REPORT ABOUT ENVISAT GOMOS NRT DATA (GOM_RR__2P) FOR DECEMBER 2004

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1. Key points for December 2004

- GOMOS temperature/ozone data data gap between about 10S-30N and 30E-100E for most of the levels/layers and very few data between 0 and 5S.
- Overall good agreement between GOMOS and ECMWF temperatures.
- GOMOS temperatures are lower than ECMWF temperatures in most of the stratosphere and mesosphere, but area mean departures are less than 1% in most of the stratosphere. Larger departures are found in the mesosphere in particular at the model top.
- Large differences between GOMOS and ECMWF ozone values (over 50% in places).
- Large scatter of GOMOS ozone data.
- Scatter plots still show some unrealistically low GOMOS ozone values.
- No water vapour data in NRT GOMOS BUFR files.
- The monitoring statistics for December were produced with the operational ECMWF model, CY28R3.

2. Amount of received data

This report covers ENVISAT GOMOS NRT data for December 2004. Data coverage and amount of received data for level 7 (2.6 hPa) is shown in Figures 1 and 2. 10357 GOMOS observations are available this month compared to 10075 last month (see number of observations in Figure 3 of the temperature report). The largest number of observations is available in the mesosphere and upper stratosphere, fewer observations are available in the lower stratosphere. Despite the larger number of GOMOS data as compared to the previous months there is a data gap between about 10S-30N and 30E-100E for most of the levels/layers. Furthermore, there are very few data between 0 and 5S.

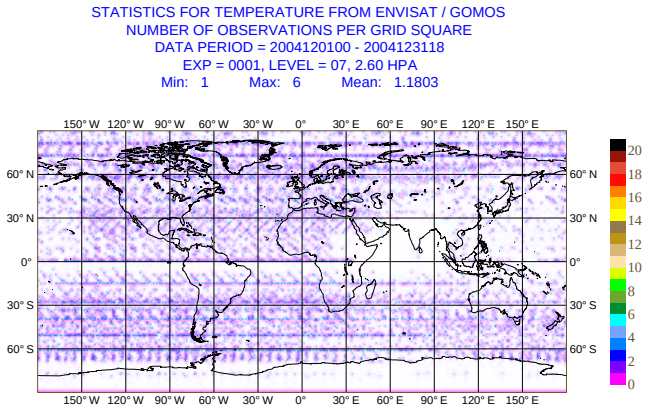

Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for for level 7 (2.6 hPa) for December 2004.

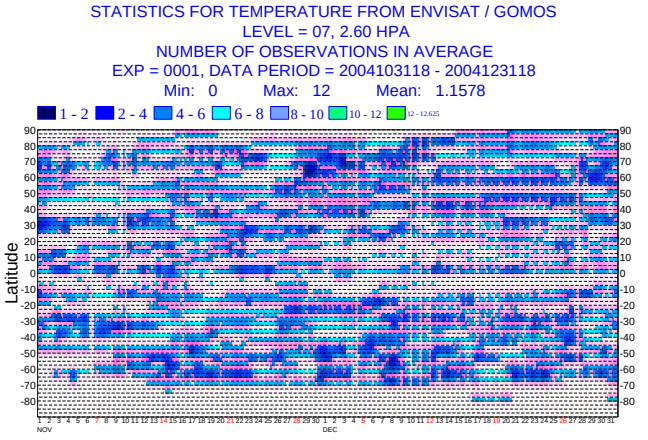

Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for for level 7 (2.6 hPa) for November and December 2004.

3. GOMOS temperature data

The profile plots (temperature report: Figures 3-8) show that over the stratosphere and most of the mesosphere the area averaged GOMOS temperatures are lower than ECMWF values, with departures less than 1% in the global mean. Slightly larger departures are found in the mesosphere in the northern mid-latitudes (up to -2.5%) and in the tropics (up to 1.5%). Departures up to more than -2% are found at the model top, specially in 60-30N and 60-90S (temperature report: Figure 5 and 8). The scatter plots (temperature report: Figures 9-16) show the behaviour of the GOMOS temperatures and the departures at several levels more clearly. Both, profile plots and scatter plots, show a slight warming in the mesosphere at high northern latitudes (90-60N) and a slight cooling at the northern mid-latitudes (60-30N) compared to November. The scatter plots show also the small amount of data between 0 and 5S for most of the levels.

Timeseries of GOMOS temperatures and departures at several levels are shown in Figures 17, 18, 21-23 of the temperature report. The zonal mean timeseries also show the warming in the northern high latitudes and the cooling in the northern mid-latitudes (temperature report: Figures 17 and 21).

From the geographical distribution of GOMOS NRT temperatures and first-guess departures for selected levels presented in the Figures 19-20 of the temperature report, one can see the data gap referred in section 2.

4. GOMOS ozone data

The profile plots (ozone report: Figures 3-8) show that there are large differences between the GOMOS ozone data and the ECMWF analysis. The largest departures (over 50%) are found in the mesosphere roughly above 0.2 hPa. Standard deviations of the departures and of the GOMOS ozone data themselves are also large (much larger than 50%) in most of the stratosphere and mesosphere, indicative of large noise in the data.

The scatter plots (ozone report: Figures 9-16) confirm that there is a very large scatter in the GOMOS ozone data. These plots also show unrealistically low (around 0 DU) GOMOS ozone values.

Plots of timeseries (ozone report: Figures 17-19) again show a relatively large noise of the GOMOS observations.

5. Water vapour data

There are no valid water vapour data in the GOMOS BUFR files. The water vapour entries are set to missing values.

6. Remarks

This monitoring report was produced with the operational ECMWF model (CY28R3). In CY28R3 ozone layers from SBUV/2 on NOAA-16 and SCIAMACHY total column ozone data produced by KNMI are actively assimilated.

All ozone values are in Dobson Units (DU), temperatures in K, and water vapour values in mg/m2.

There is no information on star magnitude and illumination condition in the BUFR files. Hence it is not possible to filter GOMOS observations based on these criteria. This reports uses all the observations available in the BUFR files.

REPORT ABOUT ENVISAT GOMOS NRT TEMPERATURE DATA (GOM_RR__2P) FOR DECEMBER 2004

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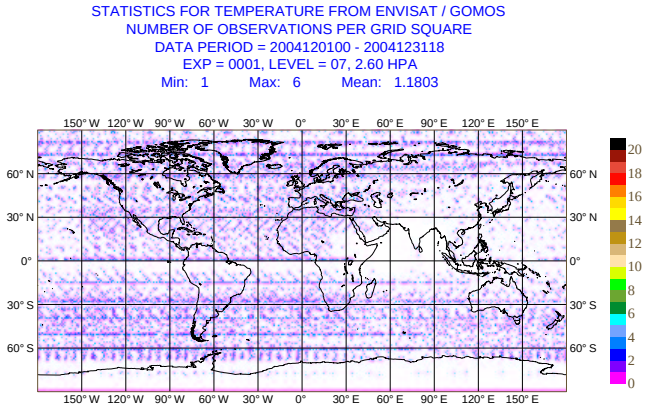


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for level 7 (2.6 hPa) for December 2004.

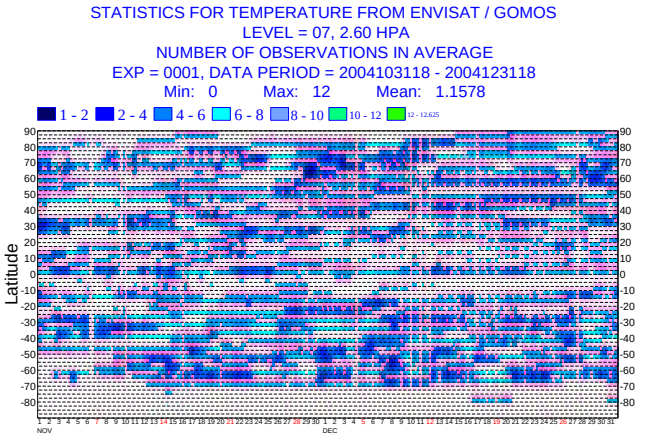


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for level 7 (2.6 hPa) for November and December 2004.

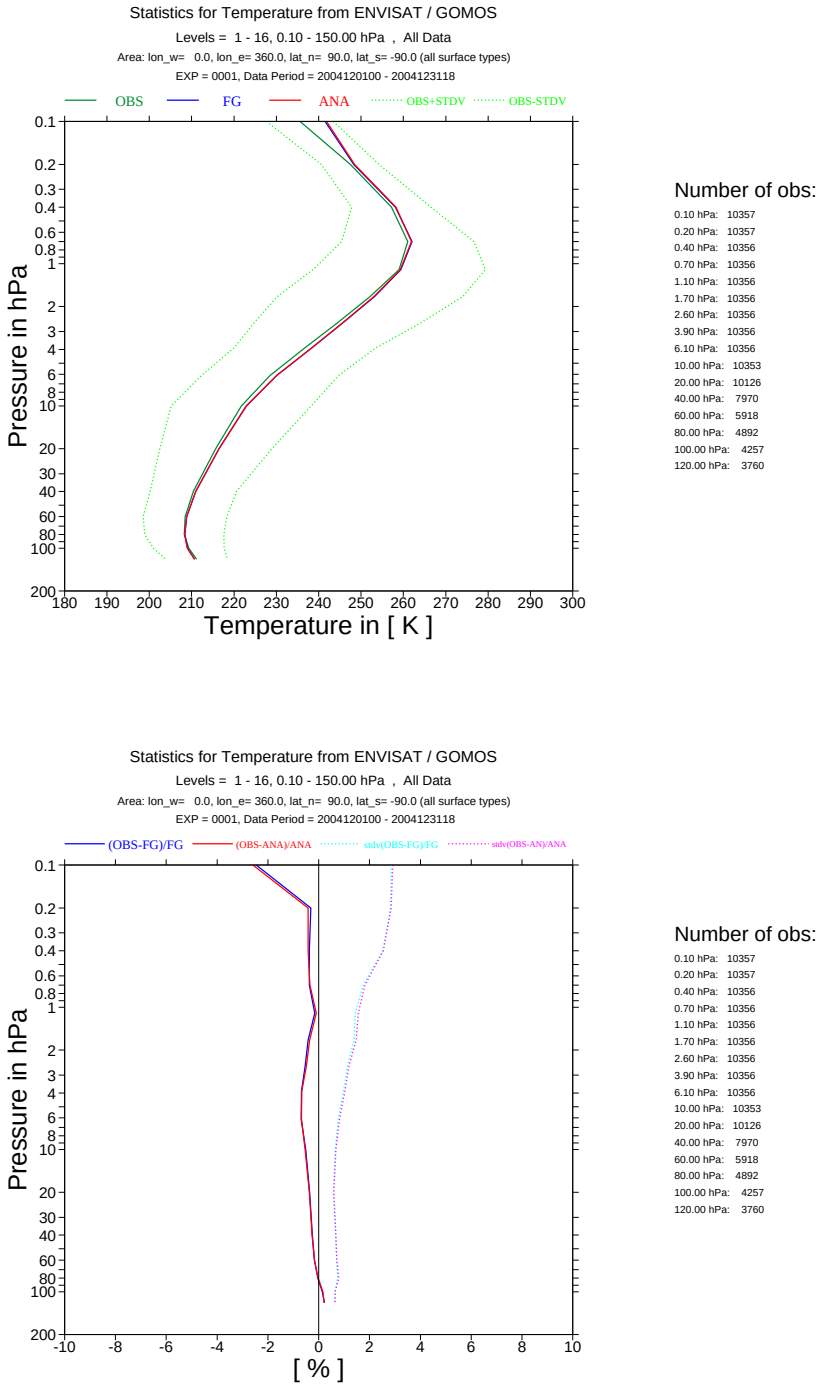
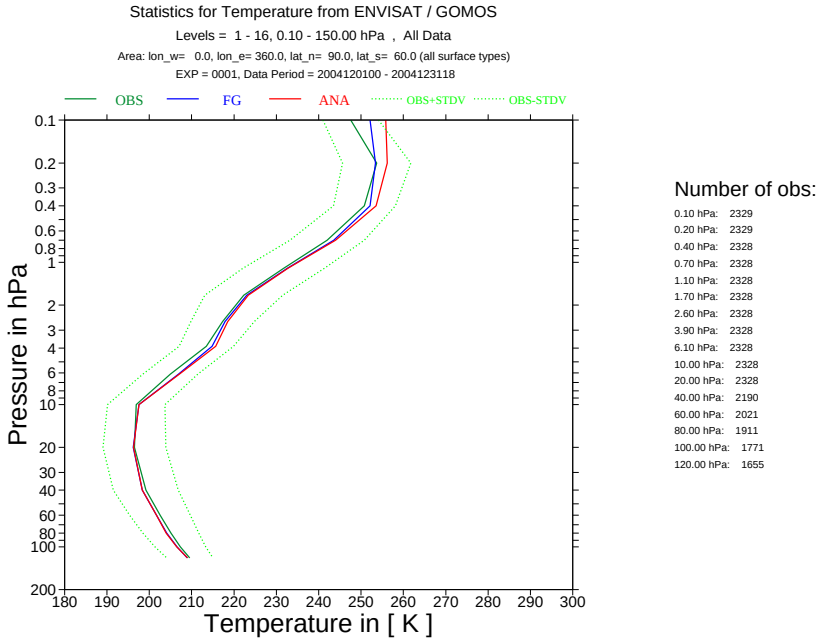


Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT temperature data in K for December 2004 (global mean). The top plot shows the mean analysis values (blue), the mean observation (red), and the mean observation +/- 1 standard deviation (dotted lines). The bottom plot shows the departures and the standard deviation of the departures in the partial columns for the 16 levels listed to the right of the diagrams.



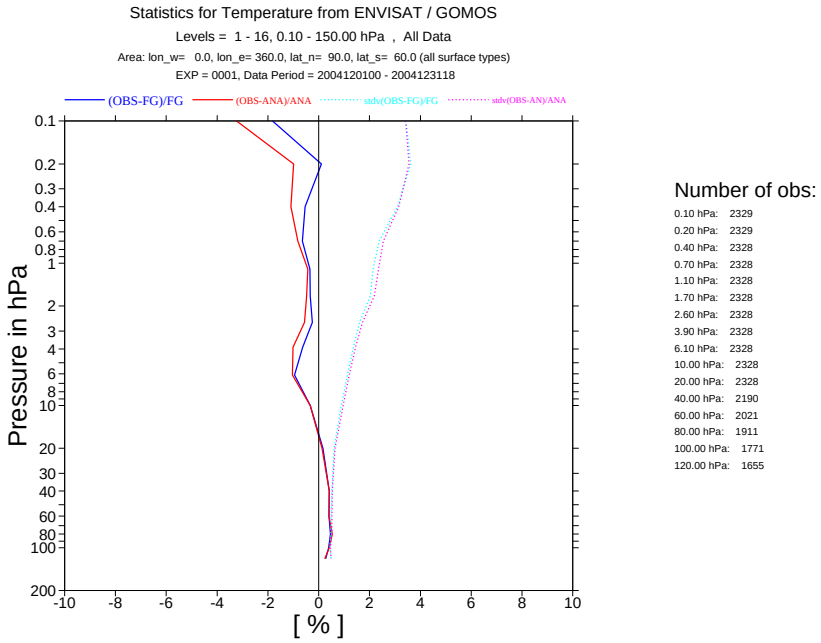
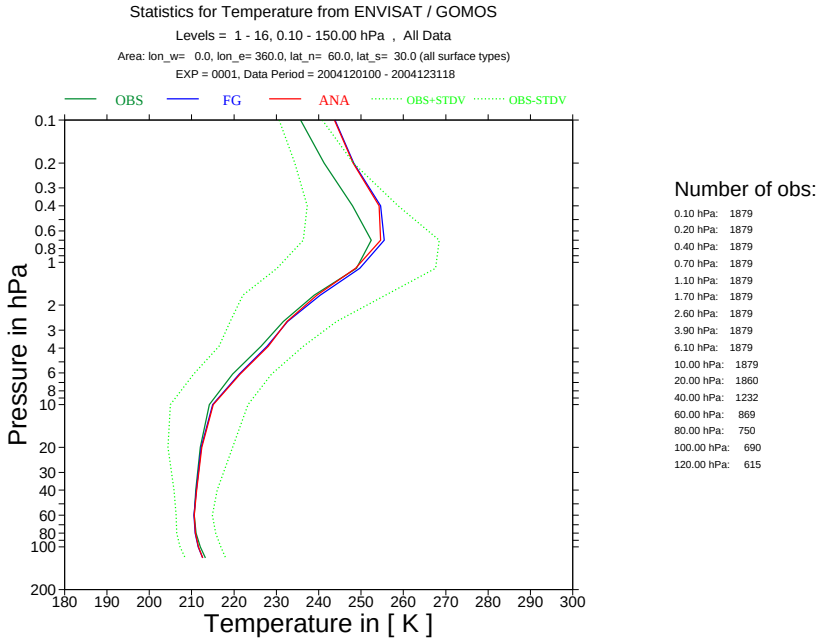


Fig. 4. As Fig. 3 but for 90N-60N.



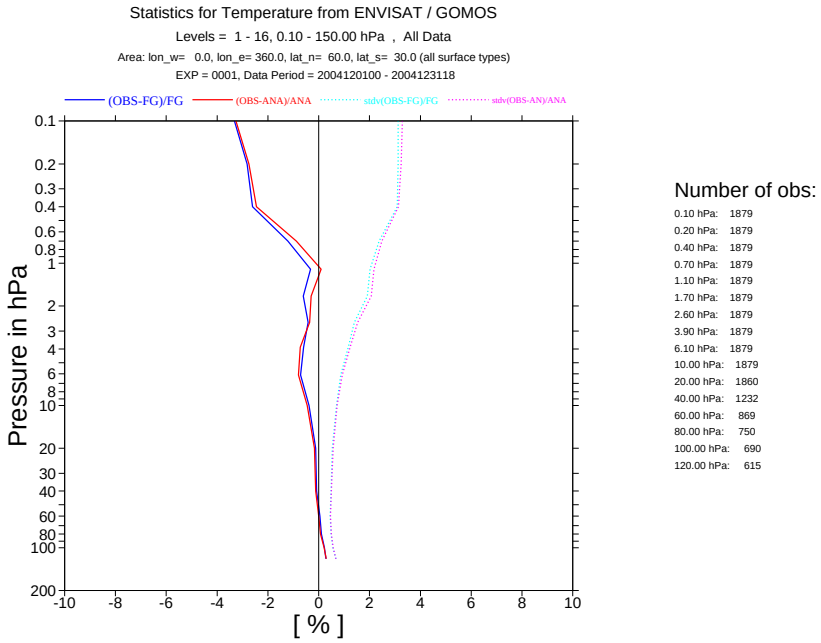
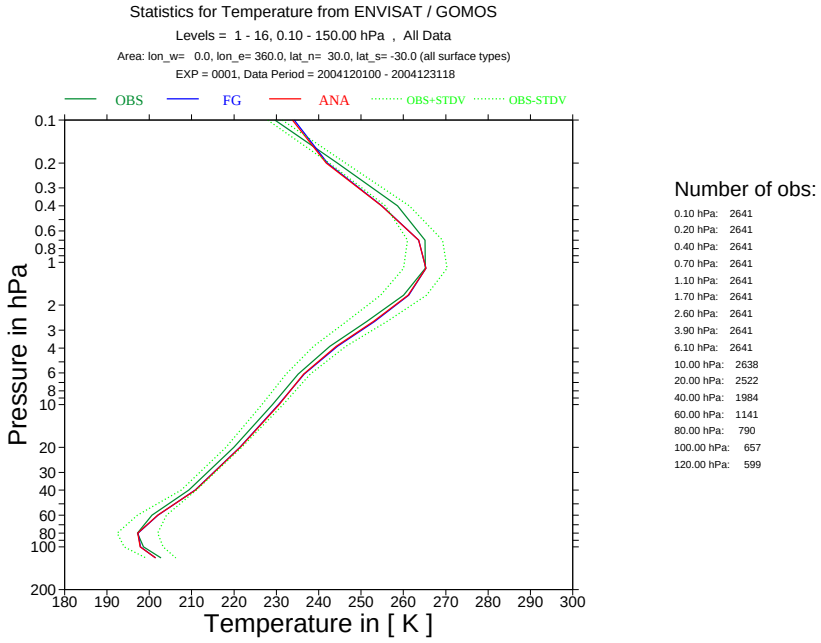


Fig. 5. As Fig. 3 but for 60-30N.



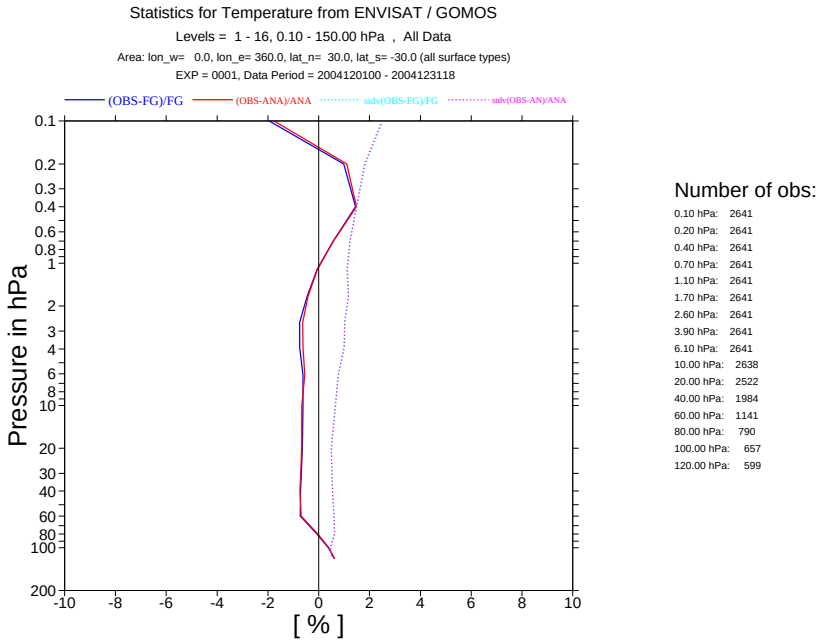
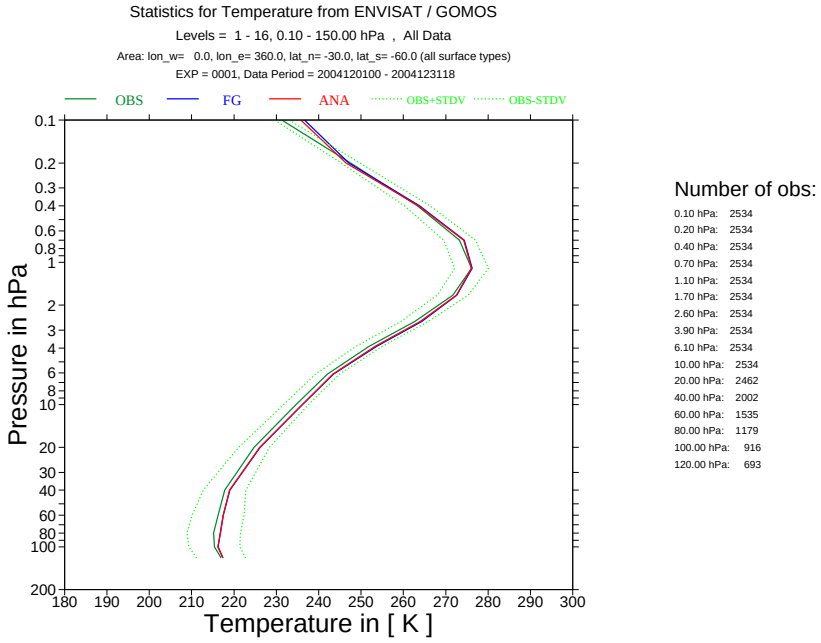


Fig. 6. As Fig. 3 but for 30N-30S.



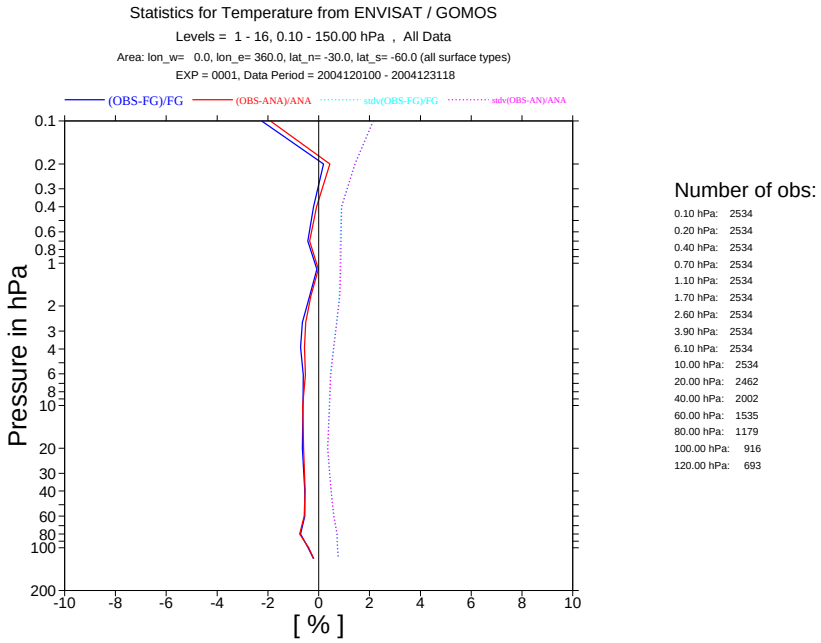
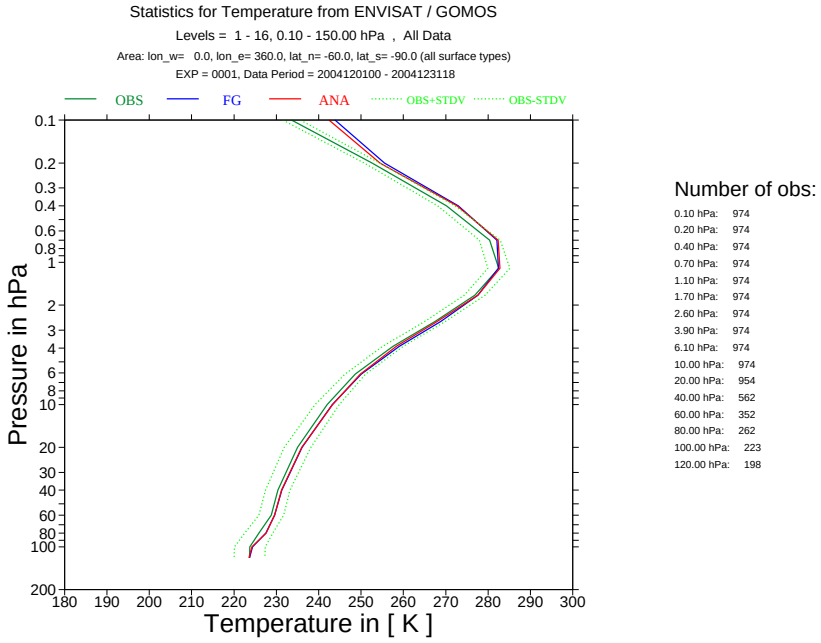


Fig. 7. As Fig. 3 but for 30-60S.



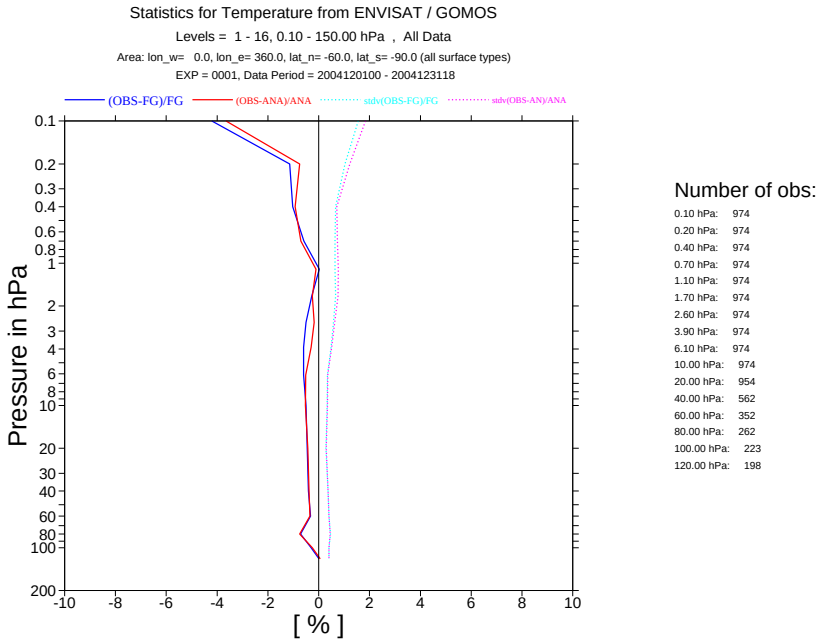


Fig. 8. As Fig. 3 but for 60-90S.

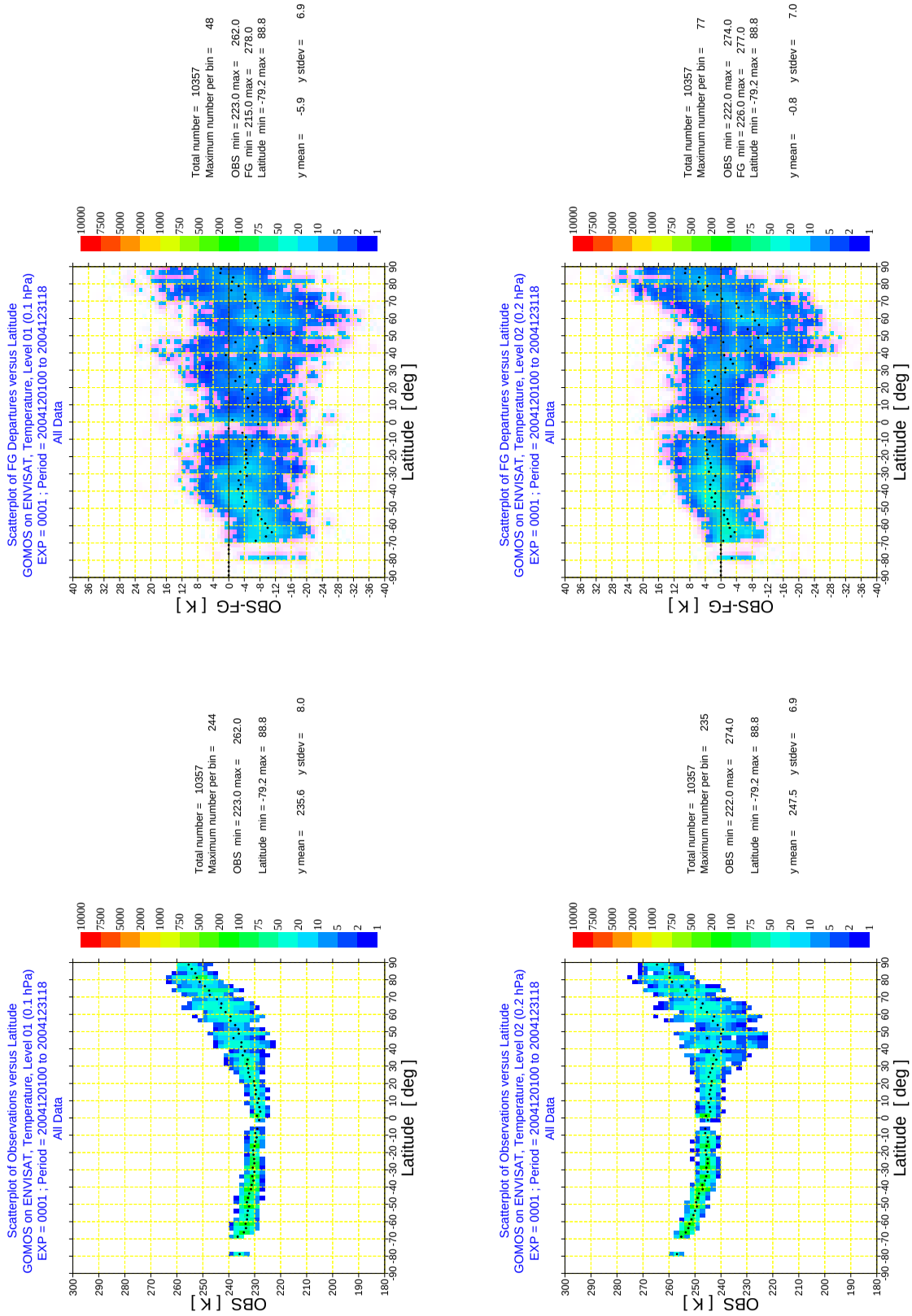


Fig. 9. Scatter plot of ENVISAT GOMOS NRT temperature data against latitude and scatter plot of first-guess departures of ENVISAT GOMOS NRT temperature data (right) against latitude for December 2004 for level 1 (0.1 hPa) and level 2 (0.2 hPa). The colours show the number of data per bin, the black dots the mean value per bin.

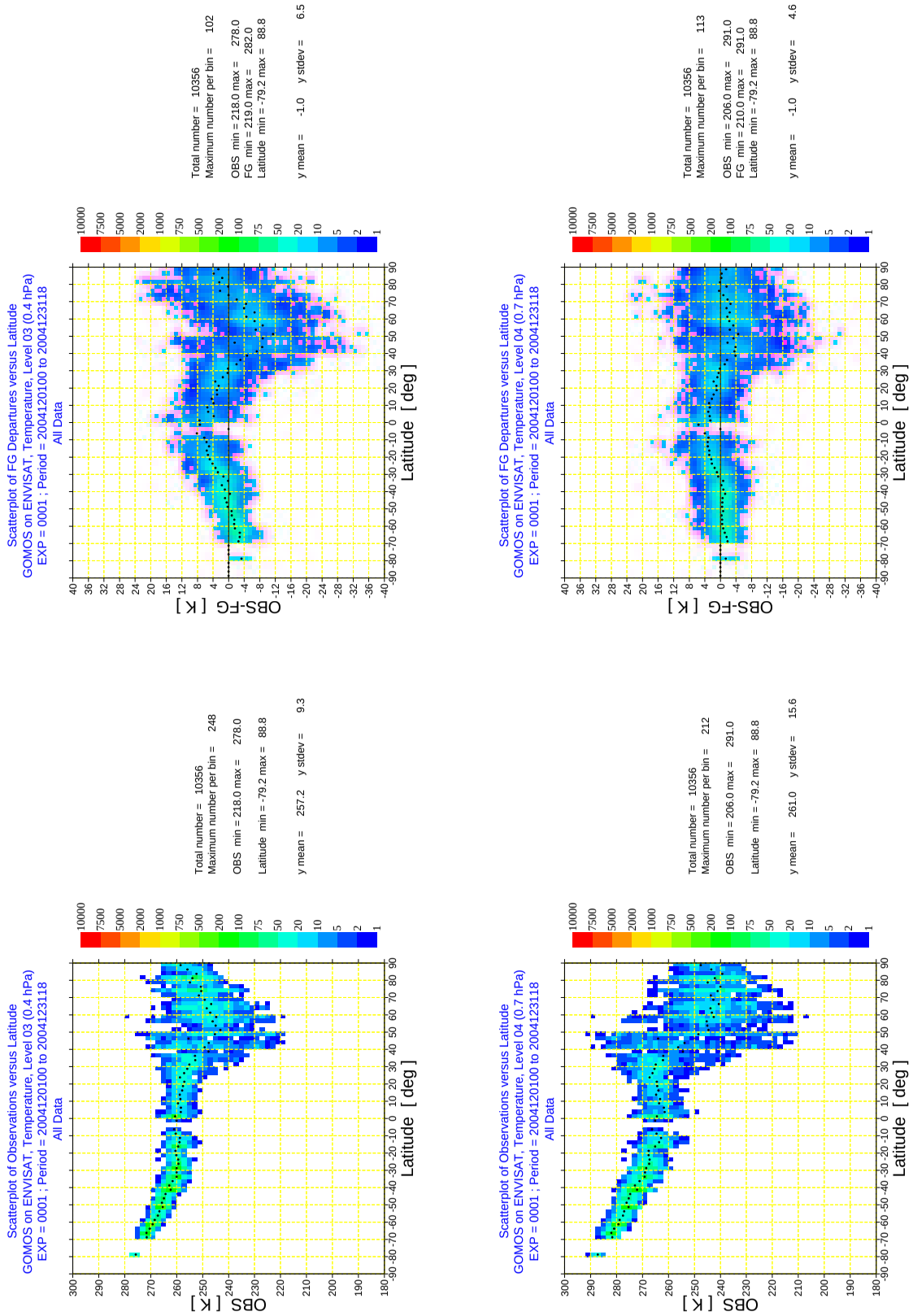


Fig. 10. As Fig. 9 but for level 3 (0.4 hPa) and level 4 (0.7 hPa).

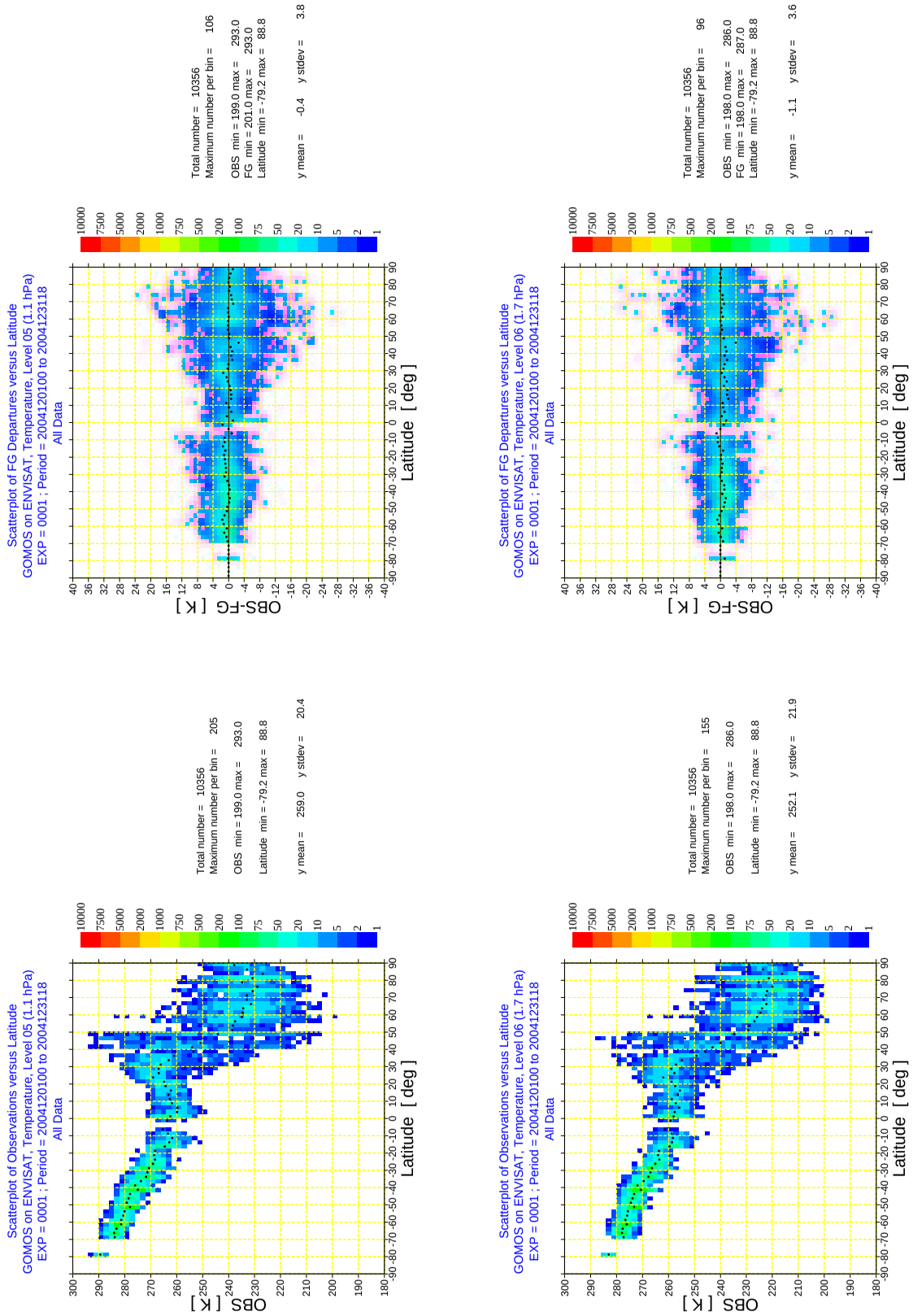


Fig. 11. As Fig. 9 but for level 5 (1.1 hPa) and level 6 (1.7 hPa).

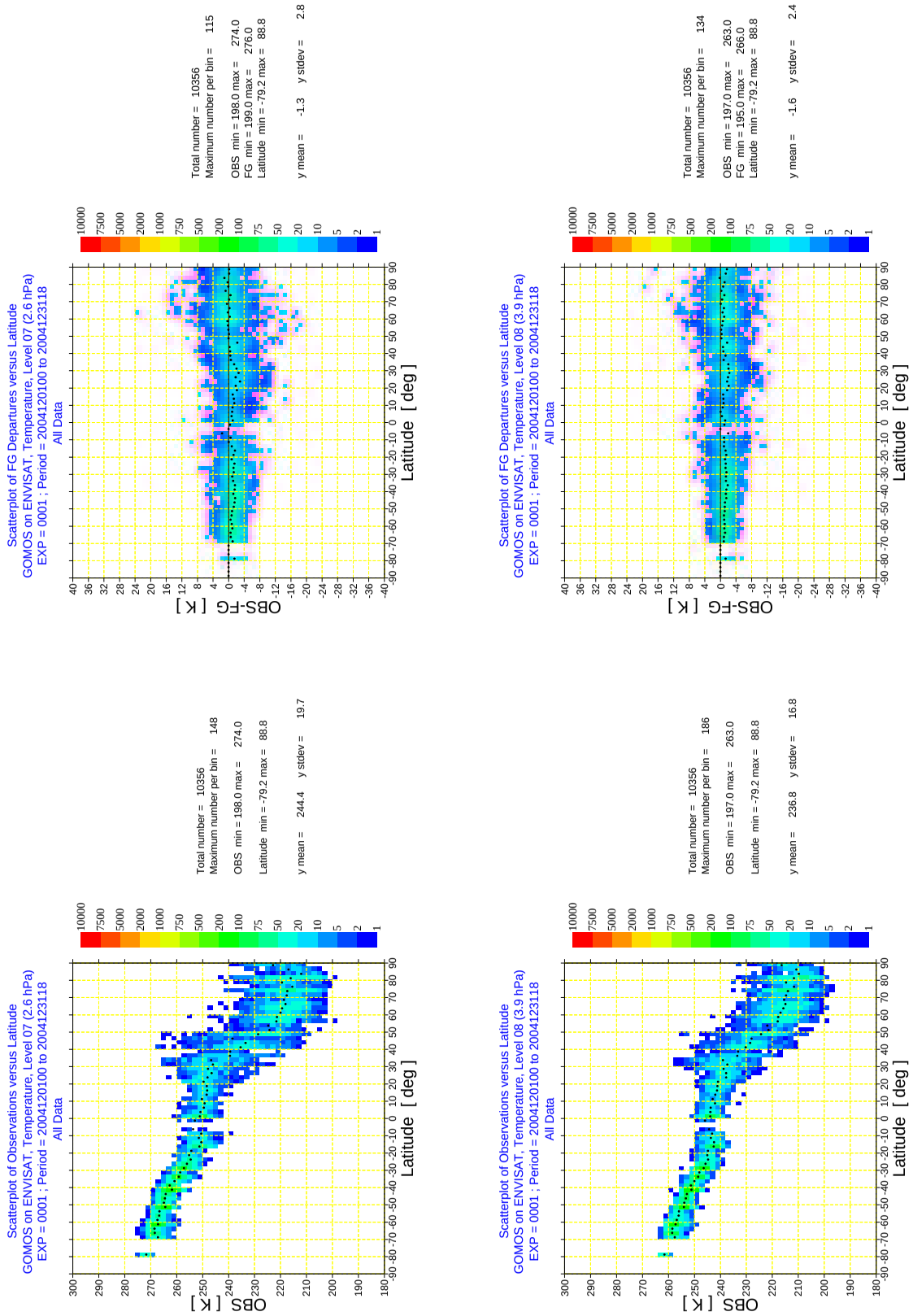


Fig. 12. As Fig. 9 but for level 7 (2.6 hPa) and level 8 (3.9 hPa).

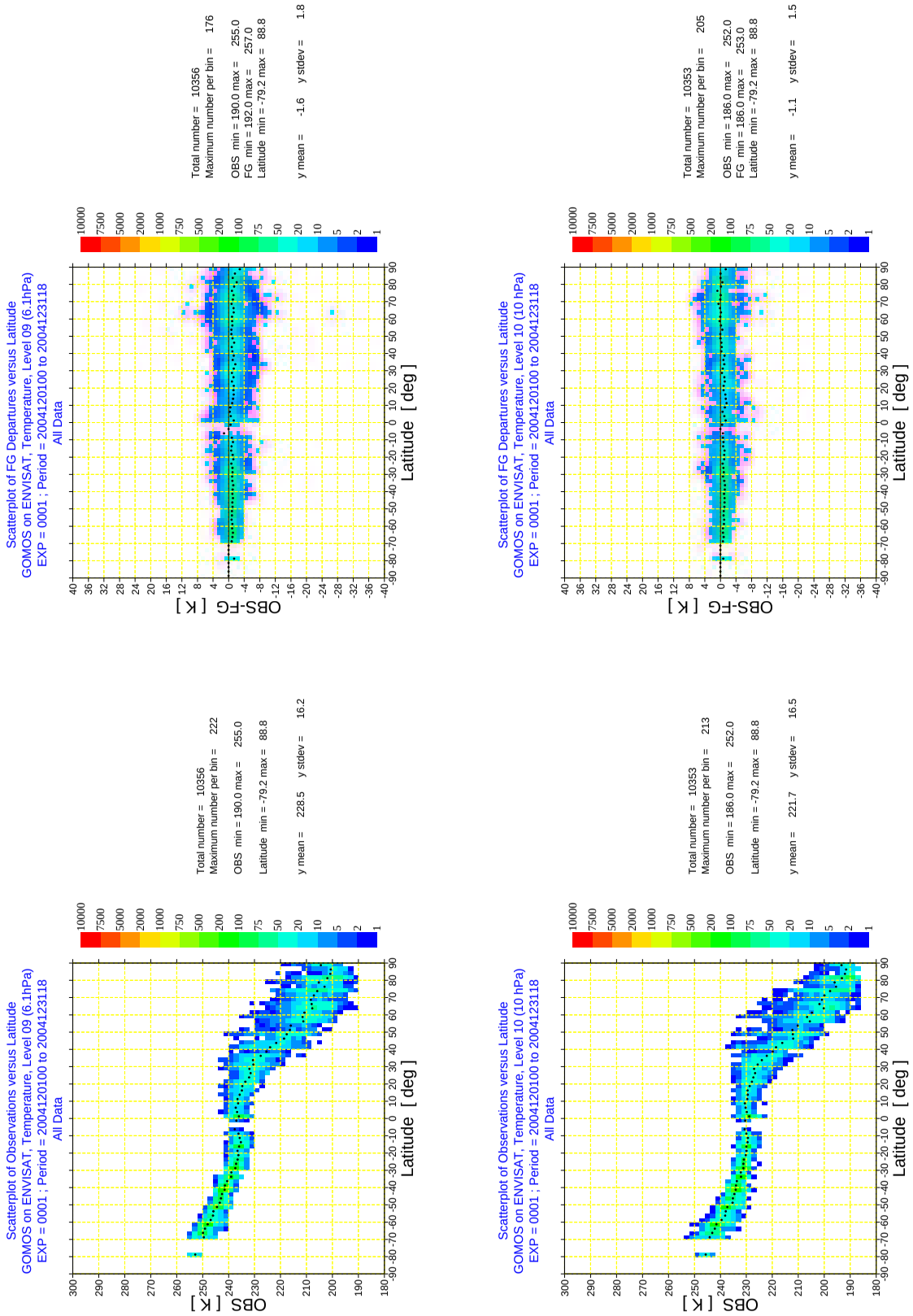


Fig. 13. As Fig. 9 but for level 9 (6.1 hPa) and level 10 (10 hPa).

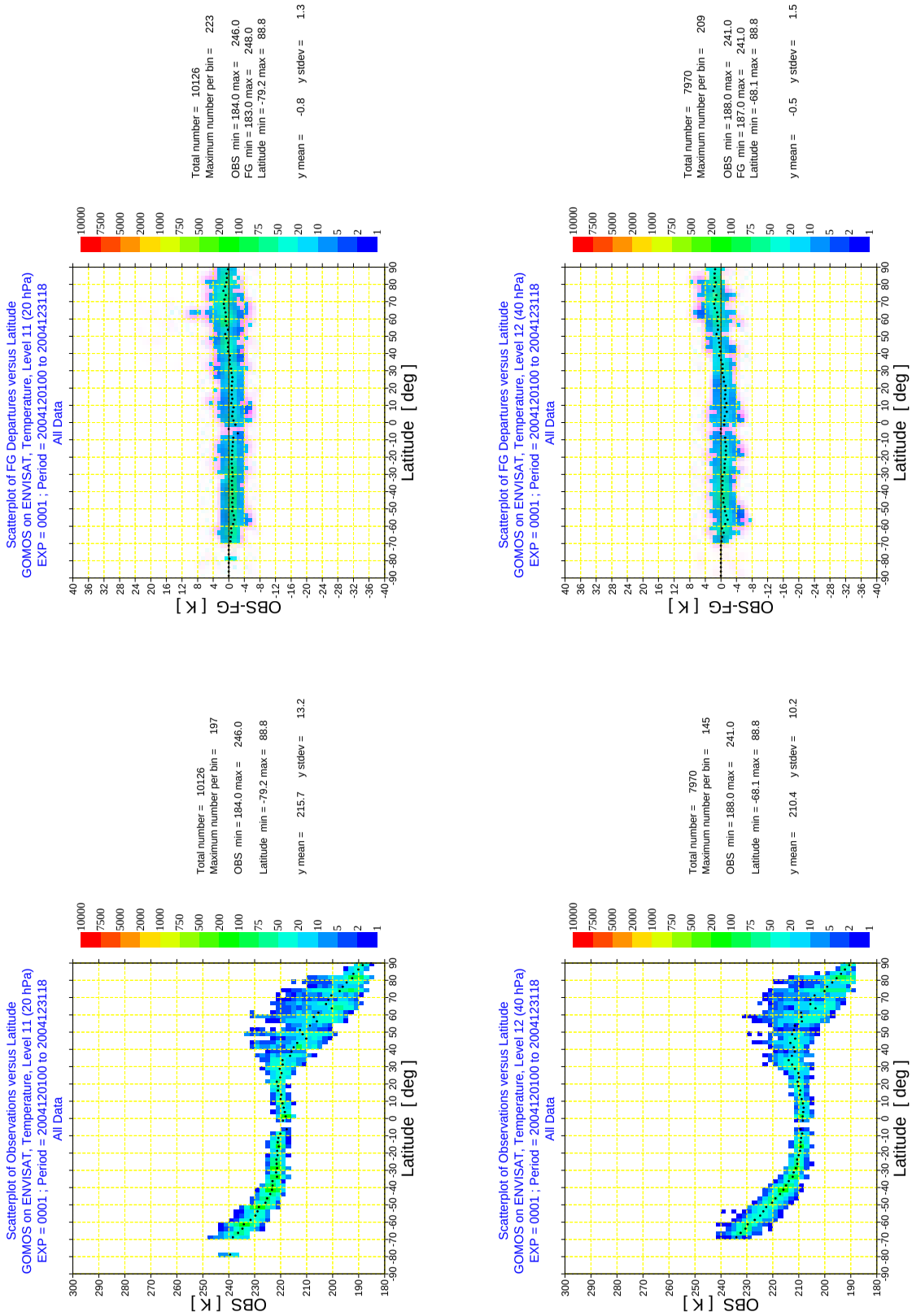


Fig. 14. As Fig. 9 but for level 11 (20 hPa) and level 12 (40 hPa).

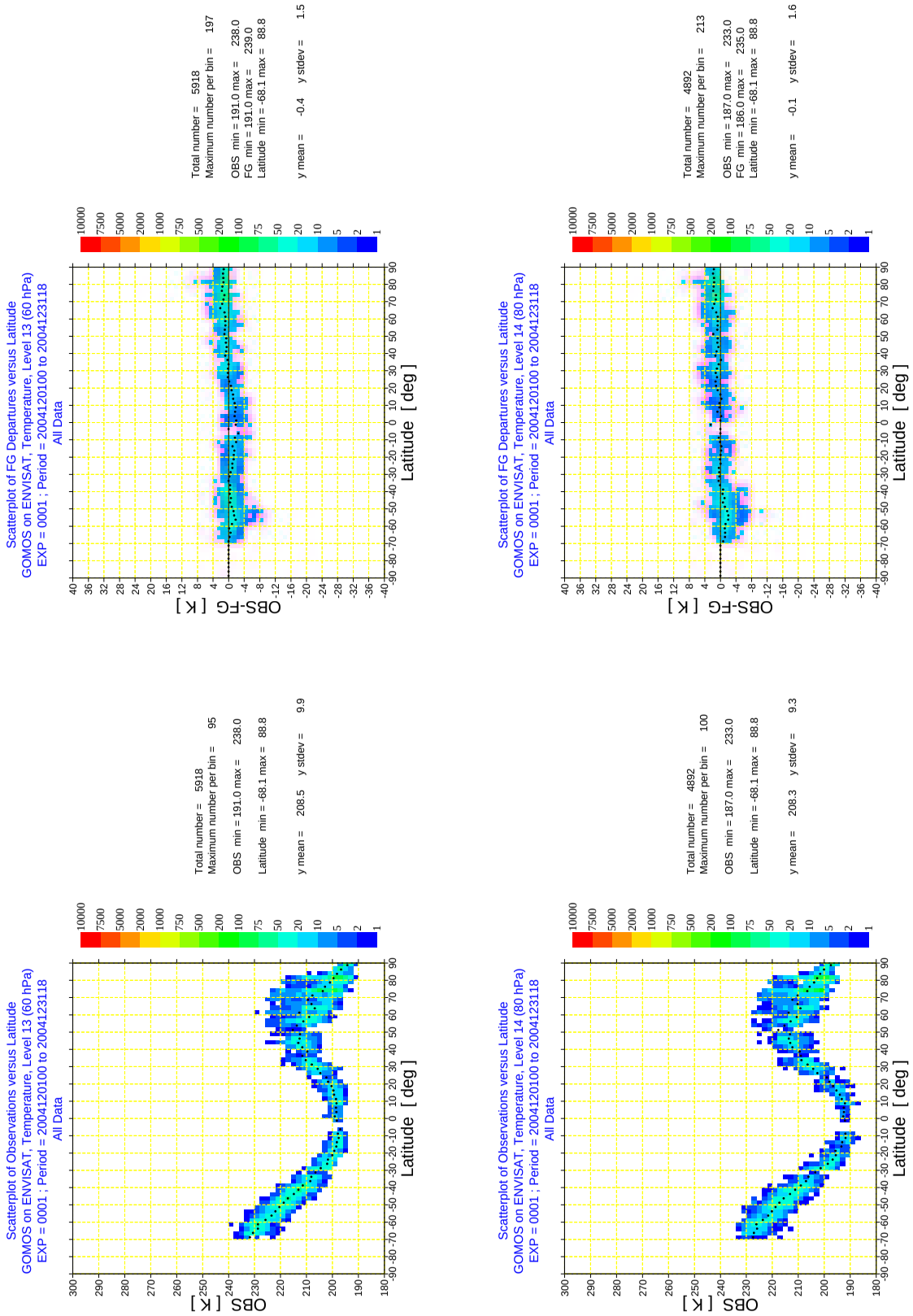


Fig. 15. As Fig. 9 but for level 13 (60 hPa) and level 14 (80 hPa).

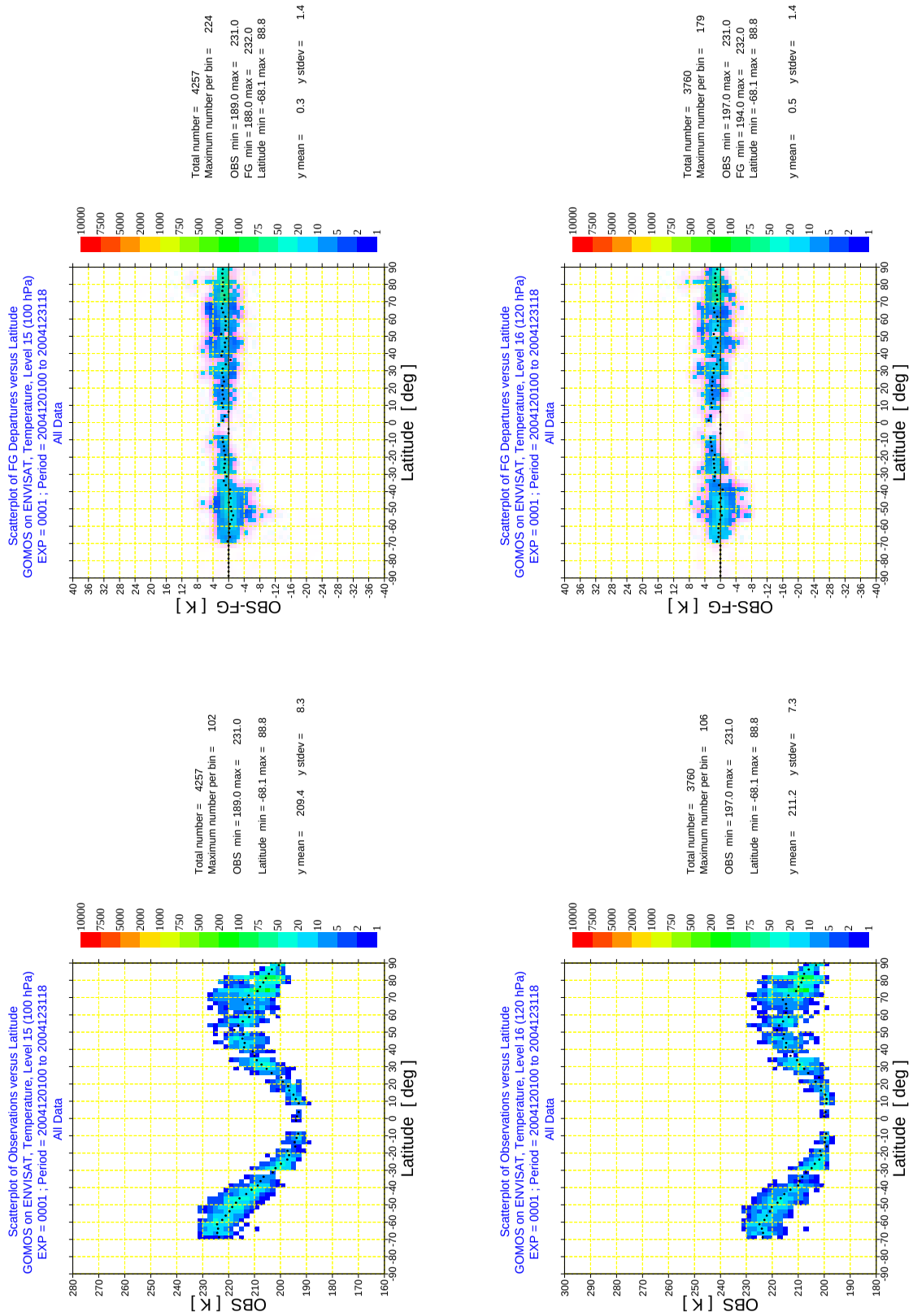


Fig. 16. As Fig. 9 but for level 15 (100 hPa) and level 16 (120 hPa).

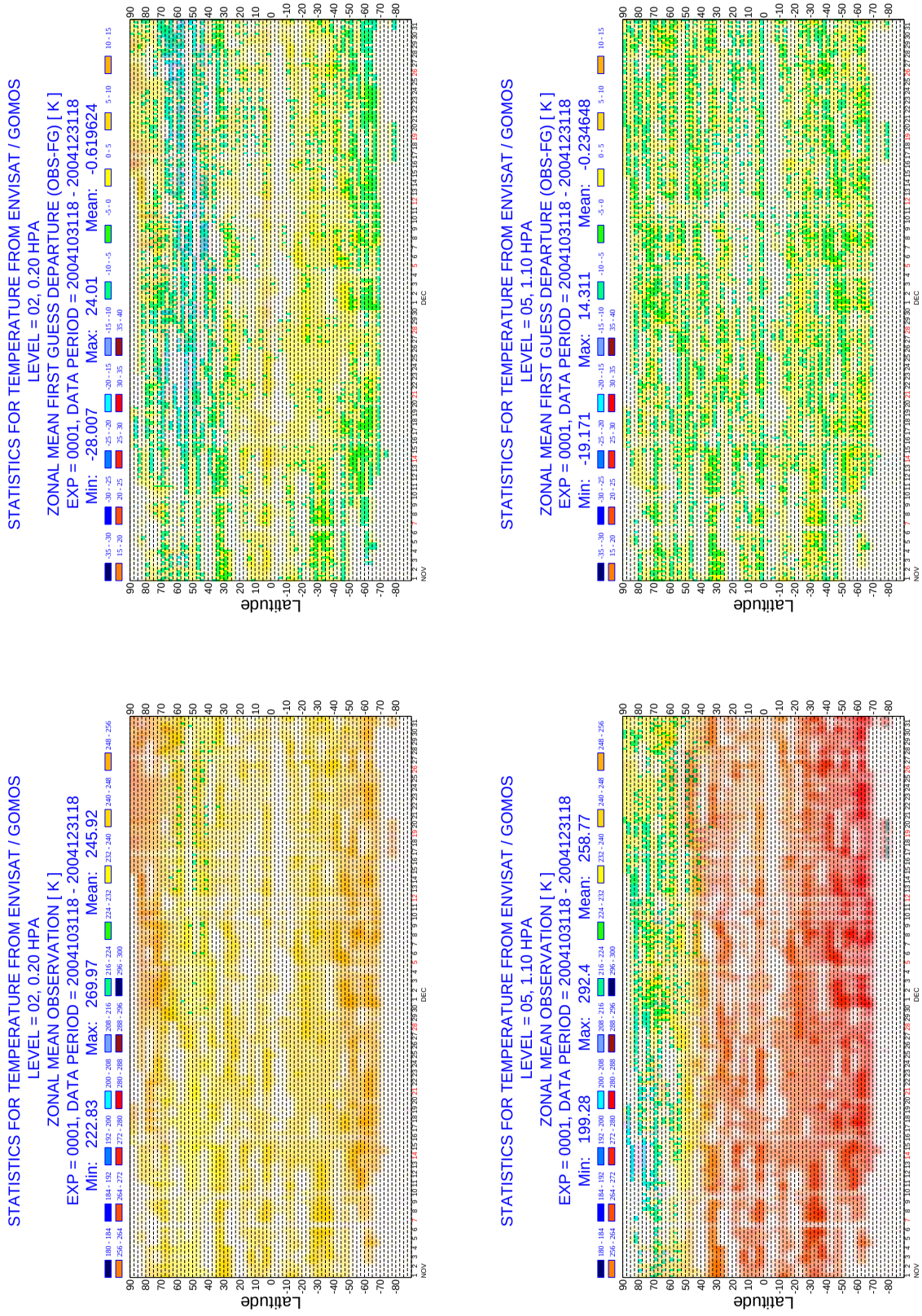


Fig. 17. Hovmoeller diagram of zonal mean ENVISAT GOMOS NRT temperature data per 6-hour cycle and and of the zonal mean first-guess departures for level 2 (0.2 hPa) and level 5 (1.1 hPa) for November and December 2004.

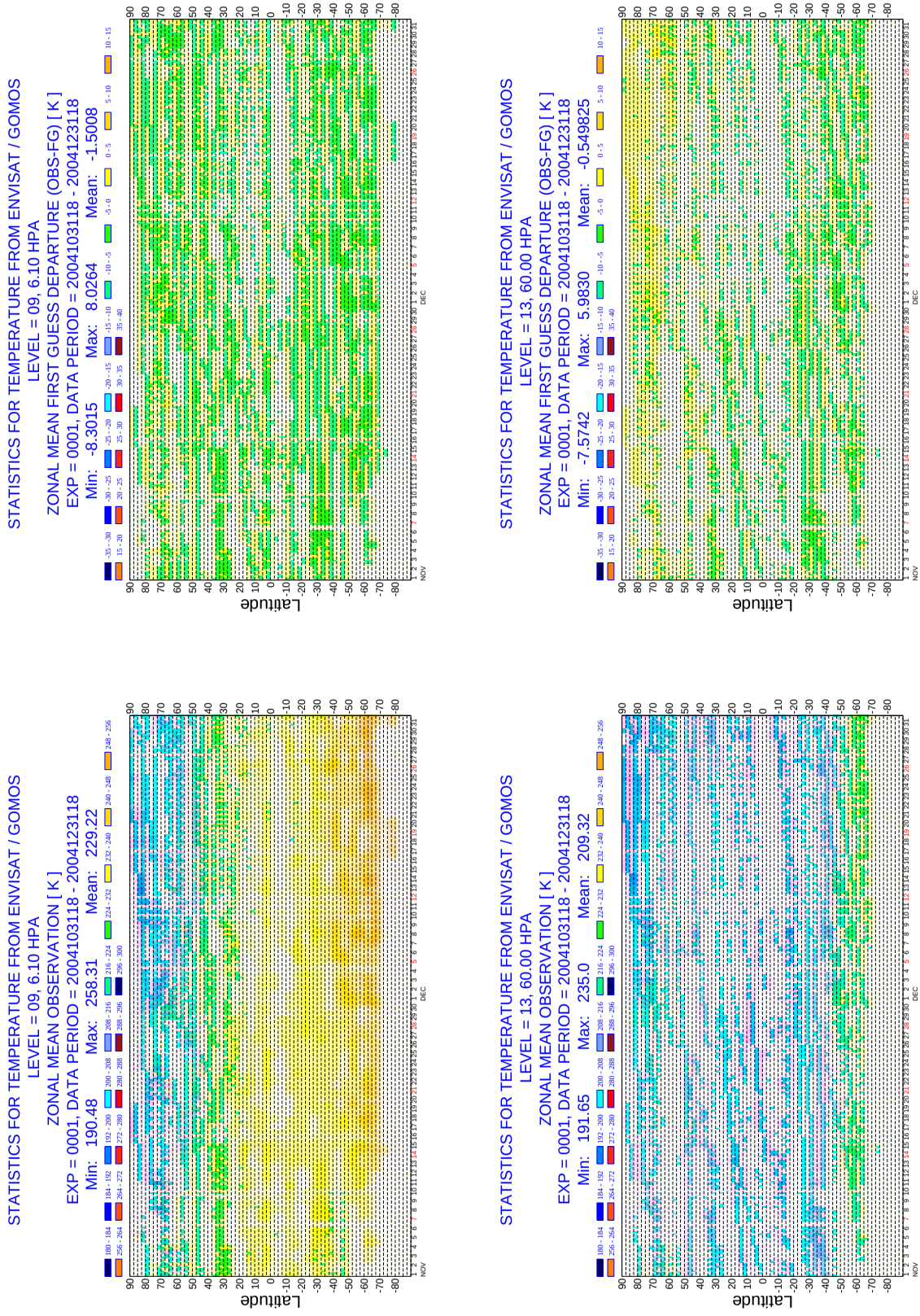


Fig. 18. As Fig. 17 but for level 9 (6.1 hPa) and level 13 (60 hPa).

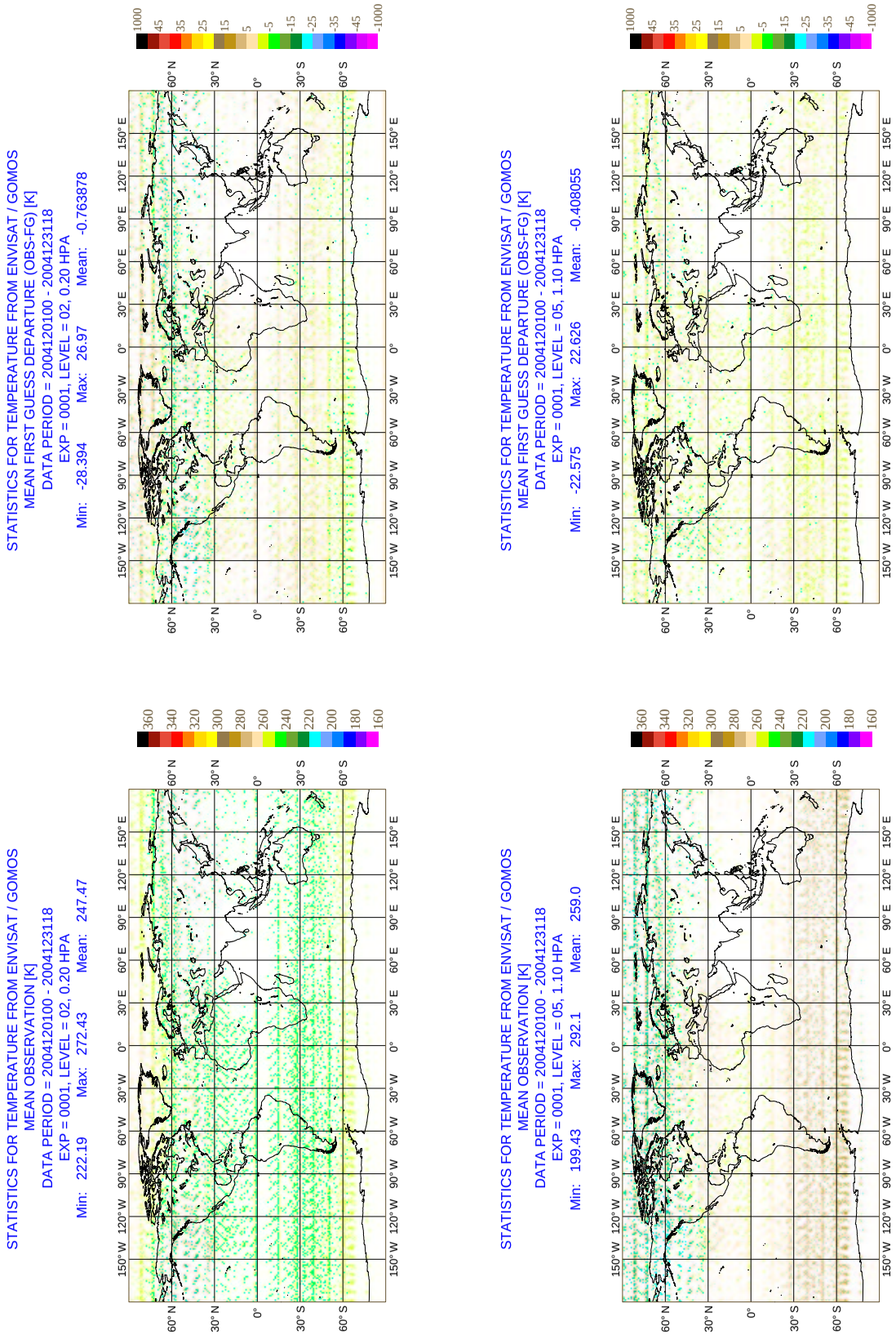


Fig. 19. Geographical distribution of mean ENVISAT GOMOS NRT temperature data and mean first-guess departures for December 2004 for level 2 (0.2 hPa) and level 5 (1.1 hPa).

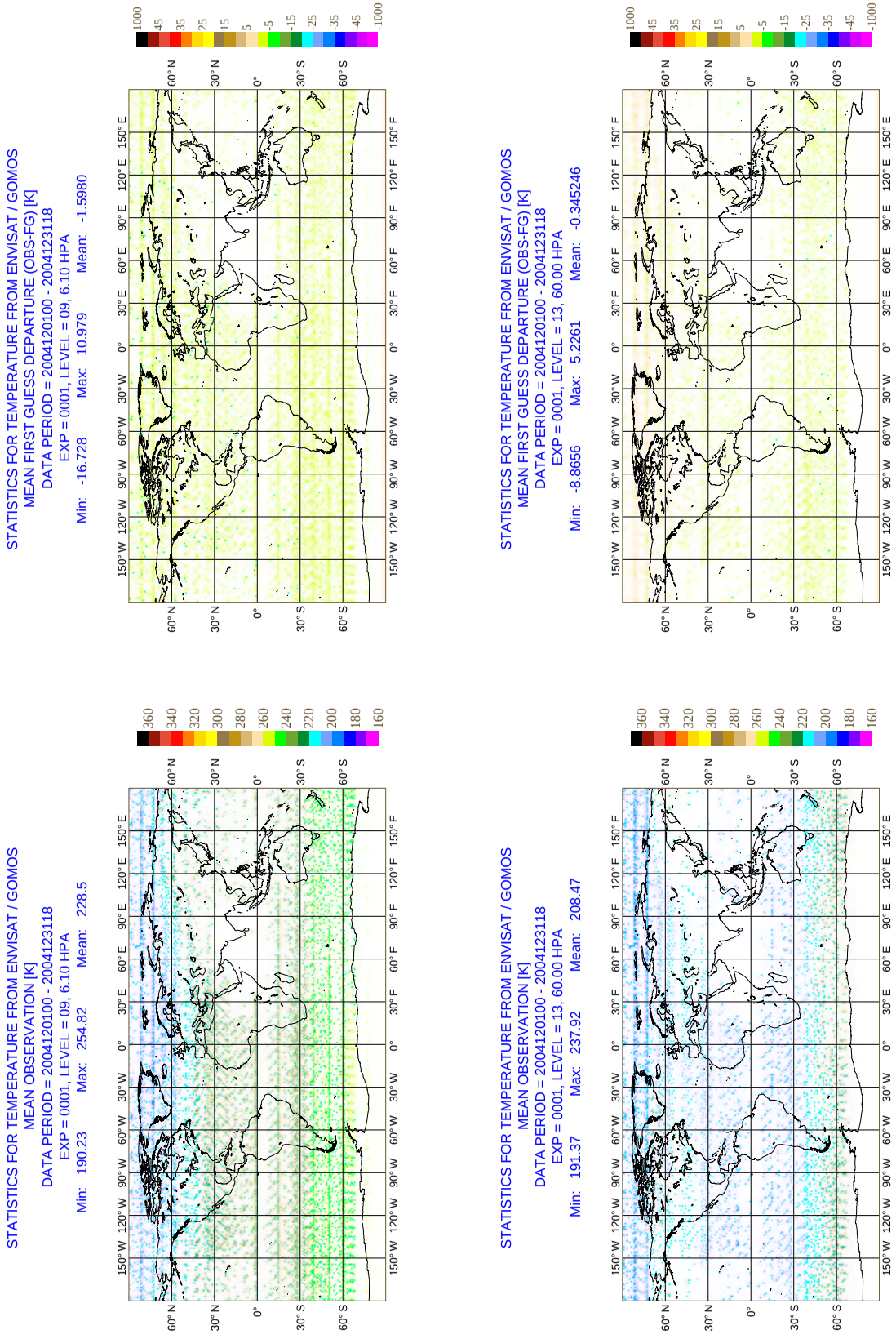


Fig. 20. As Fig. 19 but for level 9 (6.1 hPa) and level 13 (60 hPa).

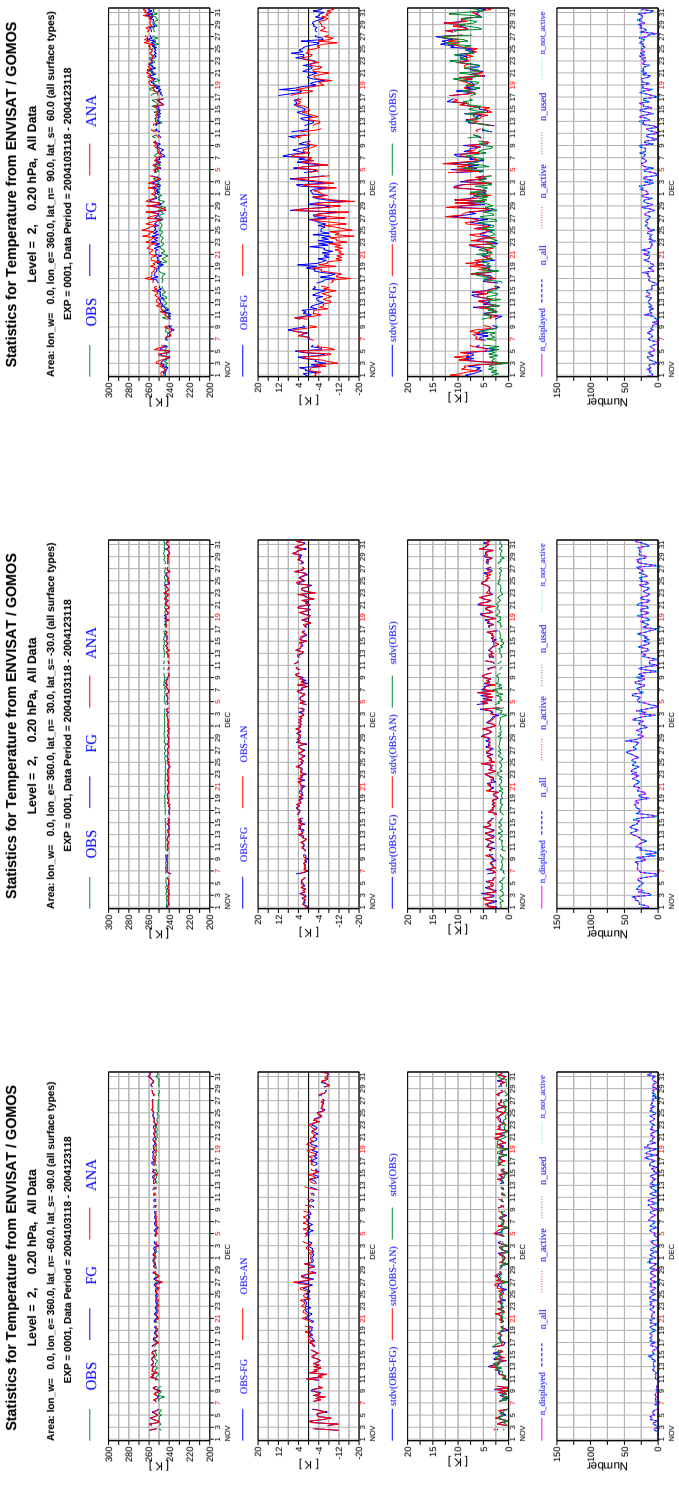


Fig. 21. Time series of mean ENVISAT GOMOS NRT temperature data, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for level 2 (0.2 hPa) 90-60N, 30N-30S, 60-90S for November and December 2004.

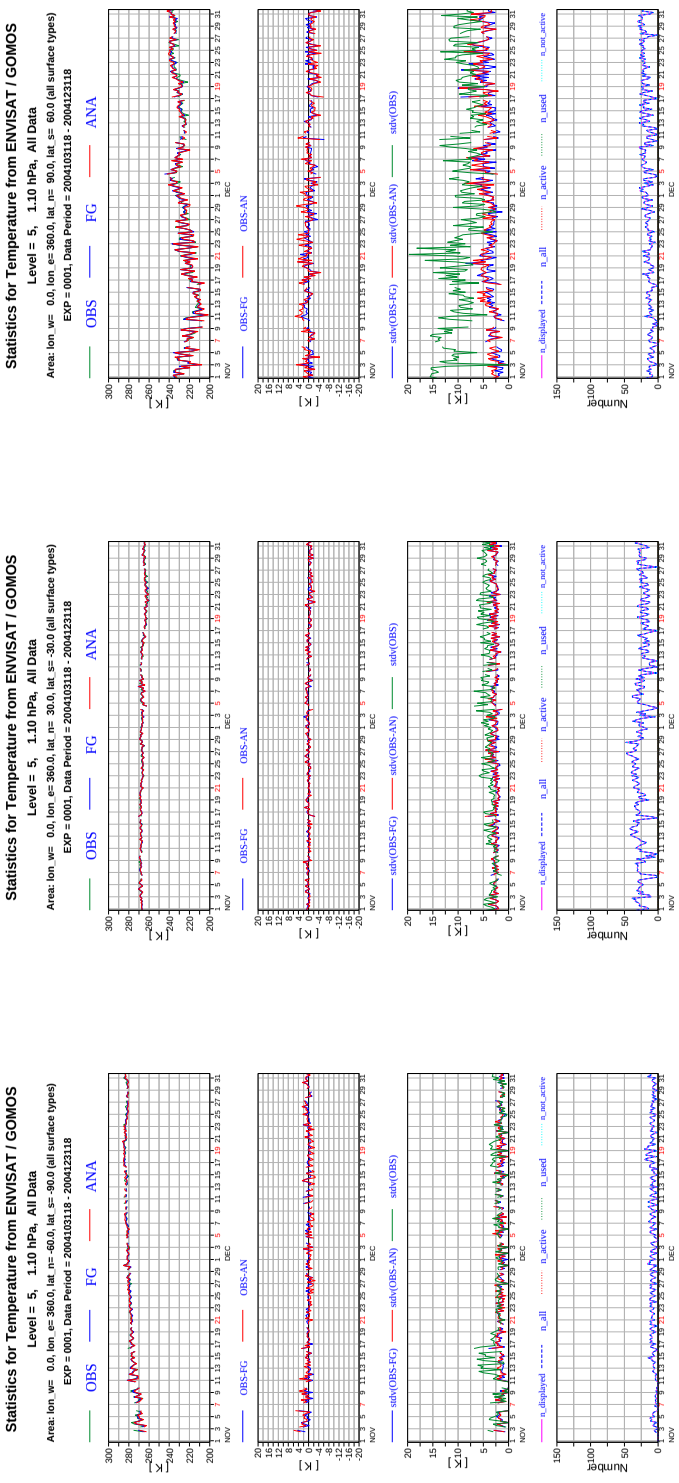


Fig. 22. As Figure 21, but for level 5 (1.1 hPa).

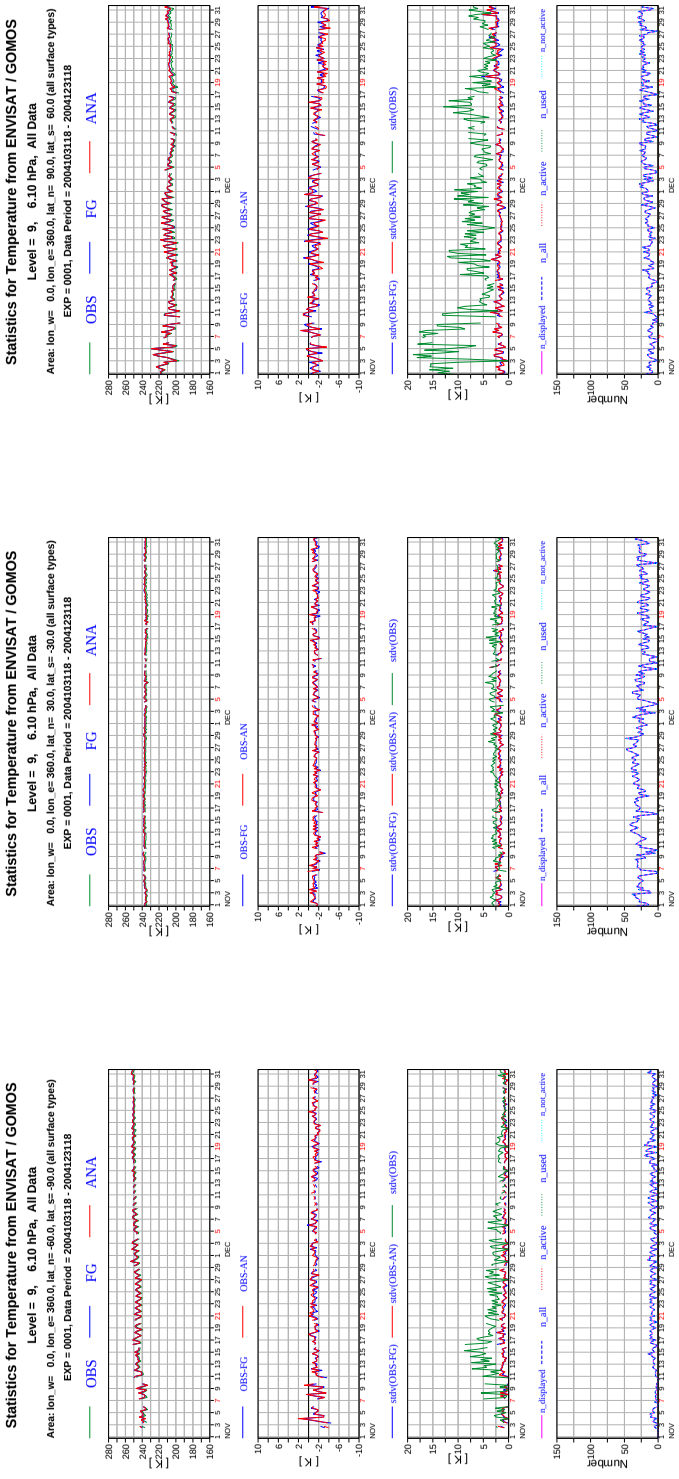


Fig. 23. As Figure 21, but for level 9 (6.1 hPa).

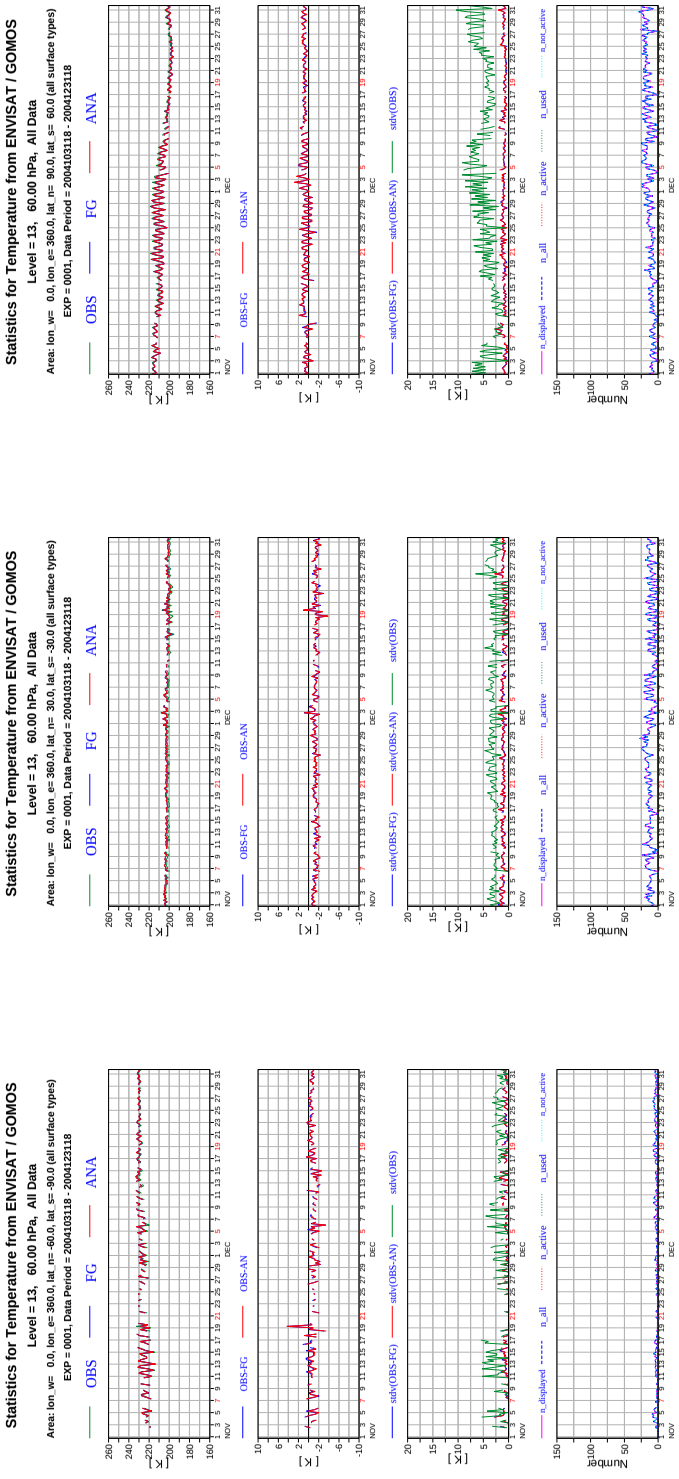


Fig. 24. As Figure 21, but for level 13 (60 hPa).

REPORT ABOUT ENVISAT GOMOS NRT OZONE DATA (GOM_RR__2P) FOR DECEMBER 2004

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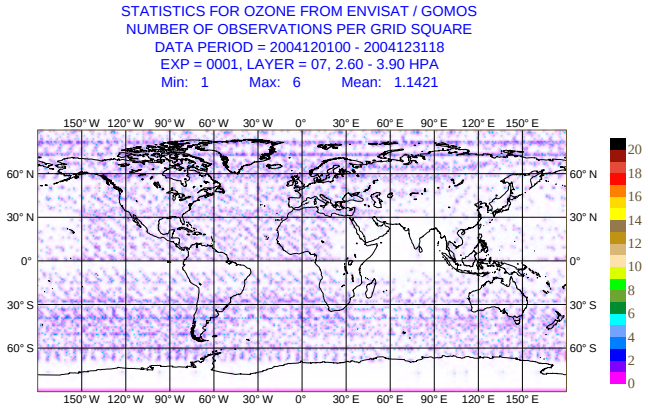

Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT ozone data for layer 7 (2.60-3.90 hPa) for December 2004.

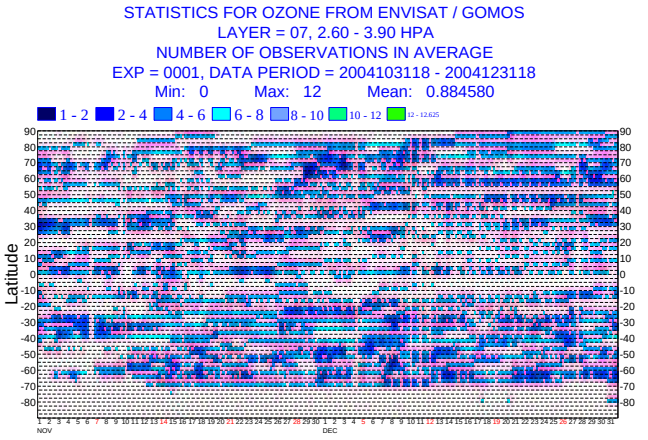

Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT ozone data per 6-hour cycle for layer 7 (2.60-3.90 hPa) for November and December 2004.

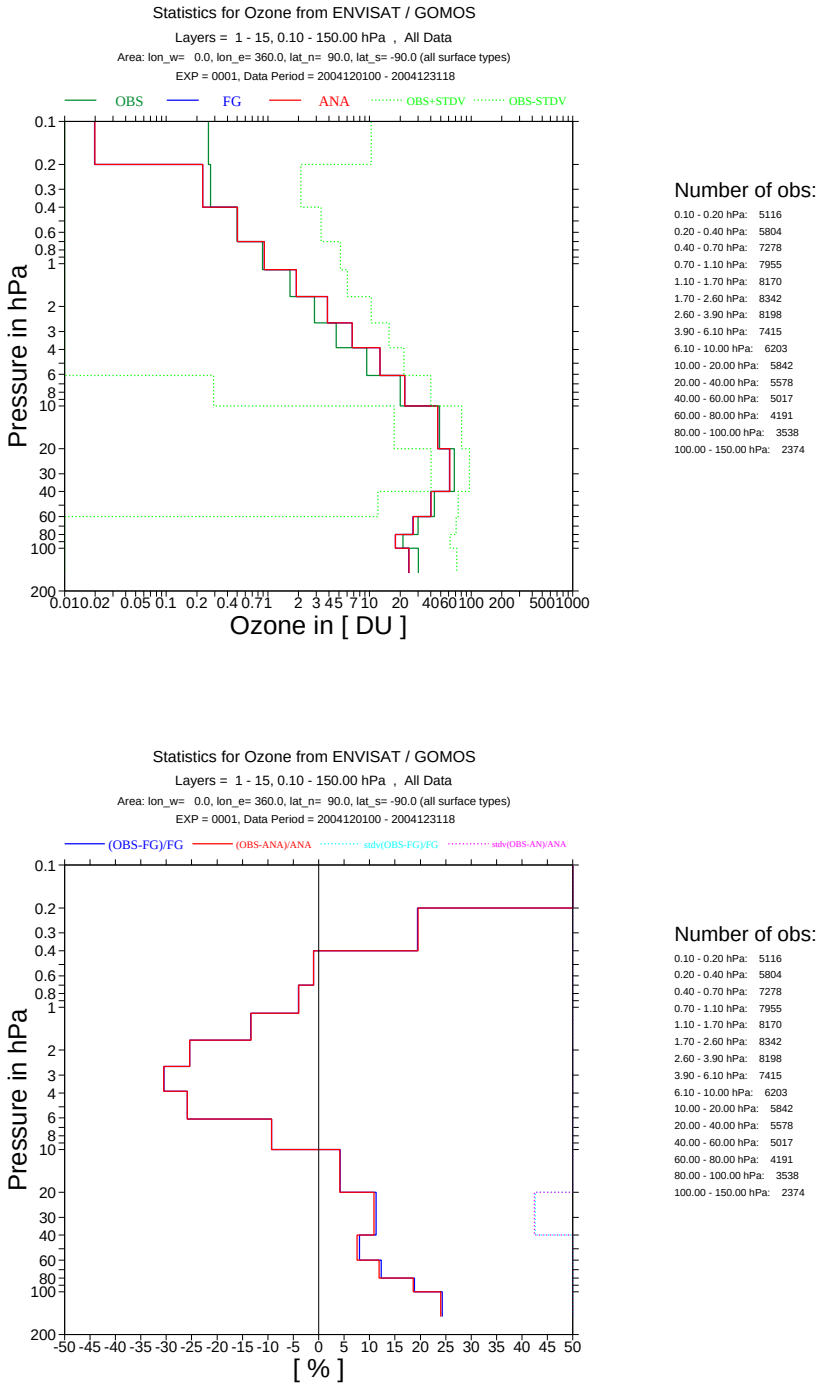

Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT ozone data in DU for December 2004 (global mean). The top plot shows the mean analysis values (blue), the mean observation (red), and the mean observation +/- 1 standard deviation (dotted lines). The bottom plot shows the departures and the standard deviation of the departures in the partial columns for the 15 layers listed to the right of the diagrams.

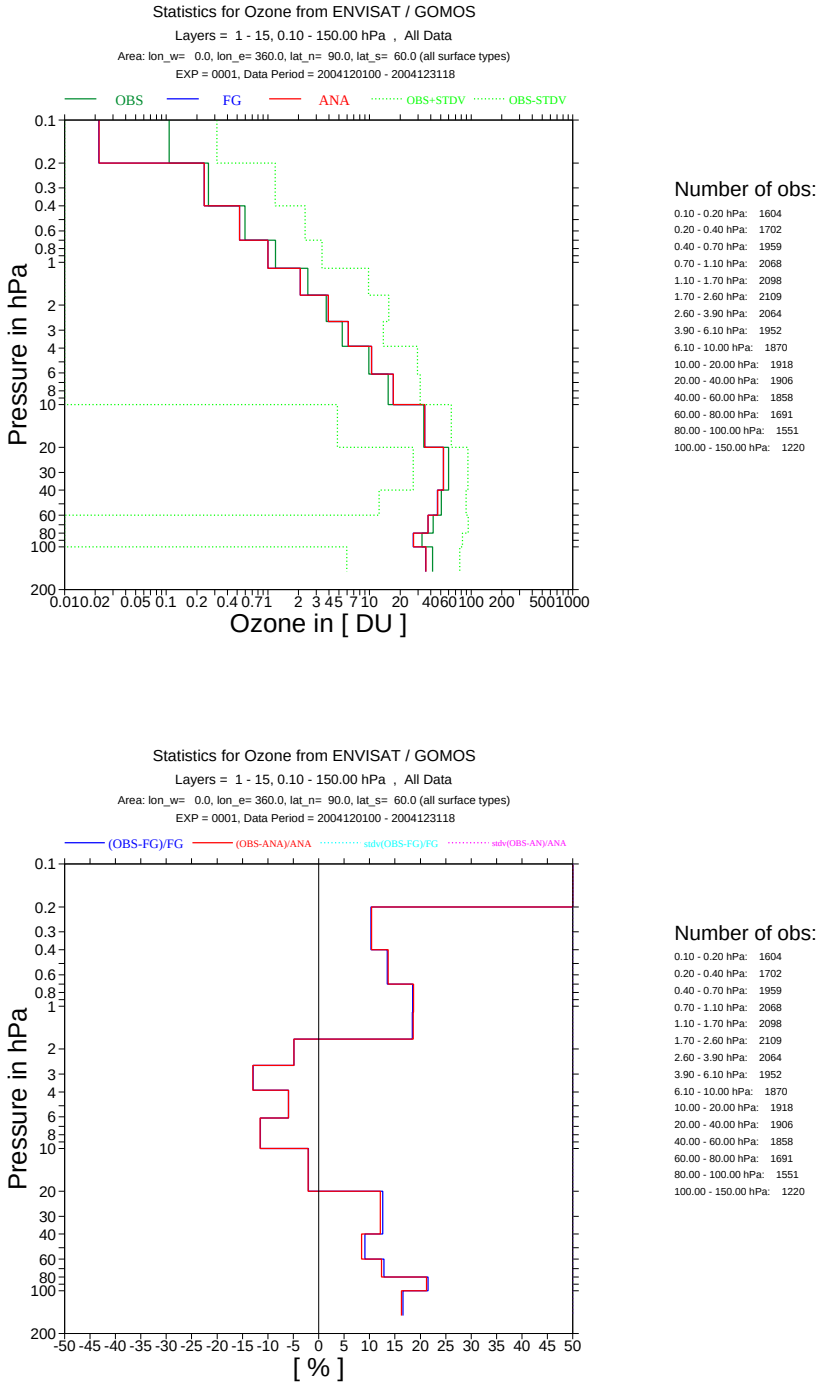

Fig. 4. As Fig. 3 but for 90N-60N.

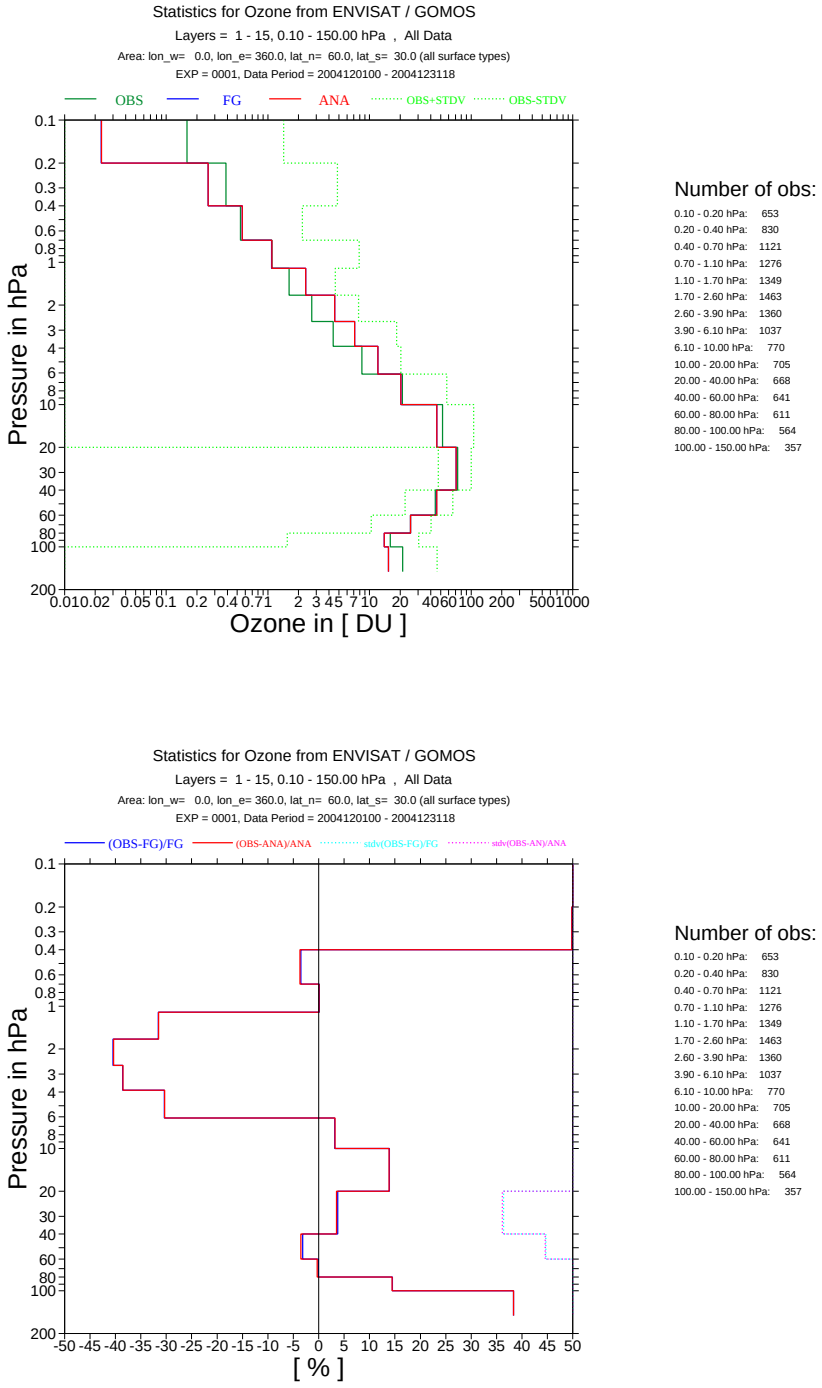

Fig. 5. As Fig. 3 but for 60-30N.

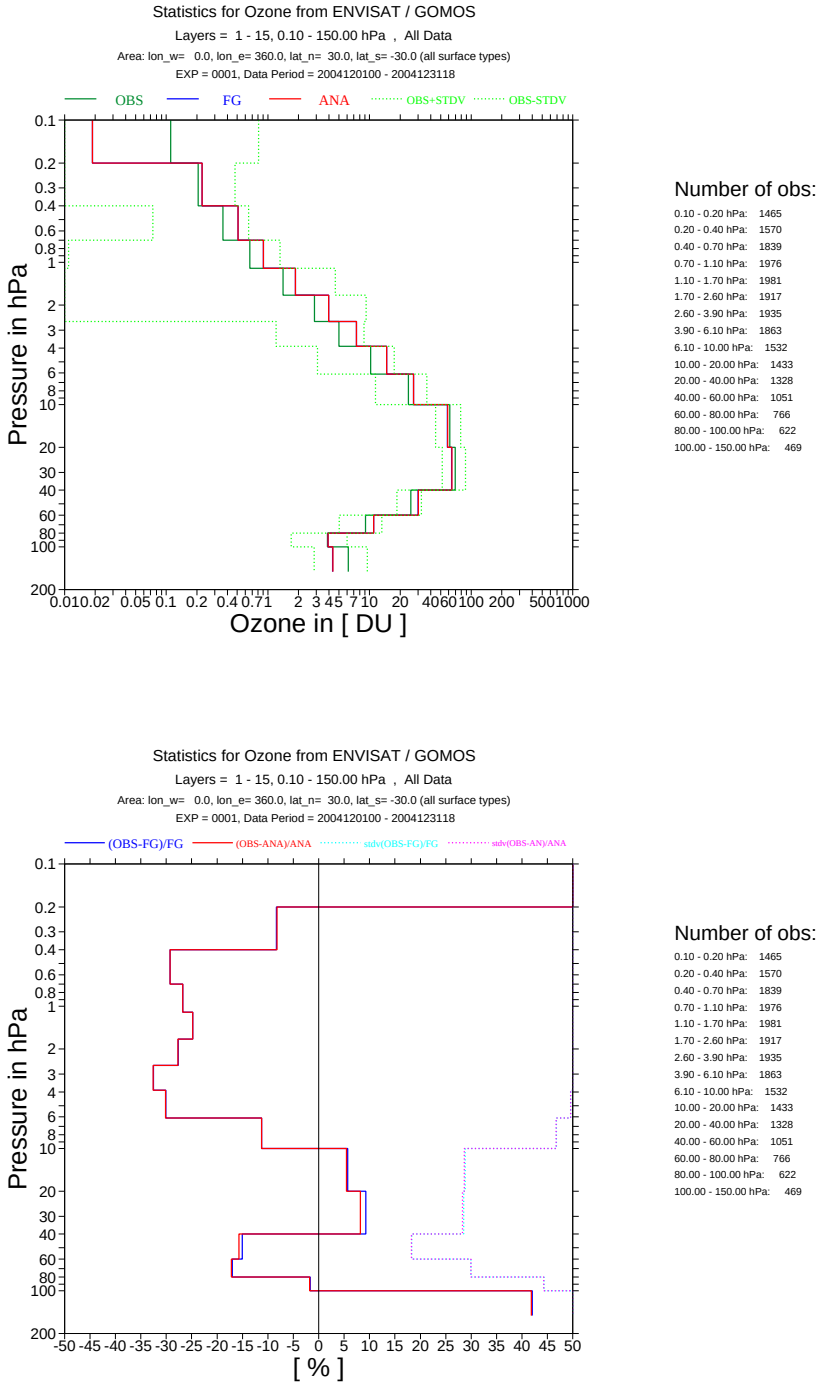

Fig. 6. As Fig. 3 but for 30N-30S.

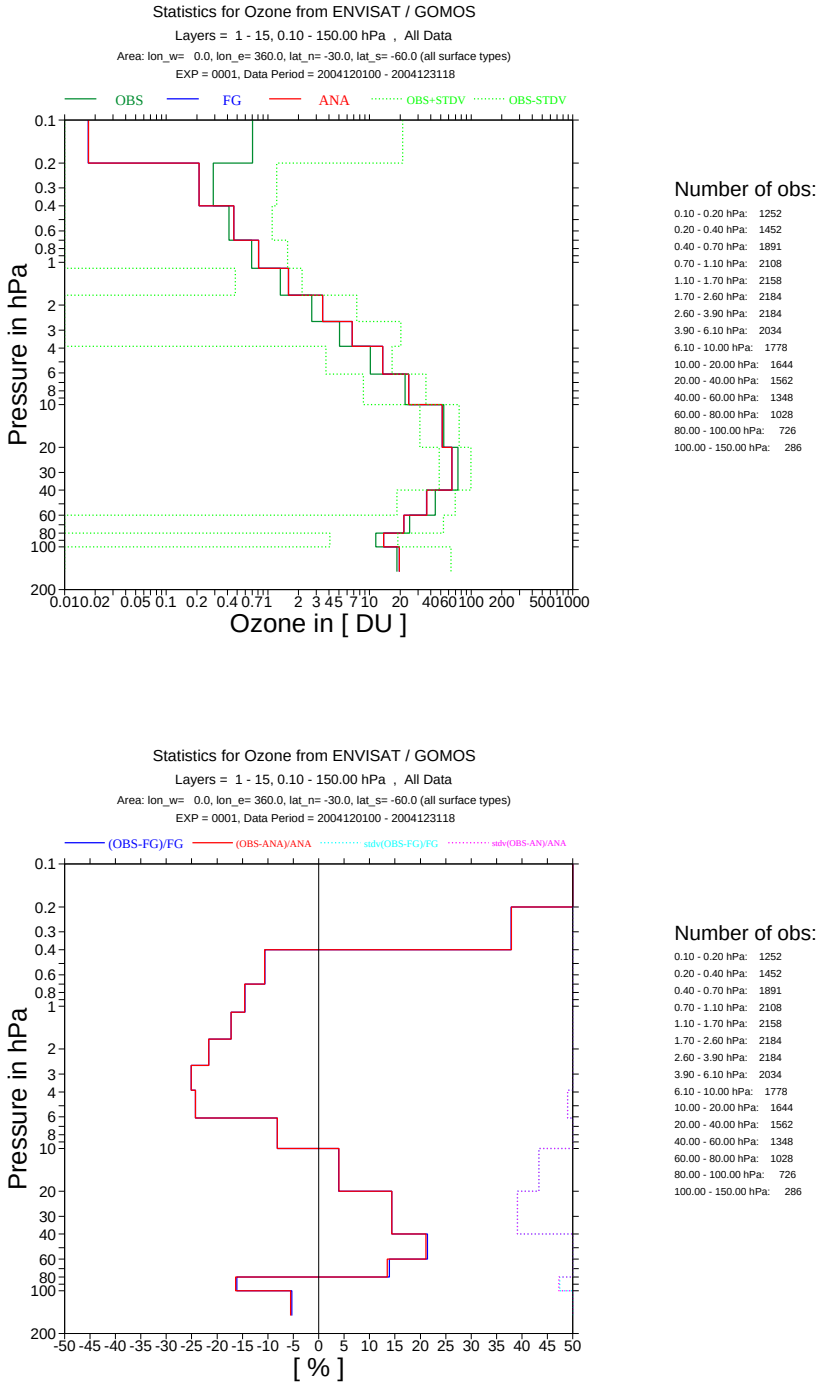

Fig. 7. As Fig. 3 but for 30S-60S.

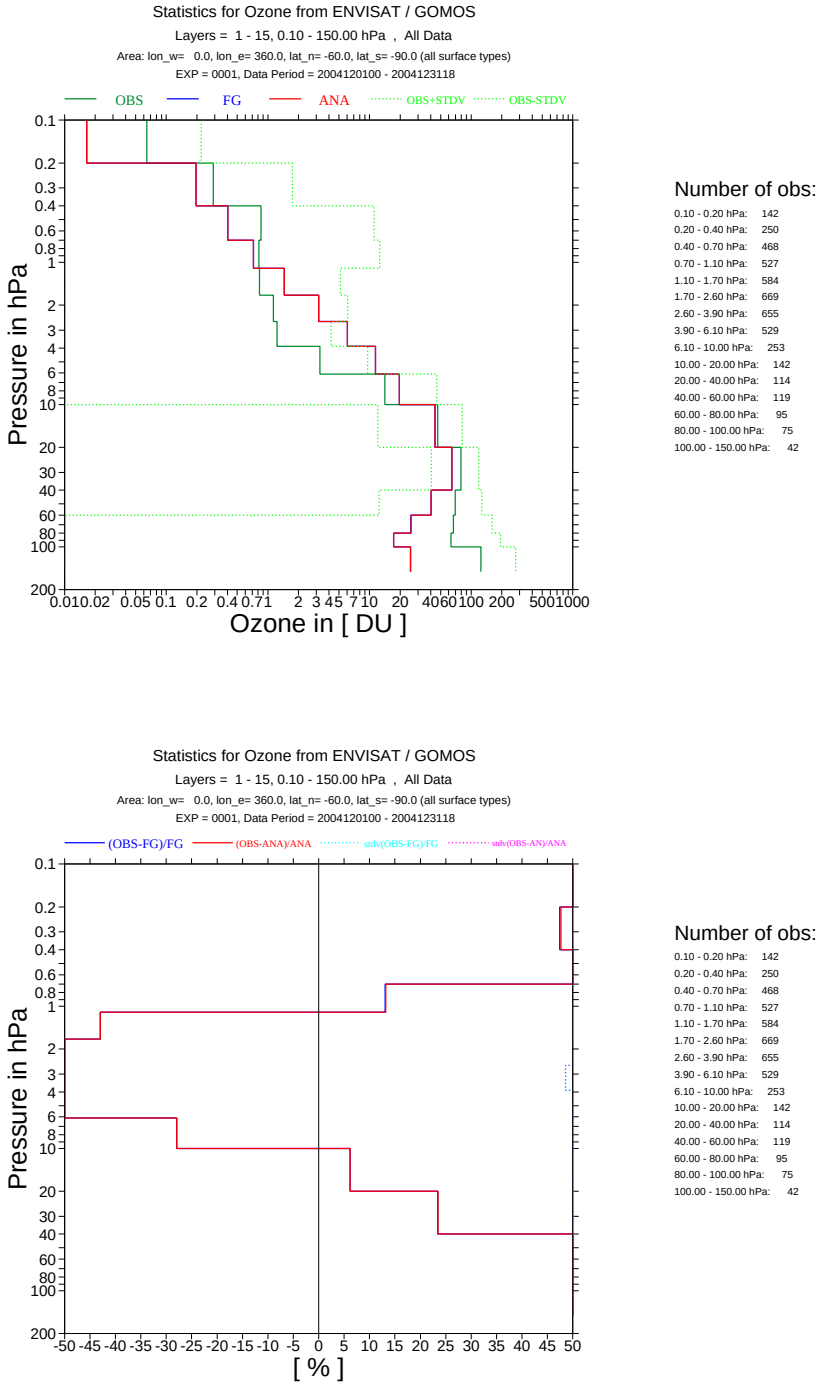

Fig. 8. As Fig. 3 but for 60-90S.

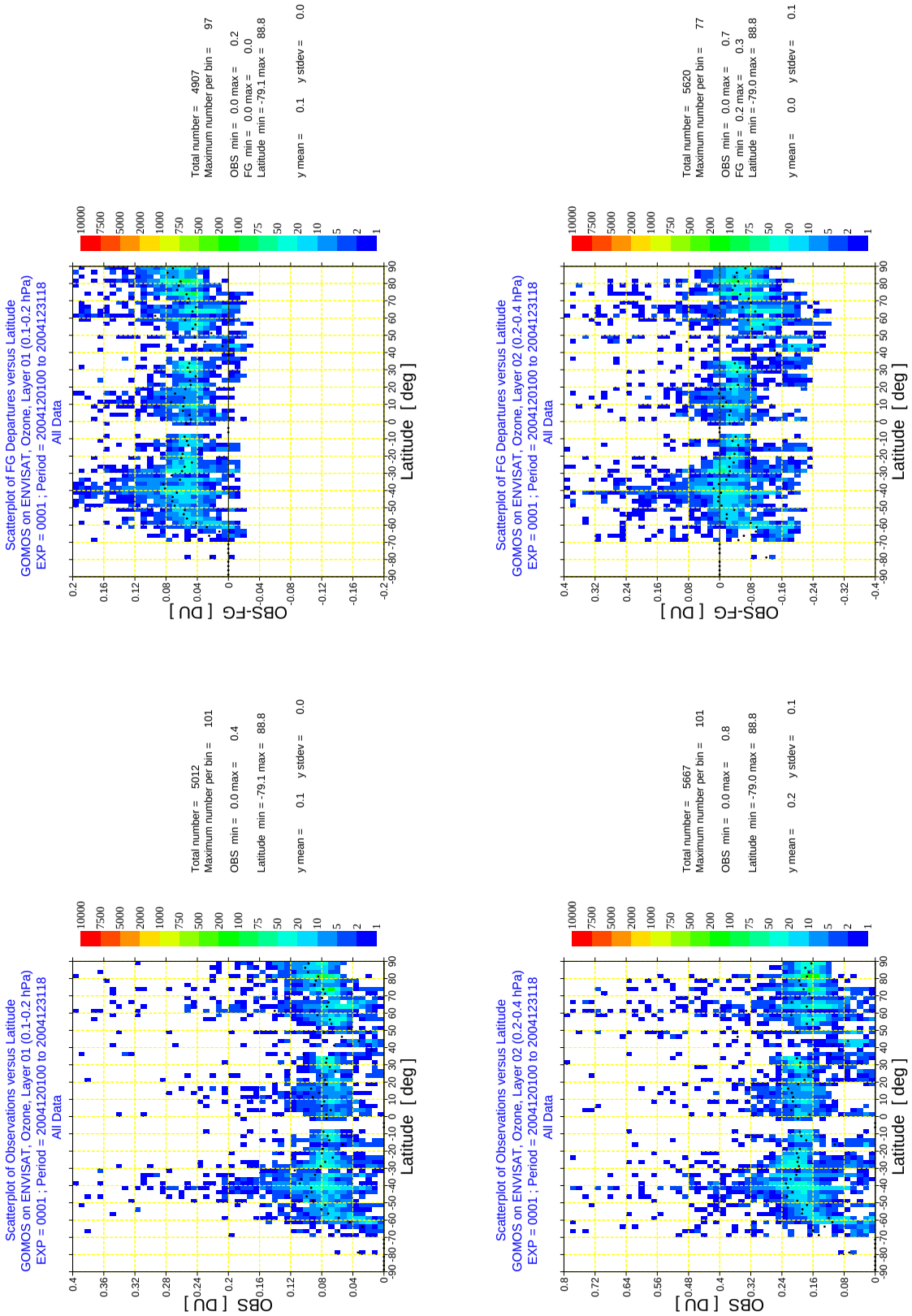

Fig. 9. Scatter plot of ENVISAT GOMOS NRT ozone data against latitude and scatter plot of first-uess departures of ENVISAT GOMOS NRT ozone data (right) against latitude for December 2004 for layer 1 (0.1-0.2 hPa) and layer 2 (0.2-0.4 hPa). The colours show the number of data per bin, the black dots the mean value per bin.

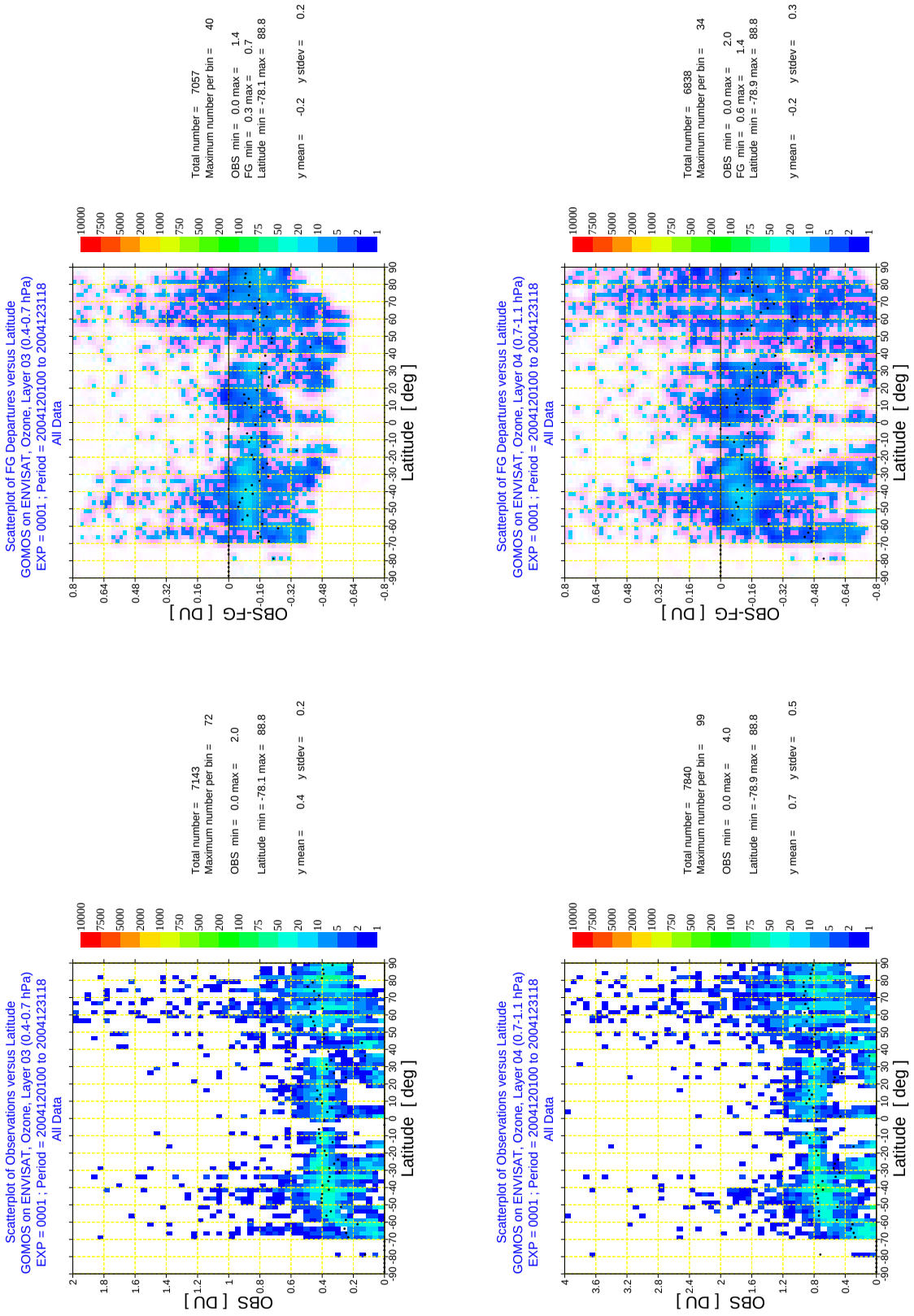

Fig. 10. As Fig. 9 but for layer 3 (0.4-0.7 hPa) and layer 4 (0.7-1.1 hPa).

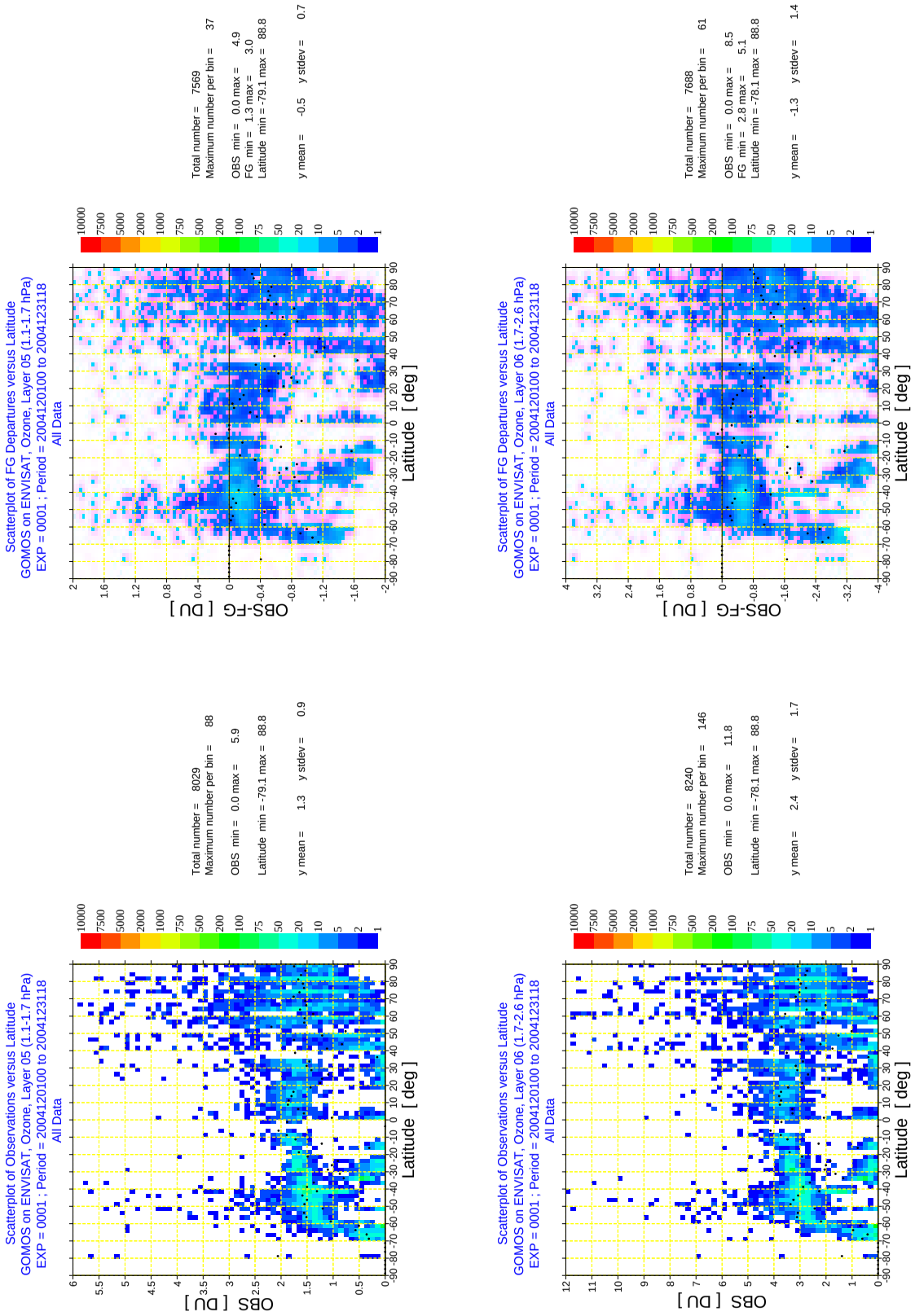

Fig. 11. As Fig. 9 but for layer 5 (1.1-1.7 hPa) and layer 6 (1.7-2.6 hPa).

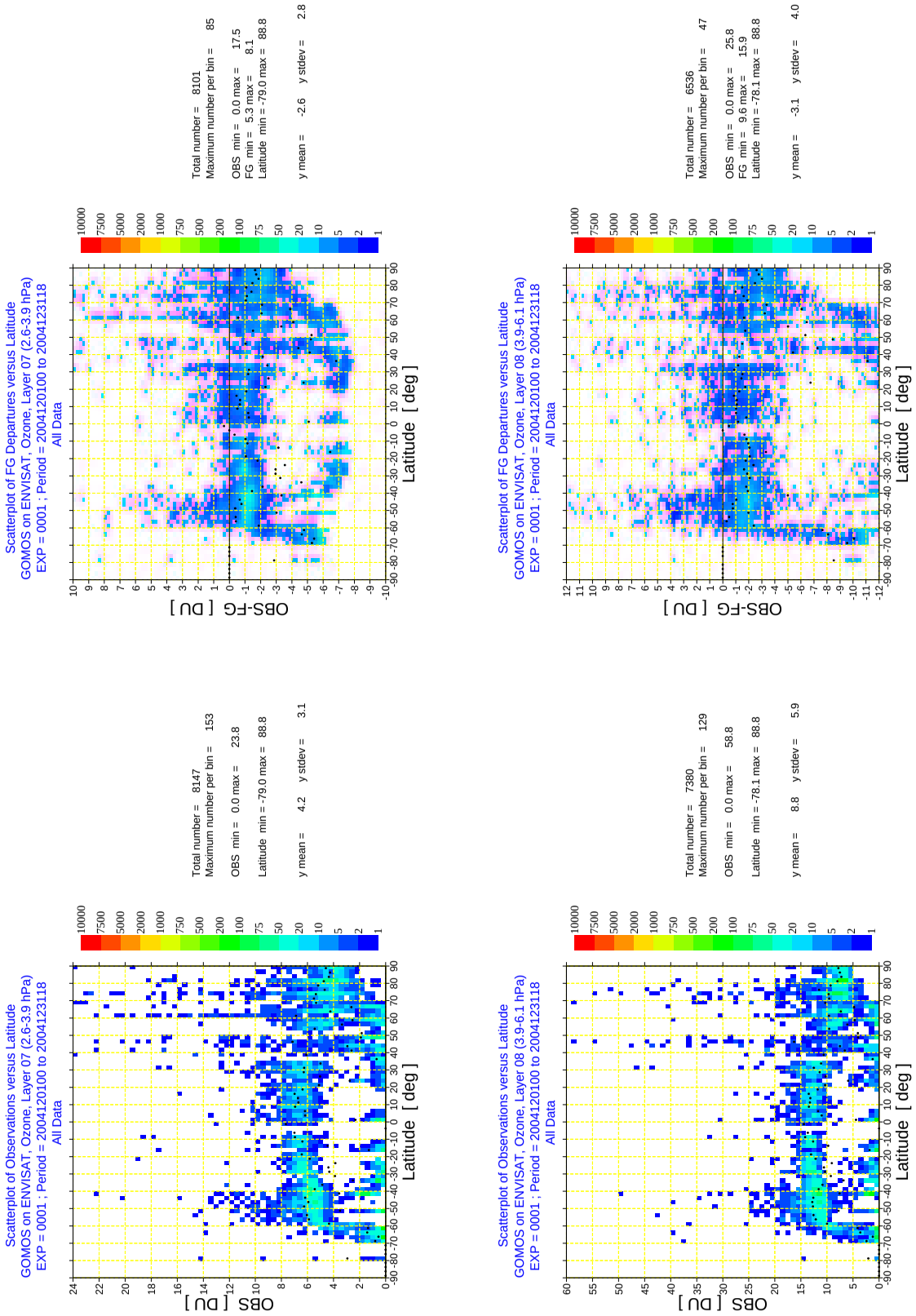

Fig. 12. As Fig. 9 but for layer 7 (2.6-3.9 hPa) and layer 8 (3.9-6.1 hPa).

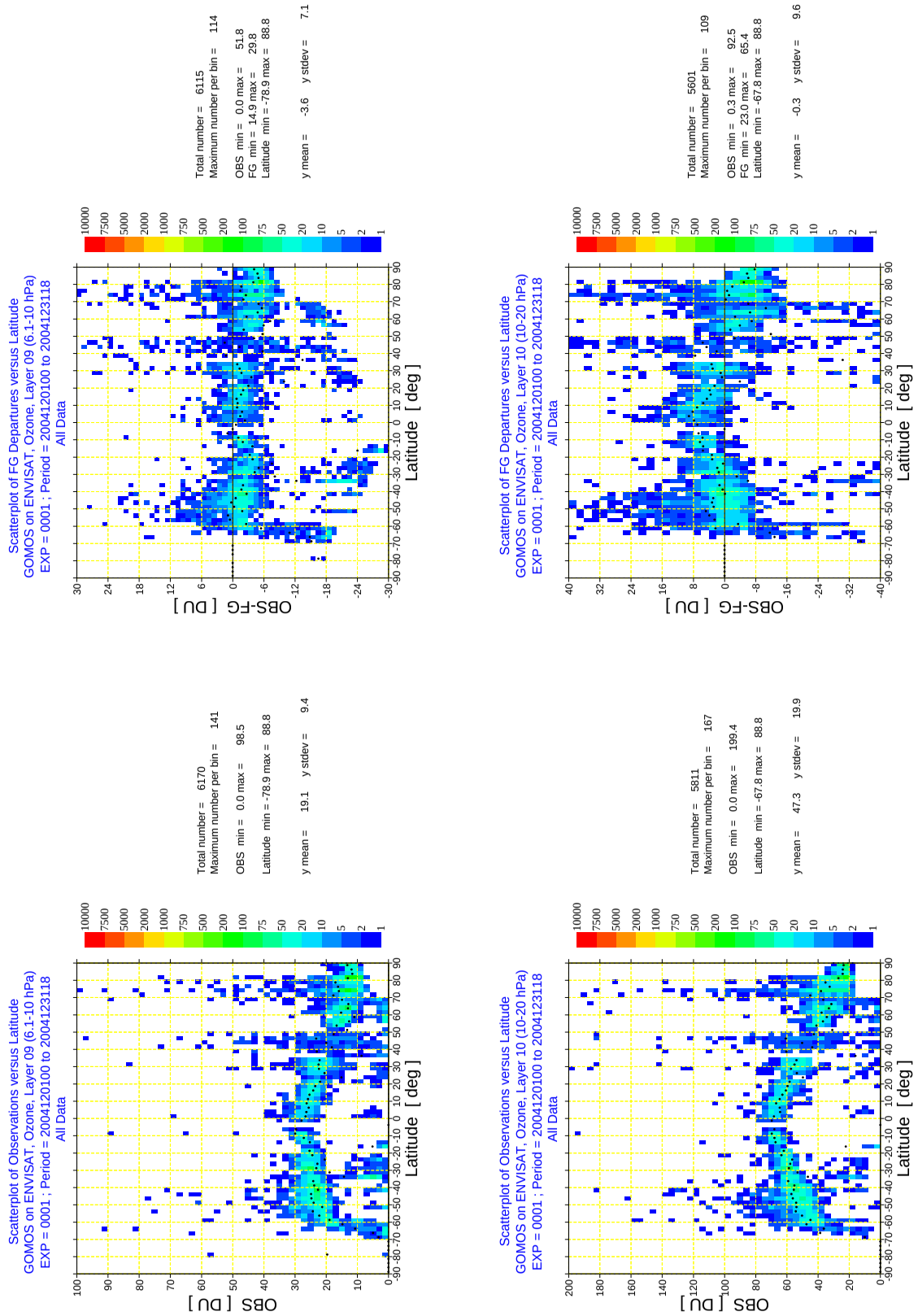

Fig. 13. As Fig. 9 but for layer 9 (6.1-10 hPa) and layer 10 (10-20 hPa).

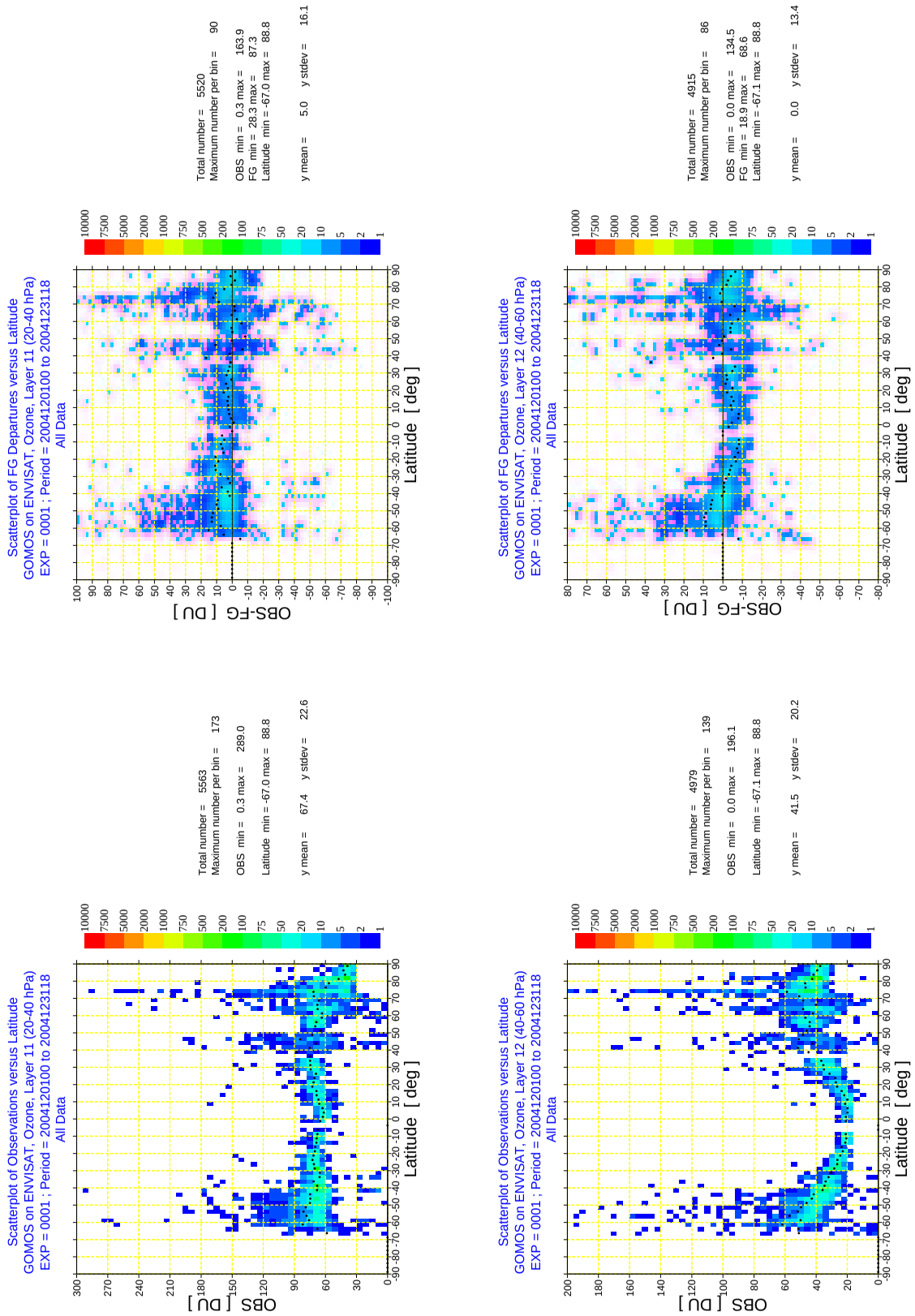

Fig. 14. As Fig. 9 but for layer 11 (20-40 hPa) and layer 12 (40-60 hPa).

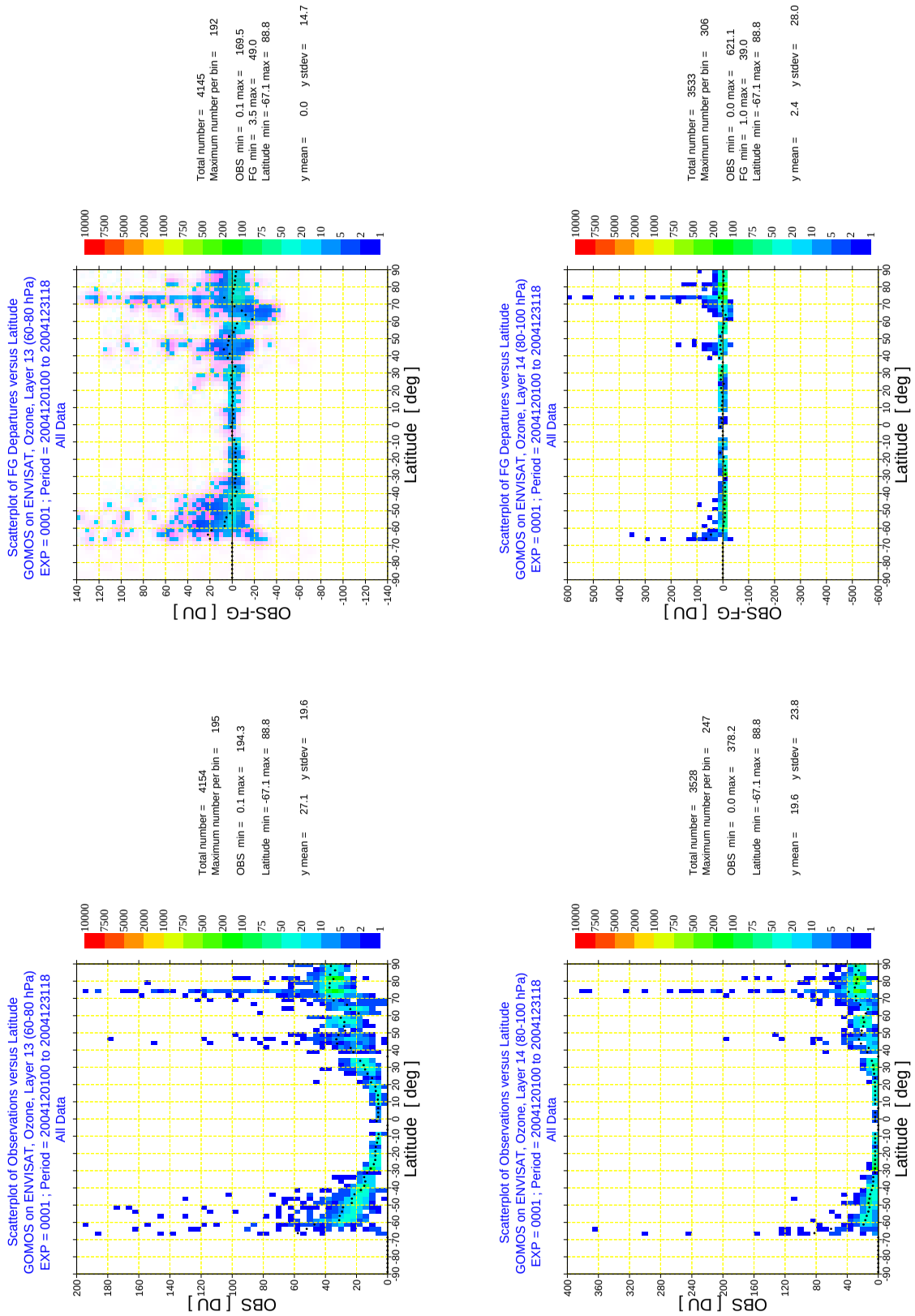

Fig. 15. As Fig. 9 but for layer 13 (60-80 hPa) and layer 14 (80-100 hPa).

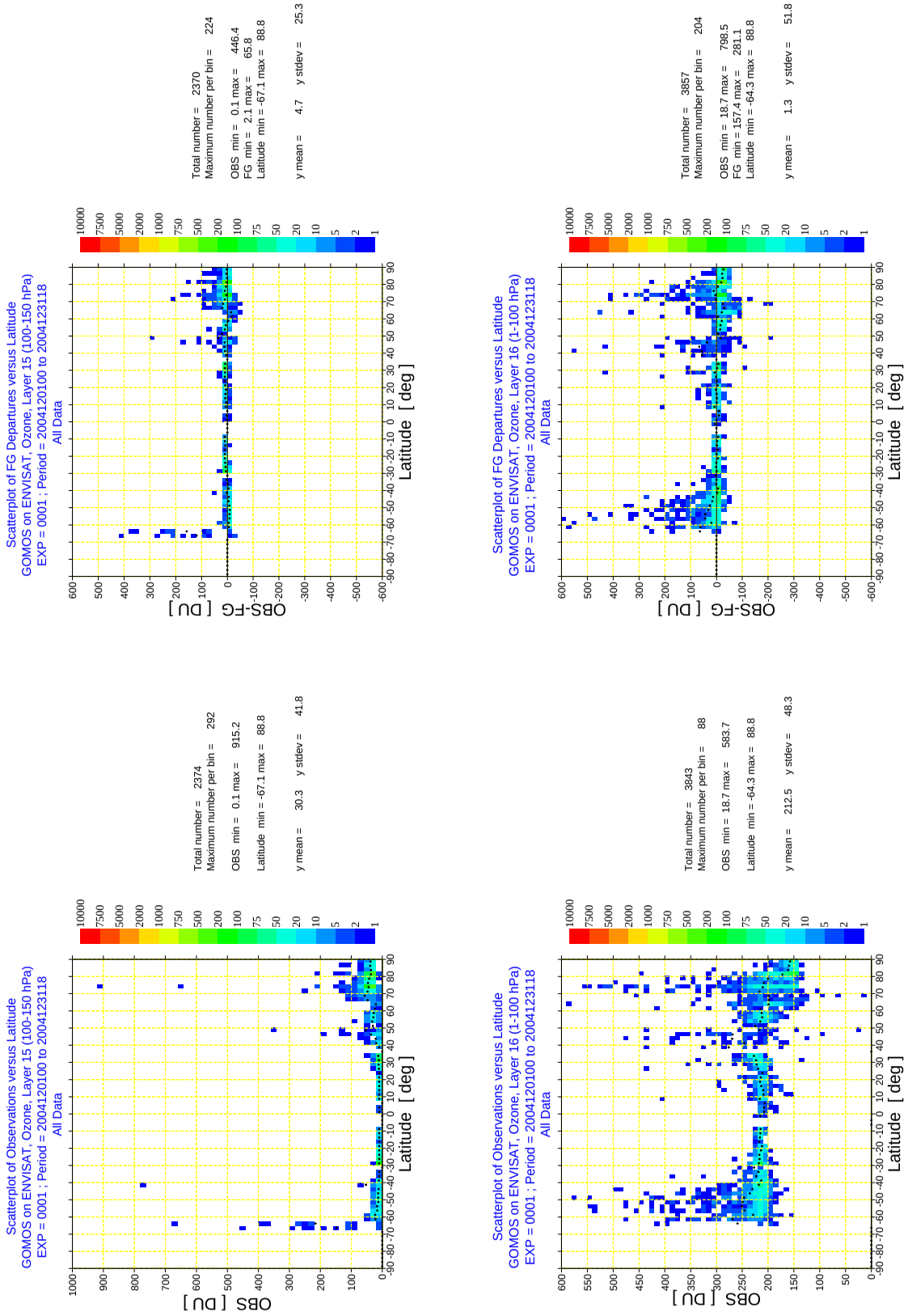

Fig. 16. As Fig. 9 but for layer 15 (100-150 hPa) and layer 16 (1-100 hPa).

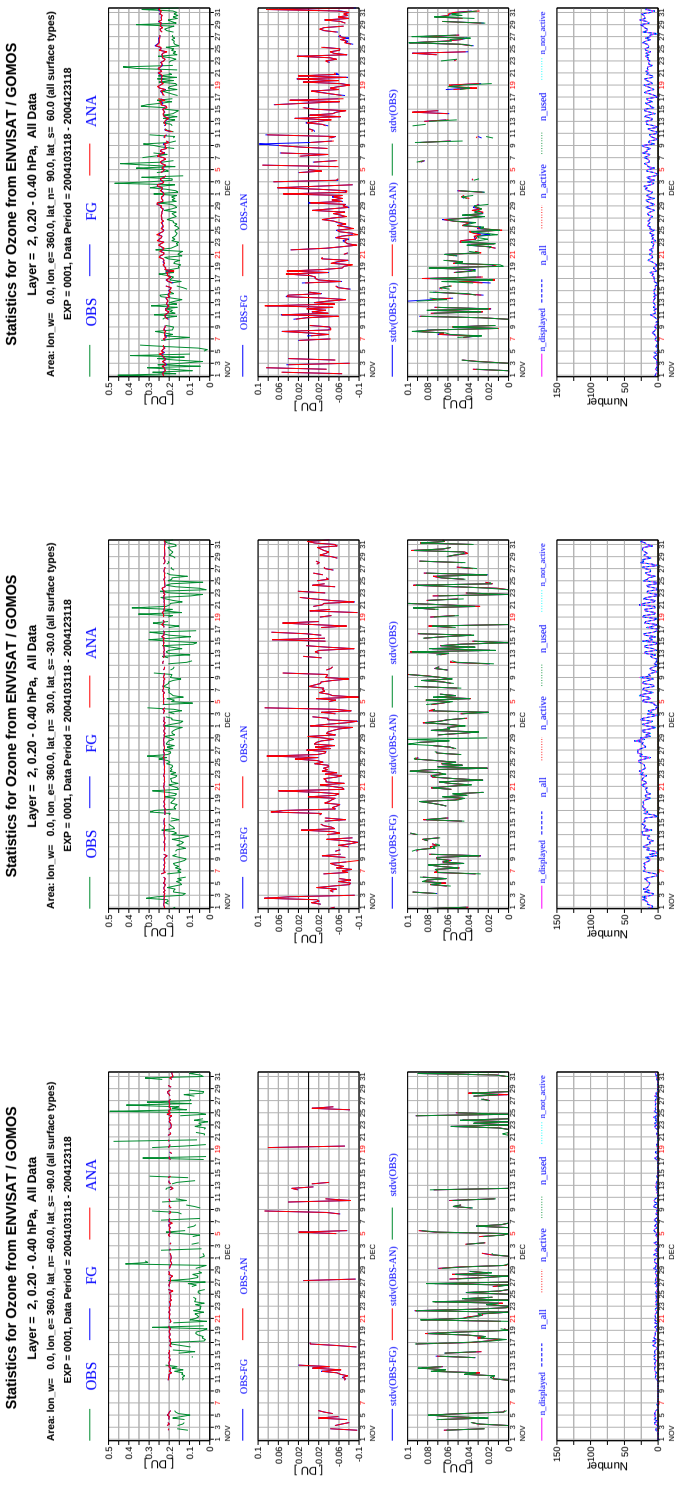

Fig. 17. Timeseries of mean ENVISAT GOMOS NRT ozone data, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for layer 2 (0.2-0.4 hPa) 90-60N, 30N-30S, 60-90S for November and December 2004.

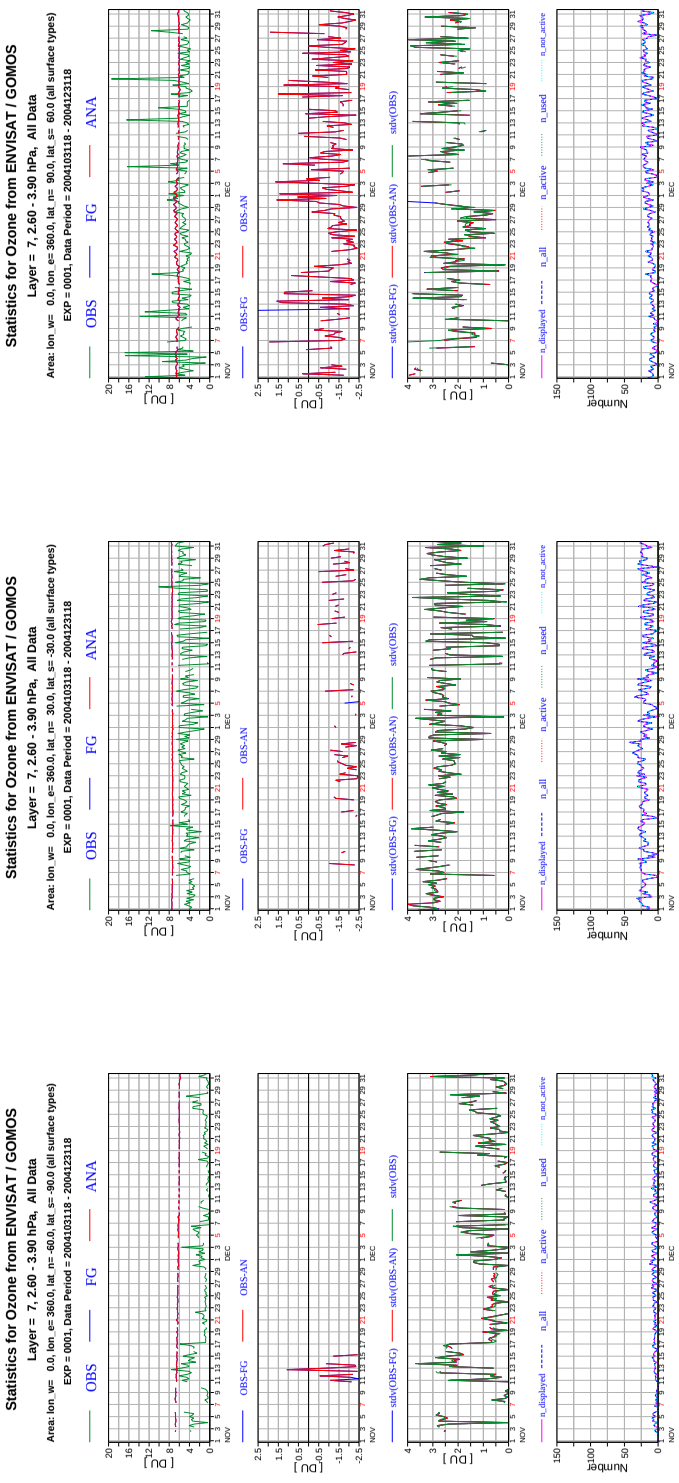

Fig. 18. As Figure 17, but for layer 7 (2.6-3.9 hPa).

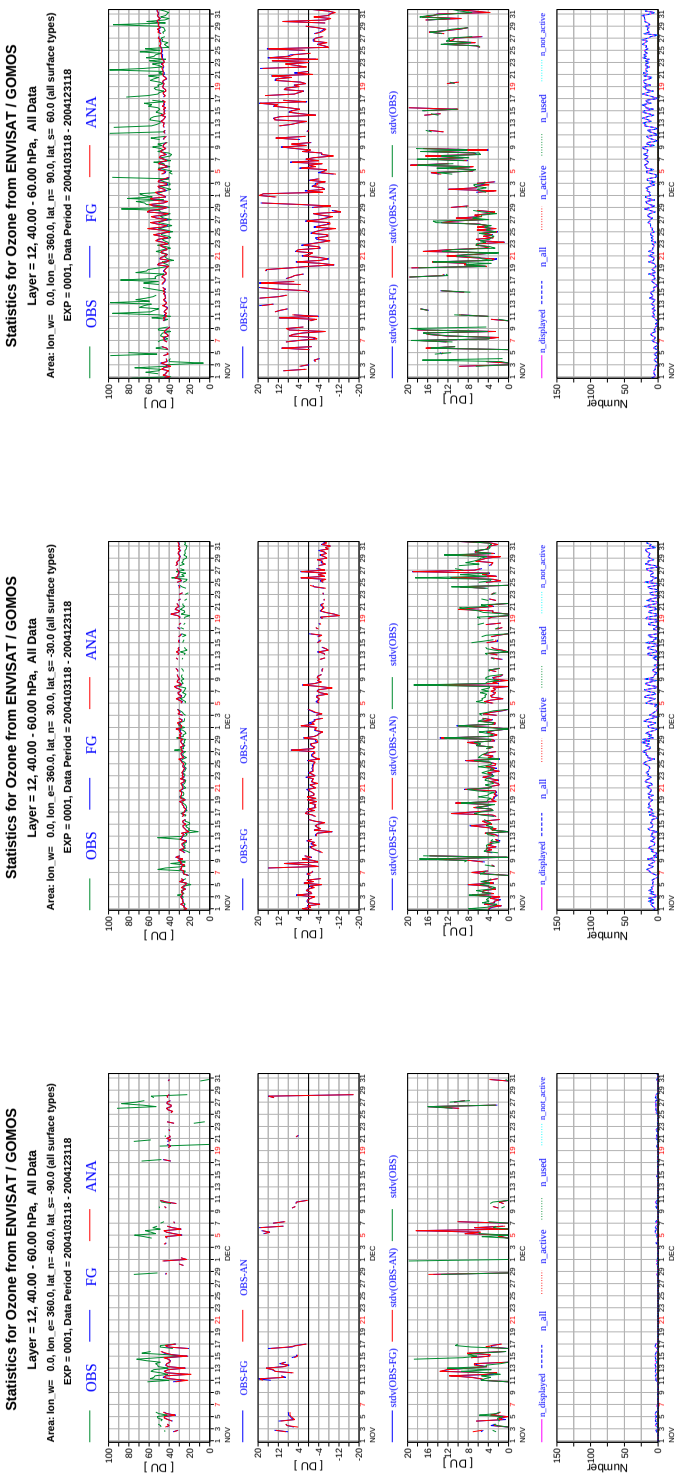

Fig. 19. As Figure 17, but for layer 12 (40-80 hPa).

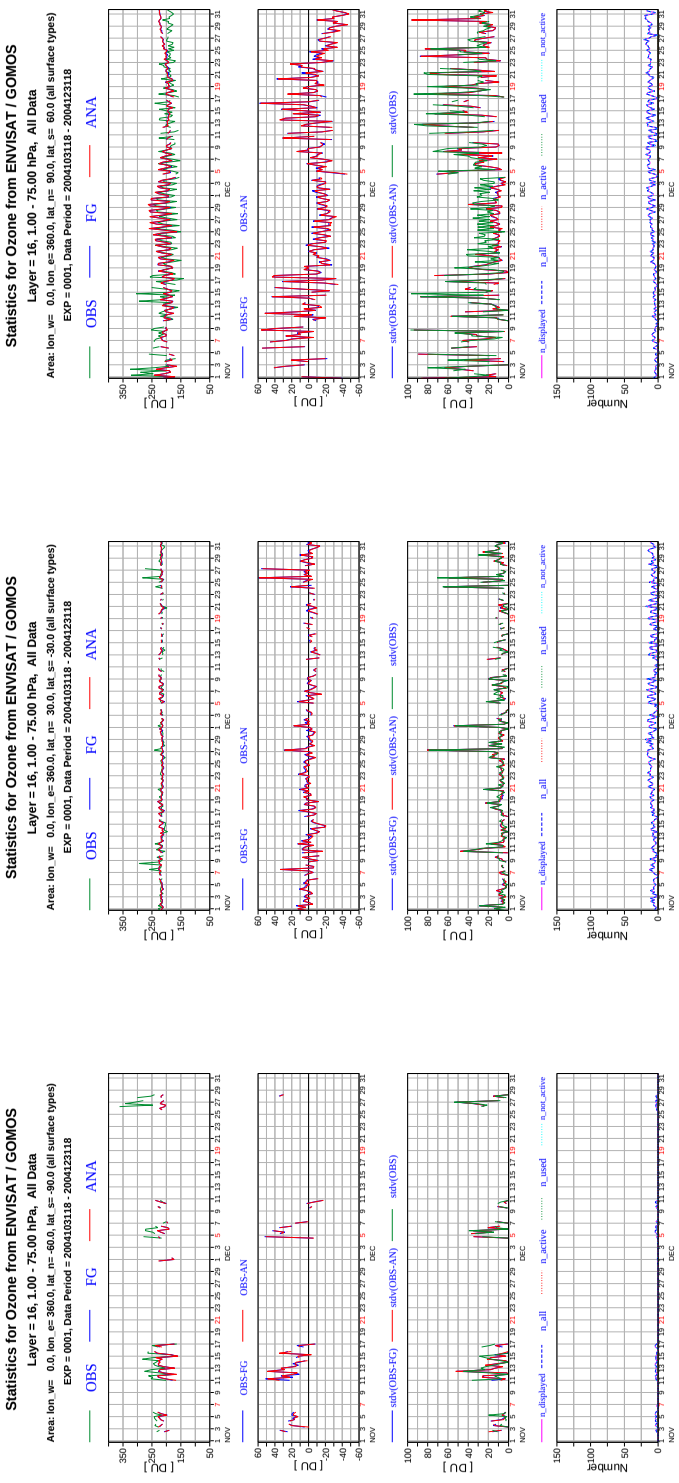

Fig. 20. As Figure 17, but for layer 16 (1-100 hPa).