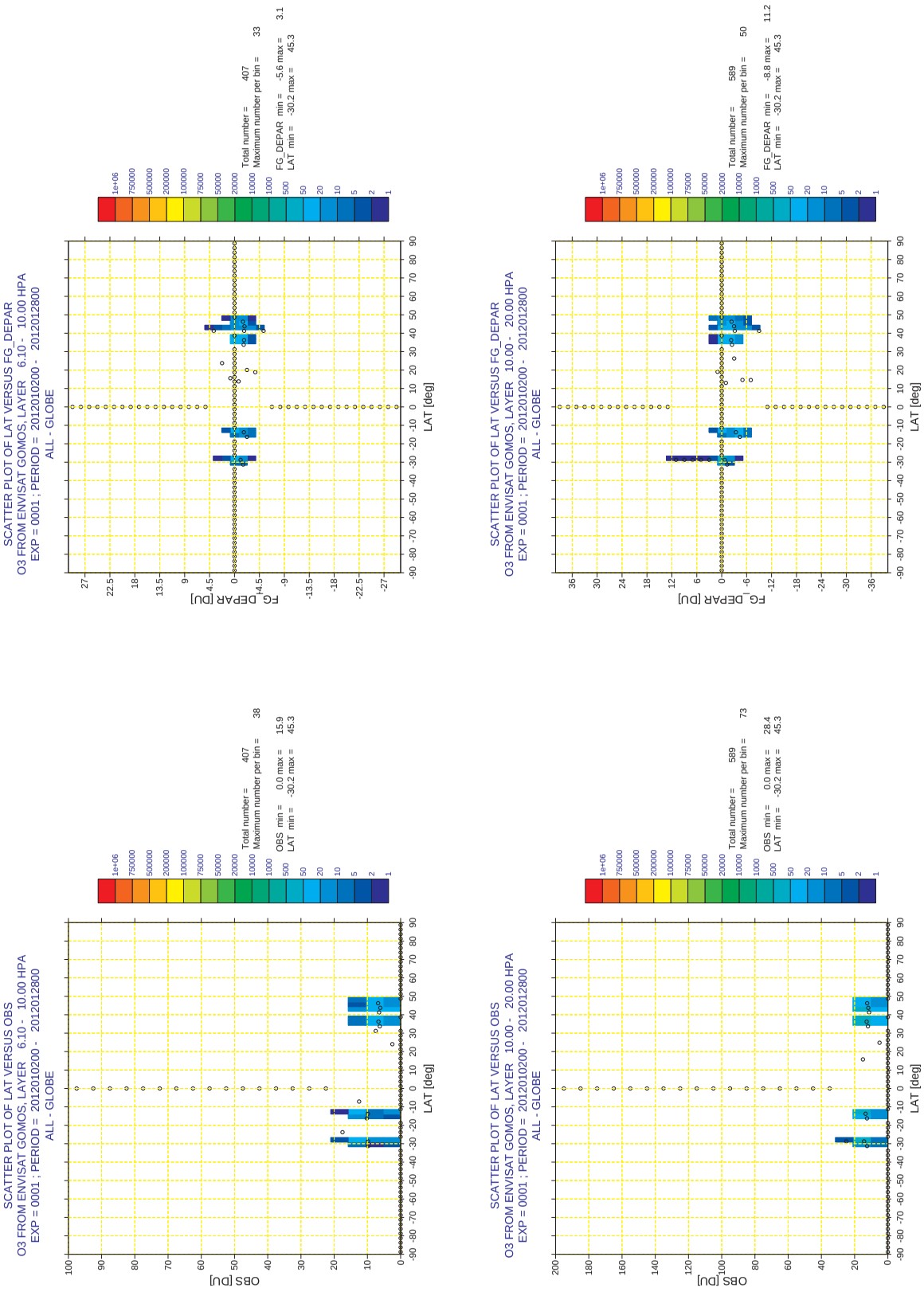

Fig. 11. As Fig. 7 but for layer 9 (6.1-10 hPa) and layer 10 (10-20 hPa).

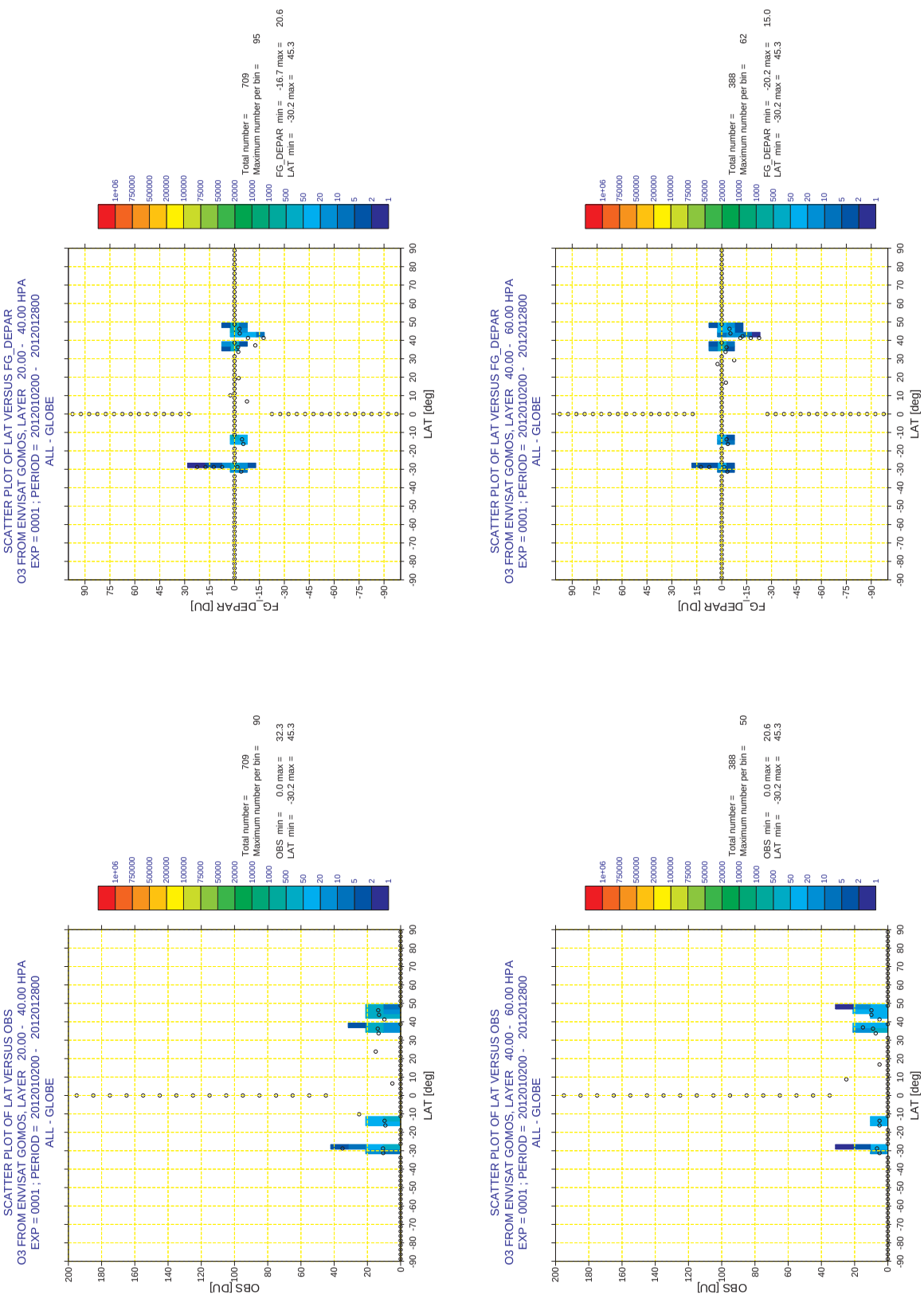

Fig. 12. As Fig. 7 but for layer 11 (20-40 hPa) and layer 12 (40-60 hPa).

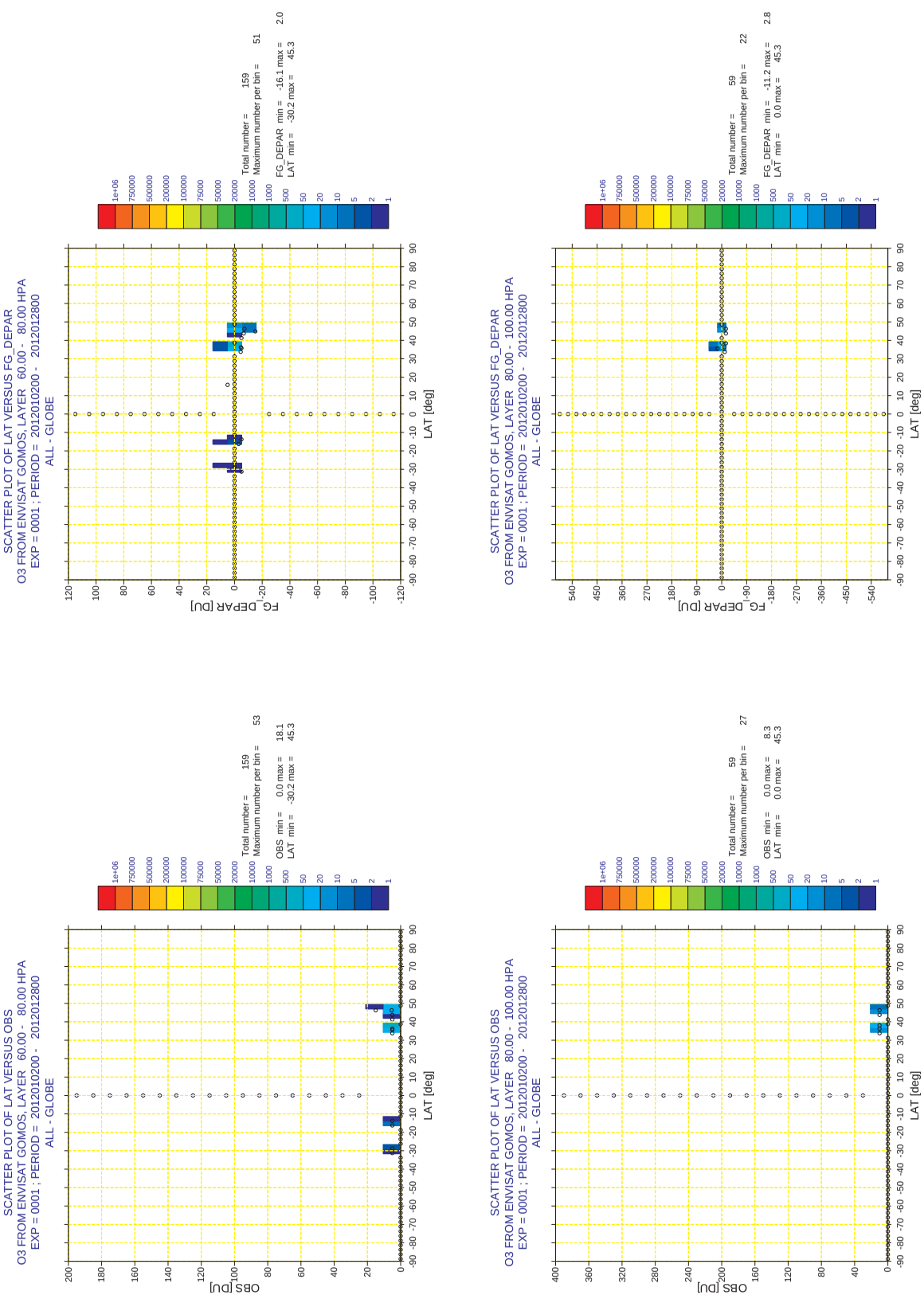

Fig. 13. As Fig. 7 but for layer 13 (60-80 hPa) and layer 14 (80-100 hPa).

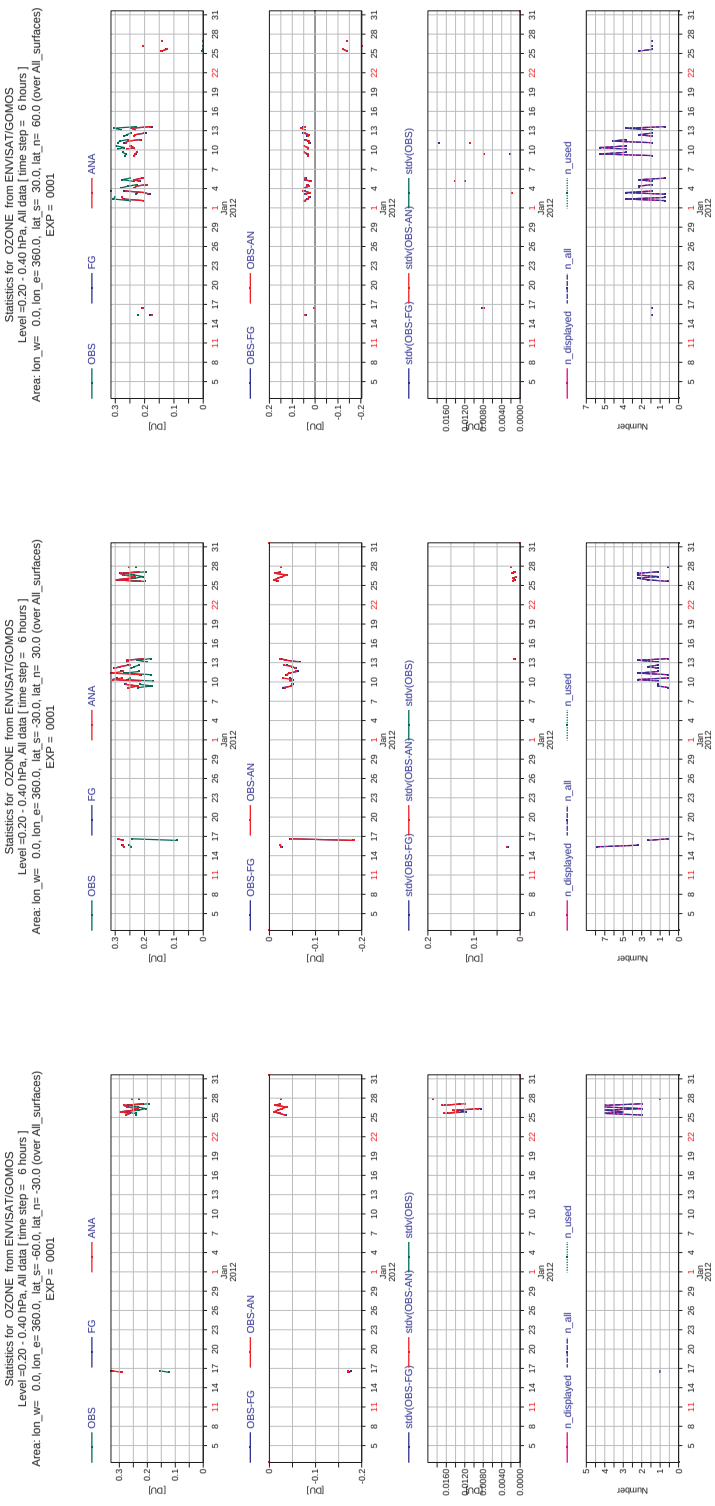

Fig. 14. Timeseries of mean ENVISAT GOMOS NRT ozone data, first guess and analysis values (top panels), first-guess and analysis departures (second panels), standard deviations (third panels) and number of data (bottom panels) per 6-hour cycle for layer 2 (0.2-0.4 hPa) at 30-60N, 30N-30S, and 30-60S for the period January 2012.

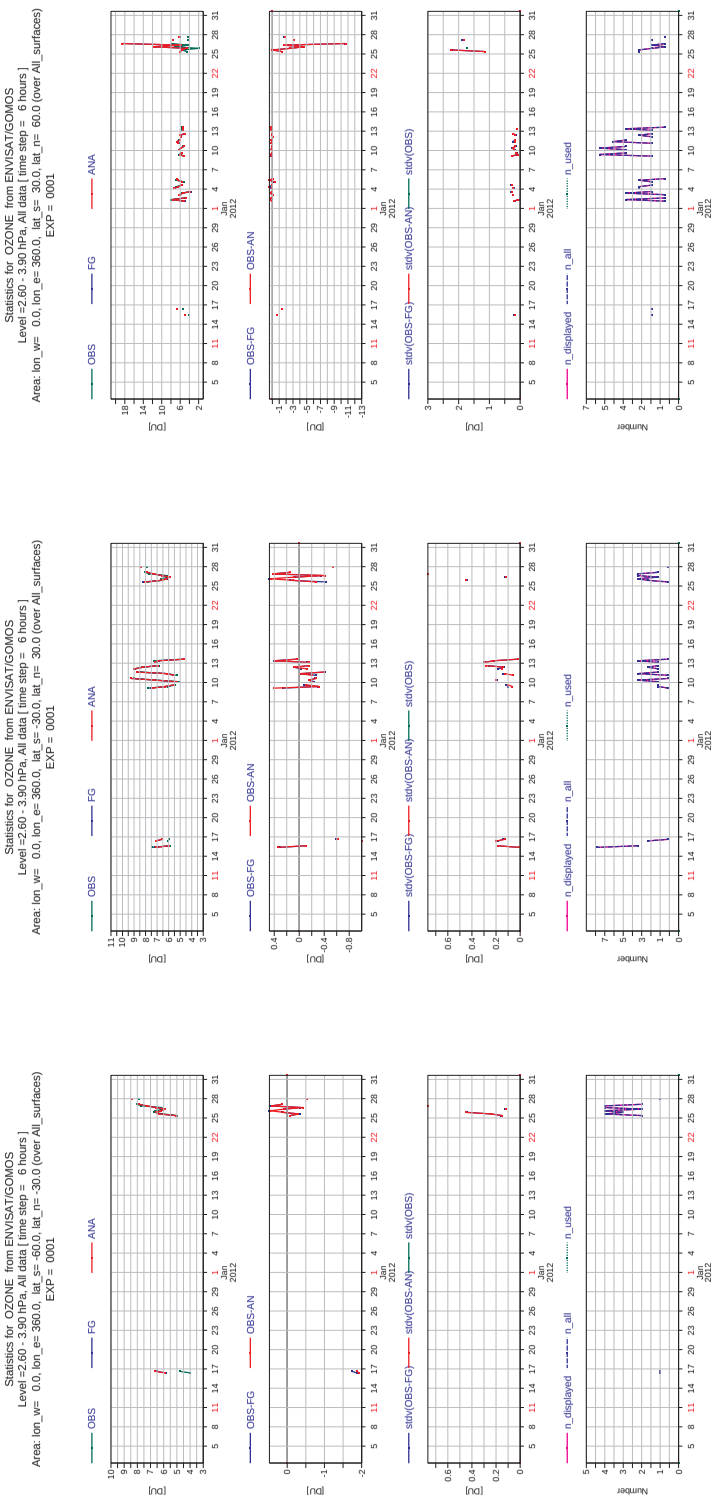

Fig. 15. As Figure 14, but for layer 7 (2.6-3.9 hPa).

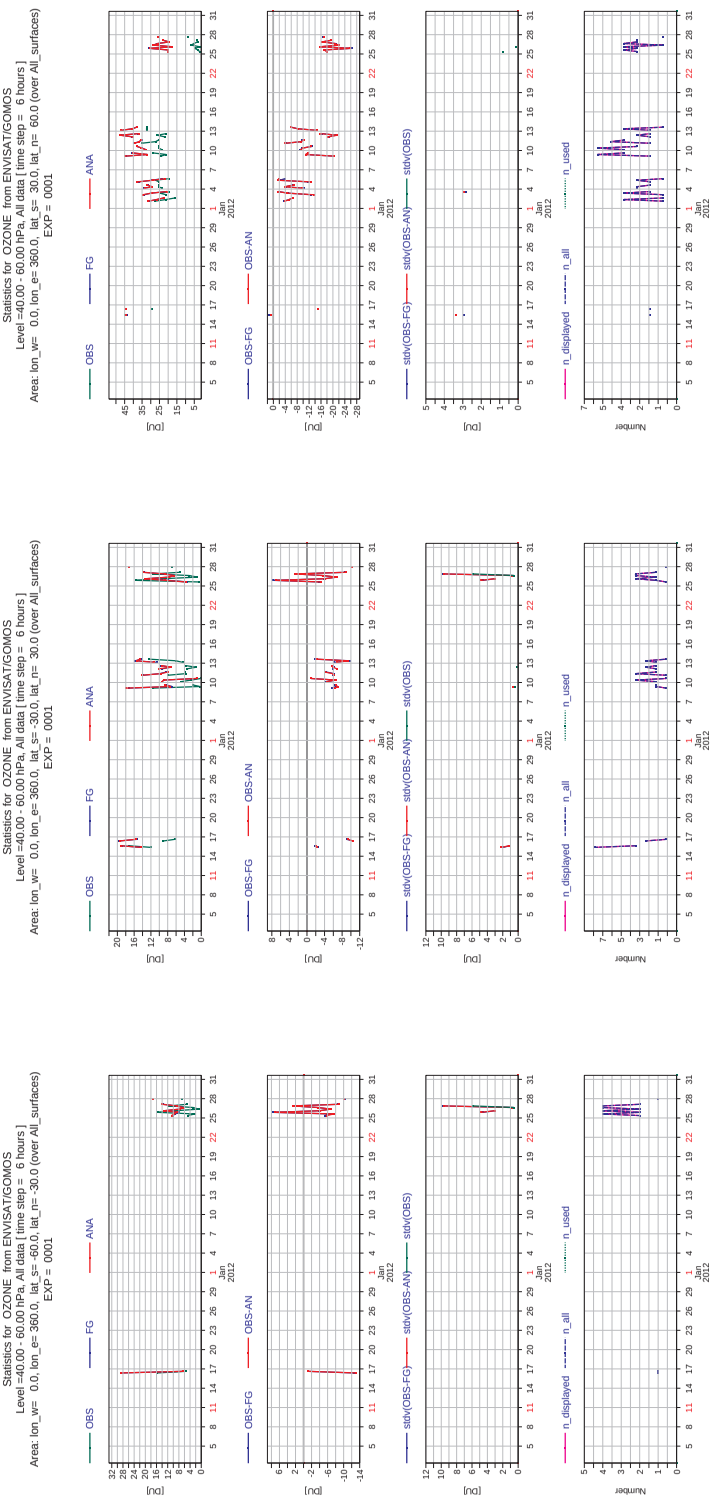

Fig. 16. As Figure 14, but for layer 12 (40-80 hPa).

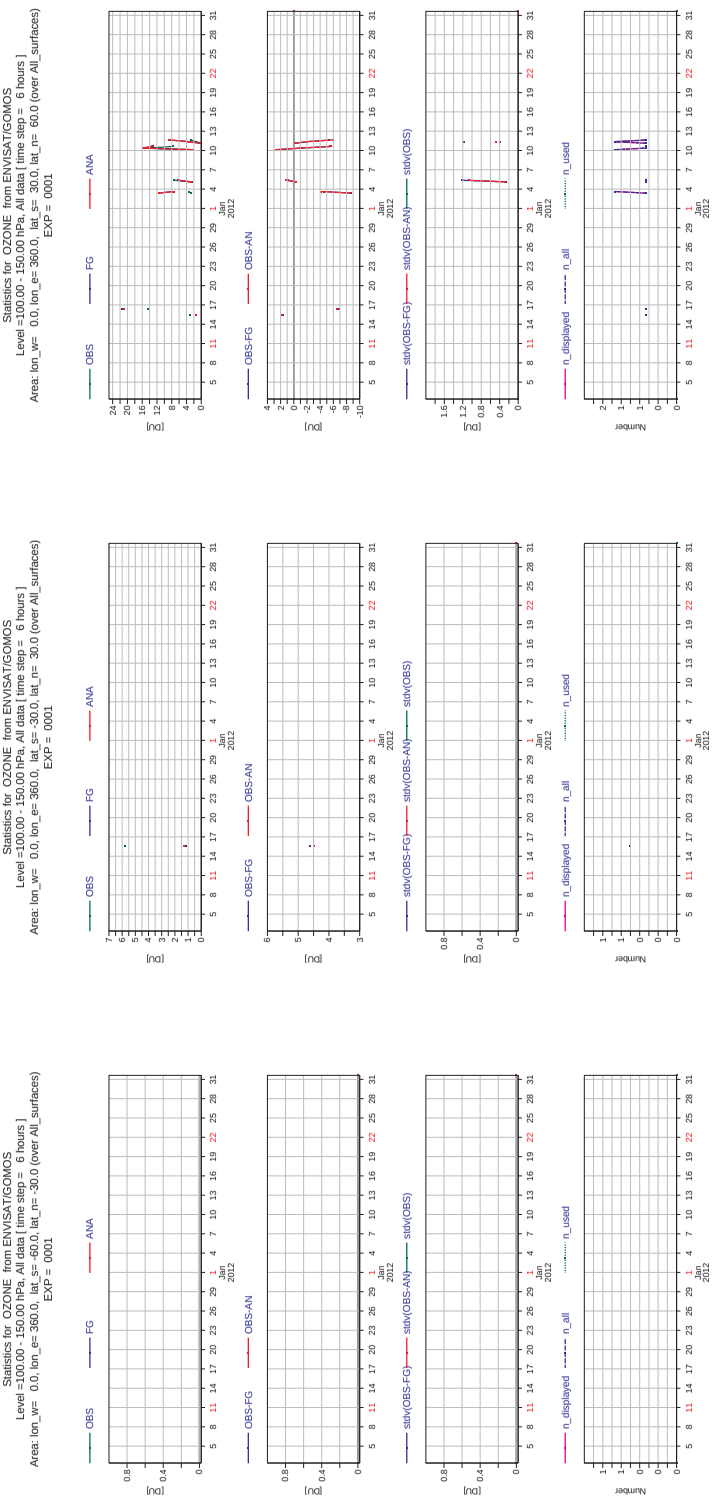

Fig. 17. As Figure 14, but for layer 15 (100-150 hPa).

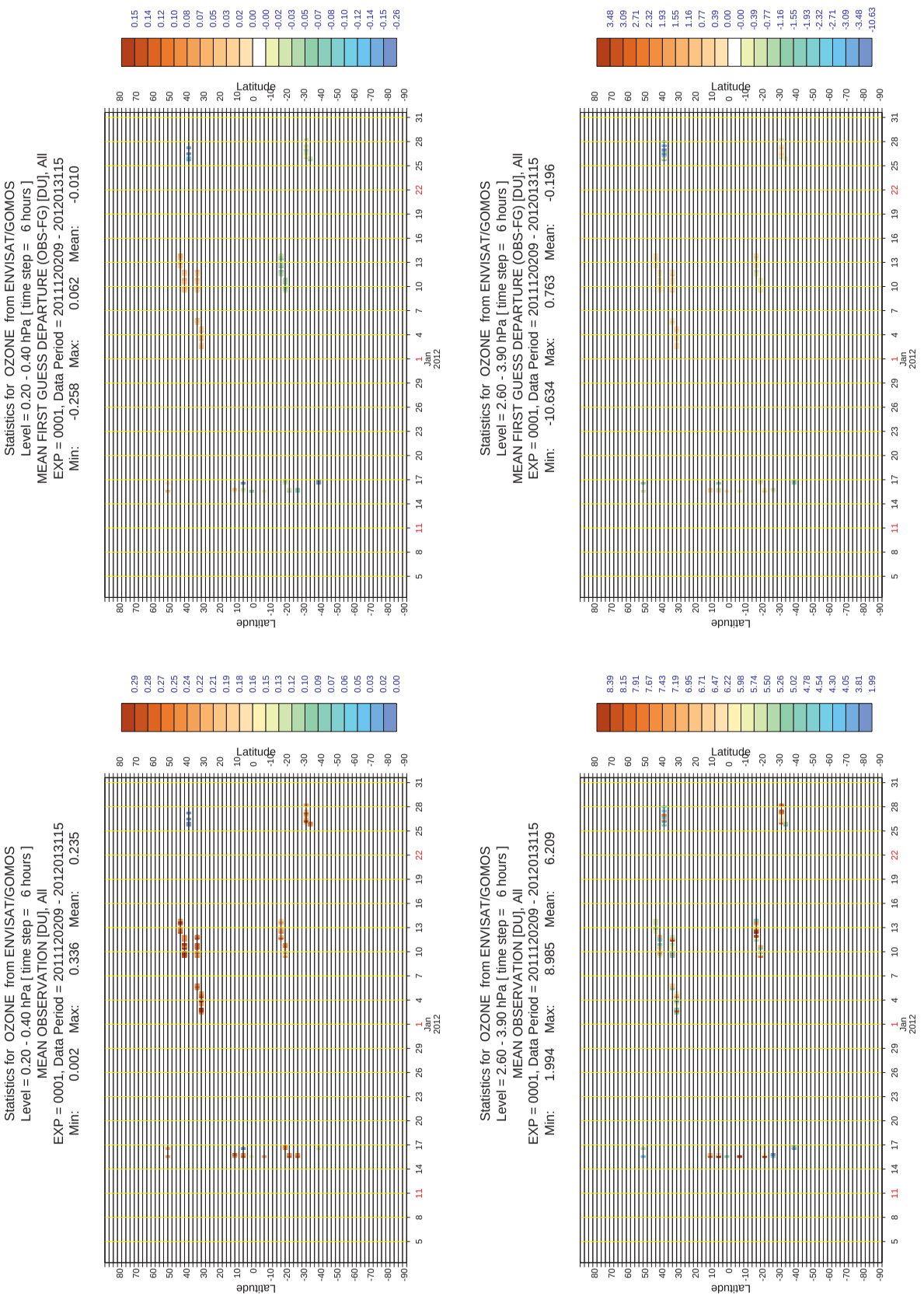

Fig. 18. Hovmoeller diagram of zonal mean ENVISAT GOMOS NRT ozone data per 6-hour cycle for January 2012 and of the zonal mean first-guess departures for layer 2 (0.2-0.4 hPa) and layer 7 (2.6-3.9 hPa).

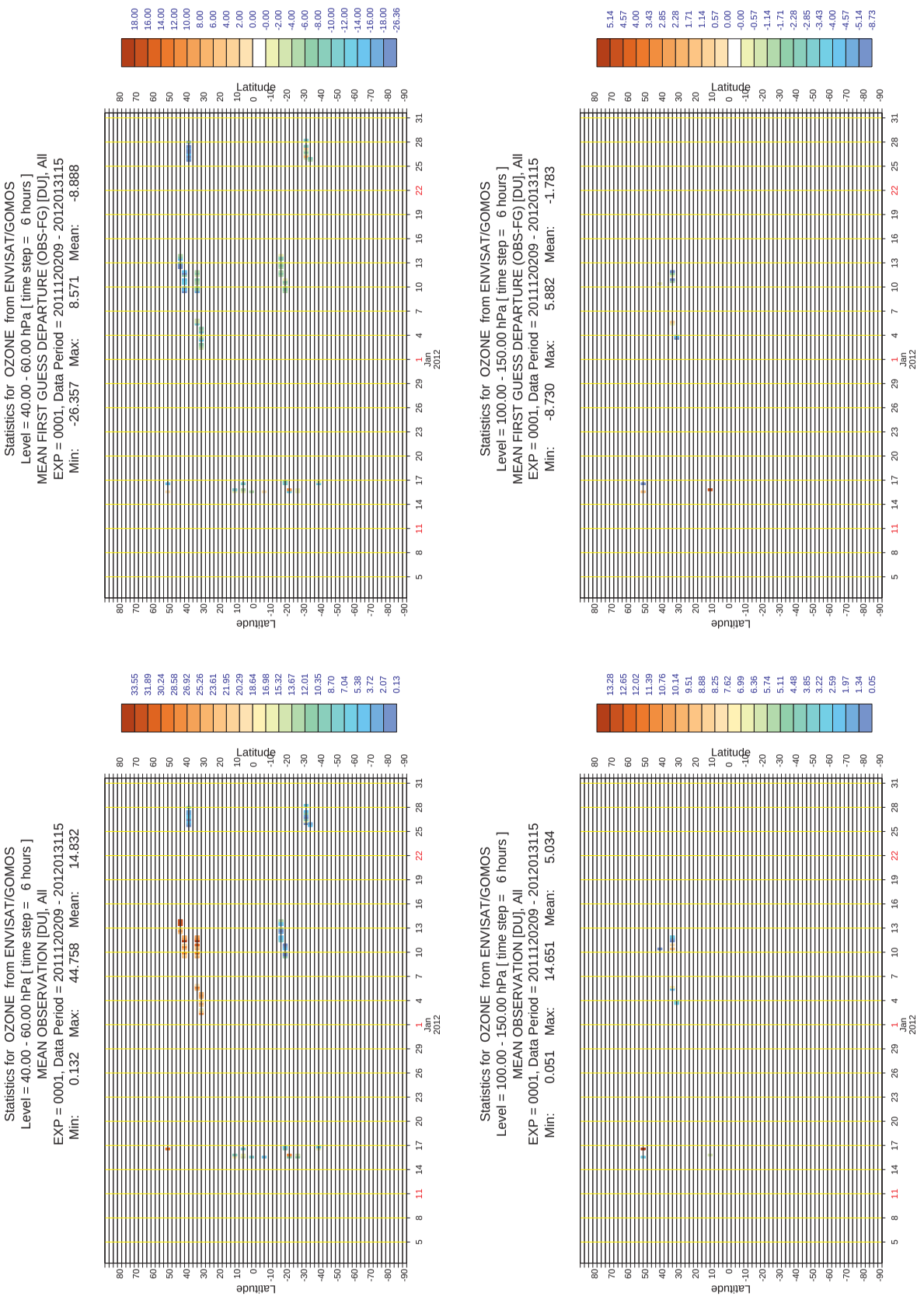

Fig. 19. As Fig. 18 but for layer 12 (40-60 hPa) and layer 15 (100-150 hPa).

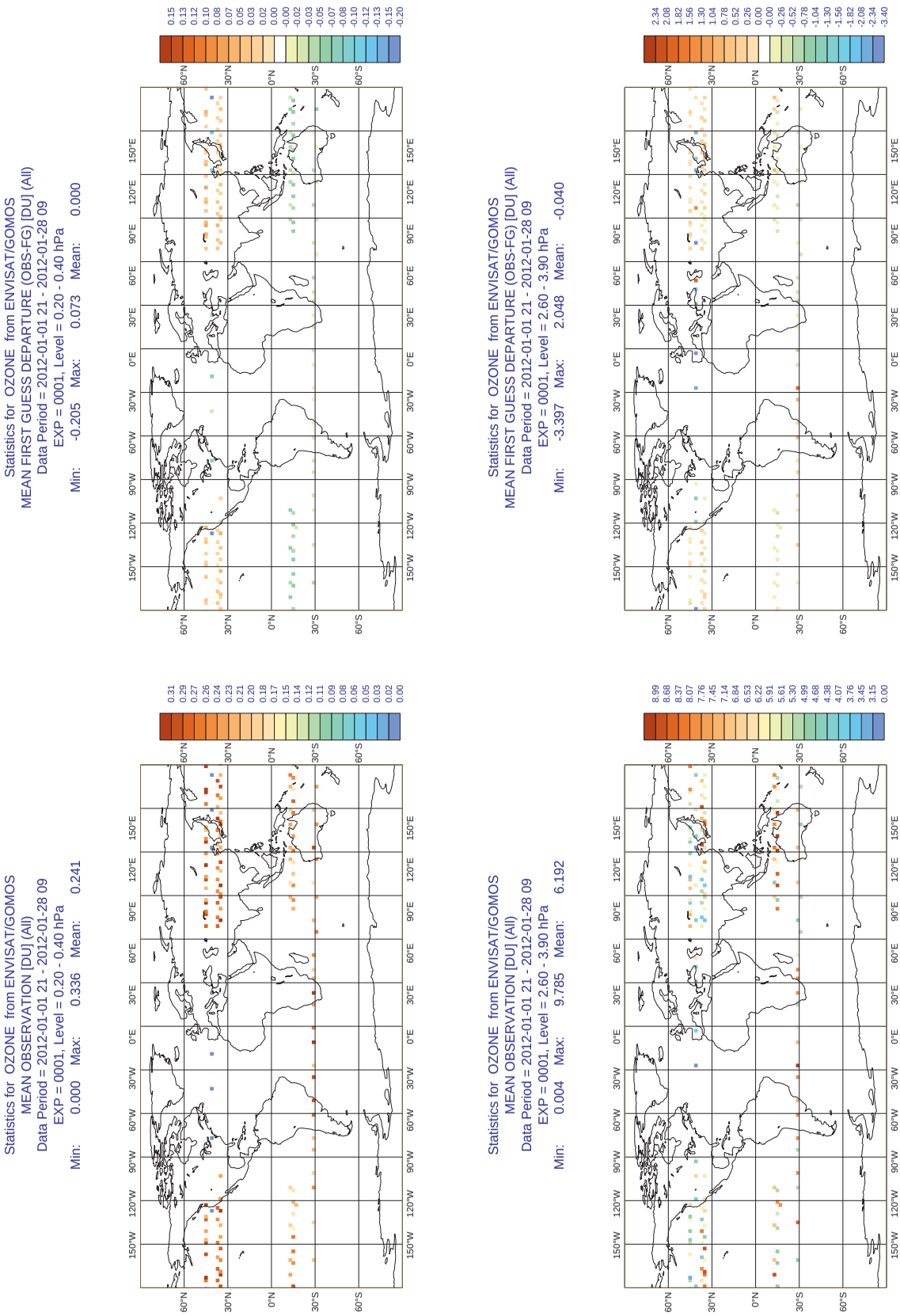

Fig. 20. Geographical distribution of mean ENVISAT GOMOS NRT ozone data and mean first-guess departures for January 2012 for layer 2 (0.2-0.4 hPa) and layer 7 (2.6-3.9 hPa).

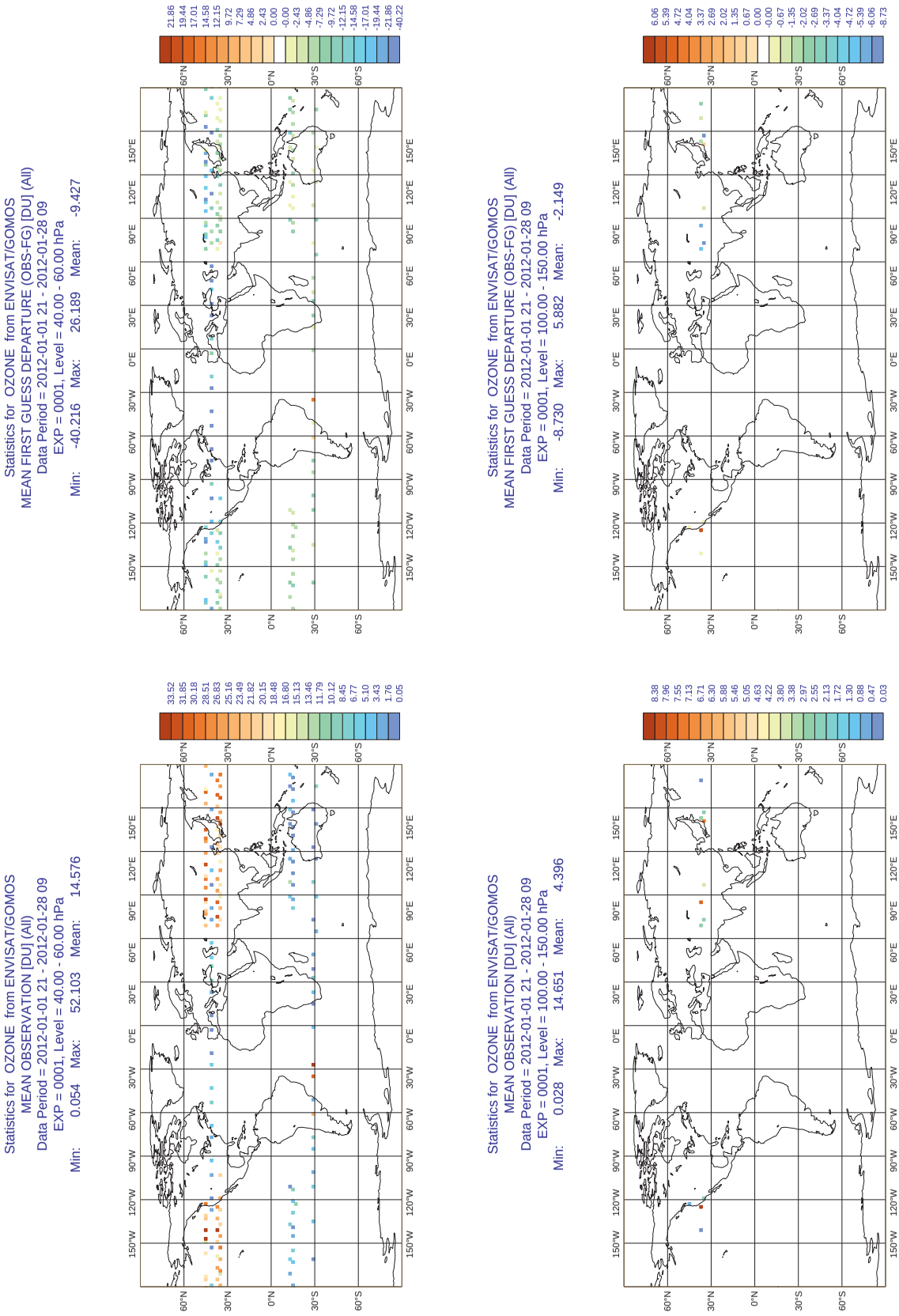

Fig. 21. As Fig. 20 but for layer 12 (40-60 hPa) and layer 15 (100-150 hPa).