

REPORT ABOUT ENVISAT GOMOS NRT DATA (GOM_RR_2P) FOR OCTOBER 2005

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November 9, 2005

1. Key points for October 2005

- Overall good agreement between GOMOS and ECMWF temperatures
- GOMOS temperatures are lower than ECMWF temperatures in most of the stratosphere and lower mesosphere, but mean departures are less than -2 K in the global mean. Larger departures are found in the mesosphere in particular above 0.2 hPa
- Large differences between GOMOS and ECMWF ozone values (over 50% in places)
- Large scatter of GOMOS ozone data
- Unrealistically low and high GOMOS ozone values
- No GOMOS BUFR files available on ESA's servers since 24 October
- No water vapour data in NRT GOMOS BUFR files
- The monitoring statistics were produced with the operational ECMWF model, CY29R2

2. Amount of received data

This report covers ENVISAT GOMOS NRT data for October 2005.

As GOMOS instrument has been operating in reduced mode (2 orbits per sequence, occultation range from 130km to 5 km and reduced IFOV azimuth from -5° to $+15^{\circ}/20^{\circ}$) the amount of available data is below the nominal amount. This month it is about 35% of the nominal figure.

As normally, the largest number of observations is in the mesosphere and upper stratosphere, fewer observations are available in the lower stratosphere (the number of observations are shown in Figures 3 of the temperature and ozone reports). Temperature data coverage and zonal amount of received data for level 8 (3.9 hPa, upper stratosphere) are presented in Figures 1 and 2. As one can see from those Figures, the data coverage is relatively poor as there are several latitude bands with very few data, or even without any data. The data coverage is even poorer in the lower stratosphere below about 60 hPa (Figure 20 of the temperature and ozone reports).

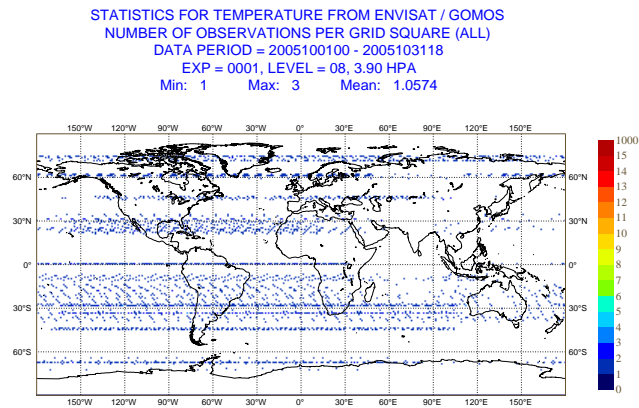


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for level 8 (3.9 hPa) for October 2005

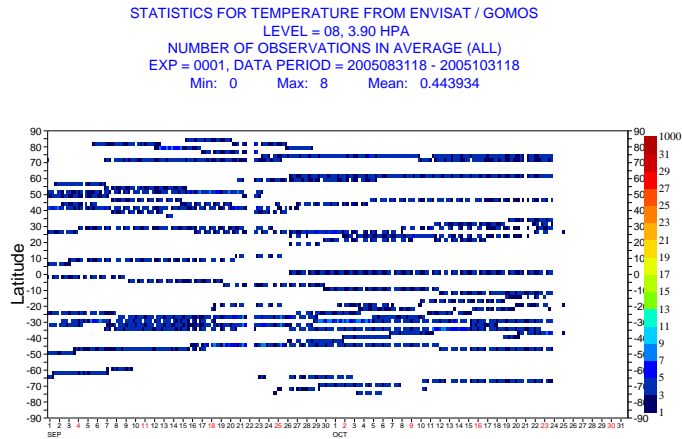


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for level 8 (3.9 hPa) for October 2005.

3. GOMOS temperature data

The temperature profile plots (temperature report: Figures 3-8) show that over most of the stratosphere and in the lower mesosphere the area averaged GOMOS temperatures are lower than ECMWF values, with mean relative departures less than -1% (-2 K) in the global mean. Larger departures are seen in the mesosphere above 0.2 hPa and the largest are found at the model top in particular in the northern mid-latitudes (up to 4.2%, 9 K, Fig. 5).

The largest standard deviations of the mean departures are seen at the model top as well, particularly at the high latitudes (Fig. 4 and 8).

The scatter plots (temperature report: Figures 9-16) show the behaviour of the GOMOS temperatures and the first-guess departures on selected levels more clearly. One can also see the data gap at several latitude bands. The geo plots (temperature report: Figures 19-20) also exhibit the poor data coverage which is more pronounced in the lower stratosphere below 60 hPa.

The zonal mean timeseries (temperature report: Figures 17-18) of GOMOS temperatures and departures and the area averaged timeseries (temperature report: Figures 21-24) are shown in Figures 17-18 and 21-24 of the temperature report, respectively.

4. GOMOS ozone data

The ozone profile plots (ozone report: Figures 3-8) show that there are large differences between ozone GOMOS data and ECMWF analysis (over 50% in places). In the global mean the largest relative mean departures (over 50%) are found in the in the mesosphere (Fig. 3). Standard deviations of the departures and of 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 (about 0 DU) and high (e.g. 280 DU in the layer 20-40 hPa) GOMOS ozone values.

Plots of timeseries (ozone report: Figures 17-19) show again a the large noise of the GOMOS ozone 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 (CY29R2). In CY29R2 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) and temperatures in K.

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 OZONE DATA (GOM_RR_2P) FOR OCTOBER 2005

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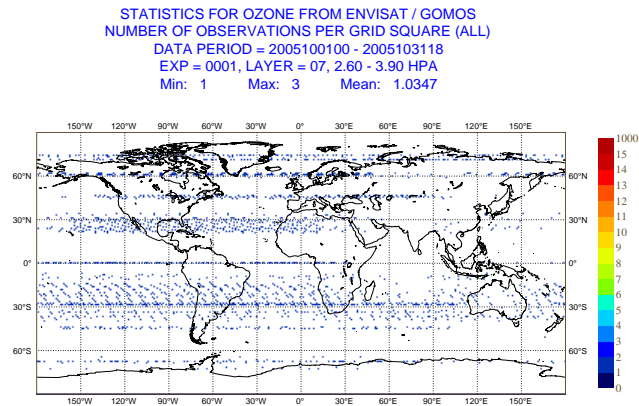


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT ozone data for layer 7 (2.60-3.90 hPa) for October 2005.

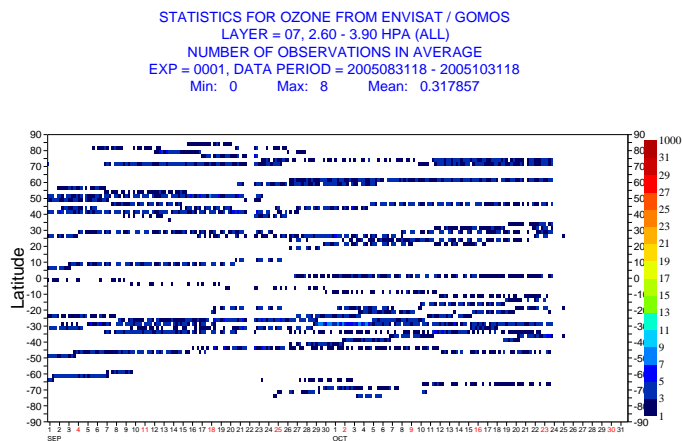


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT ozone data per 6-hour cycle for layer 7 (2.60-3.90 hPa) for September and October 2005.

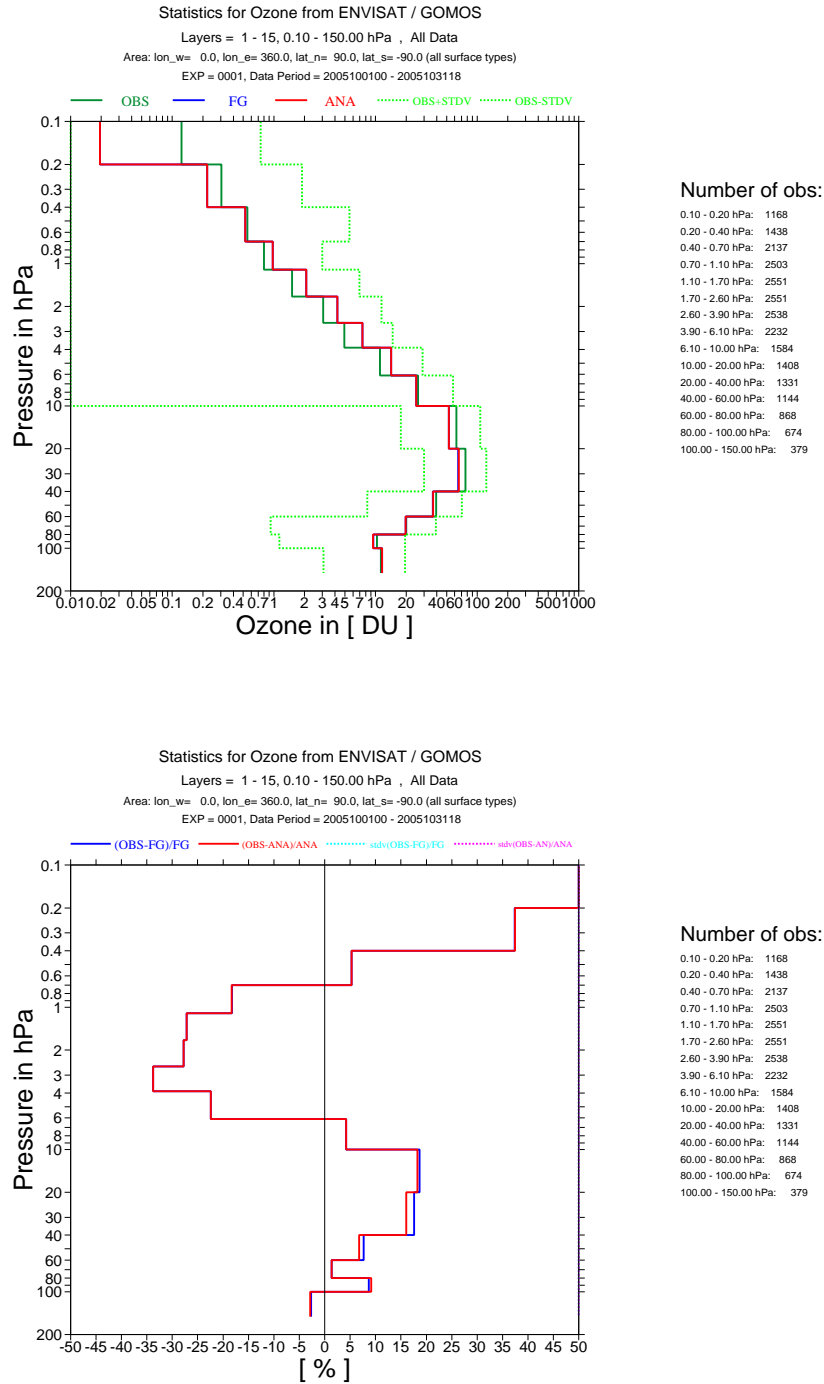


Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT ozone data in DU for October 2005 (global mean). The top plot shows the mean analysis values (red), the mean first-guess (blue), the mean observation (red), and the mean observation (green) +/- 1 standard deviation (green dotted lines). The bottom plot shows the departures and the standard deviation of the departures in the partial columns for the 15 layers listed to the right of the diagrams.

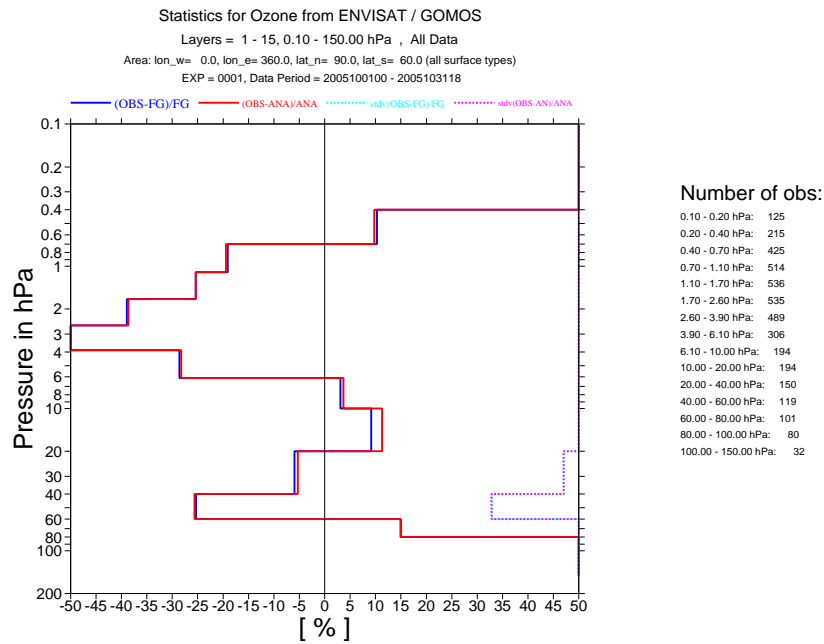
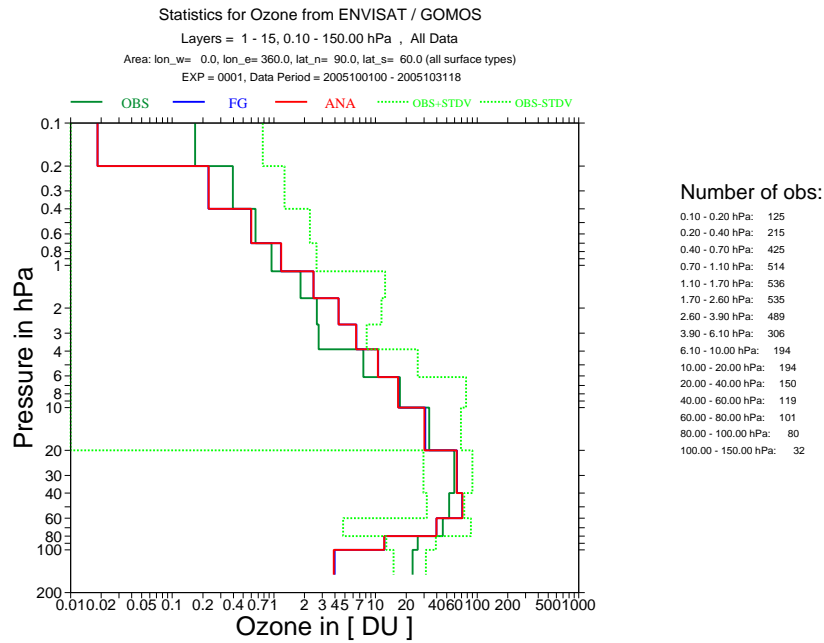


Fig. 4. As Fig. 3 but for 90N-60N.

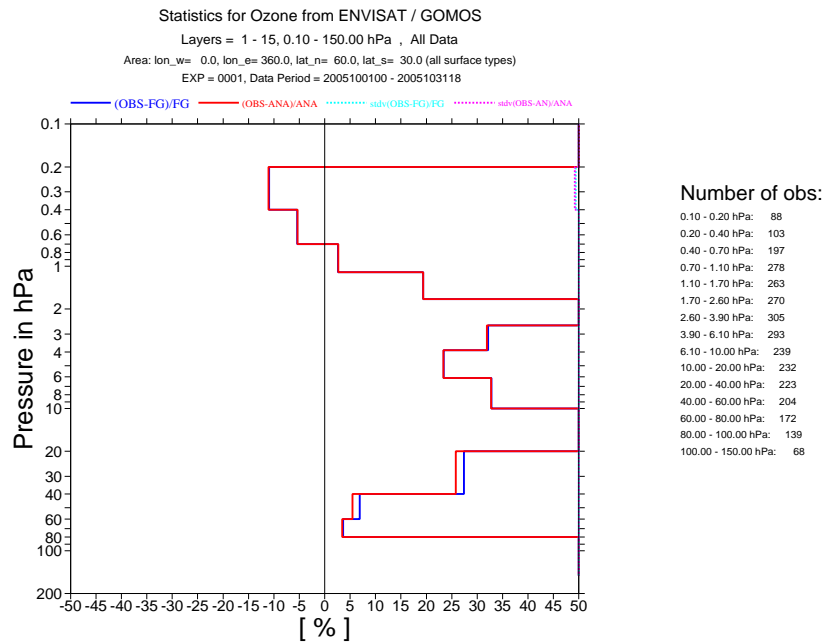
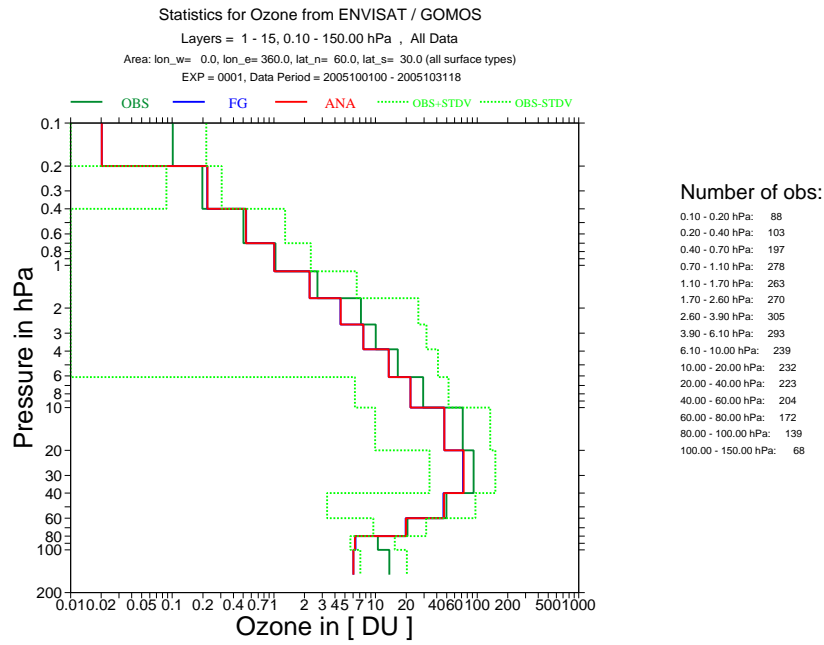


Fig. 5. As Fig. 3 but for 60-30N.

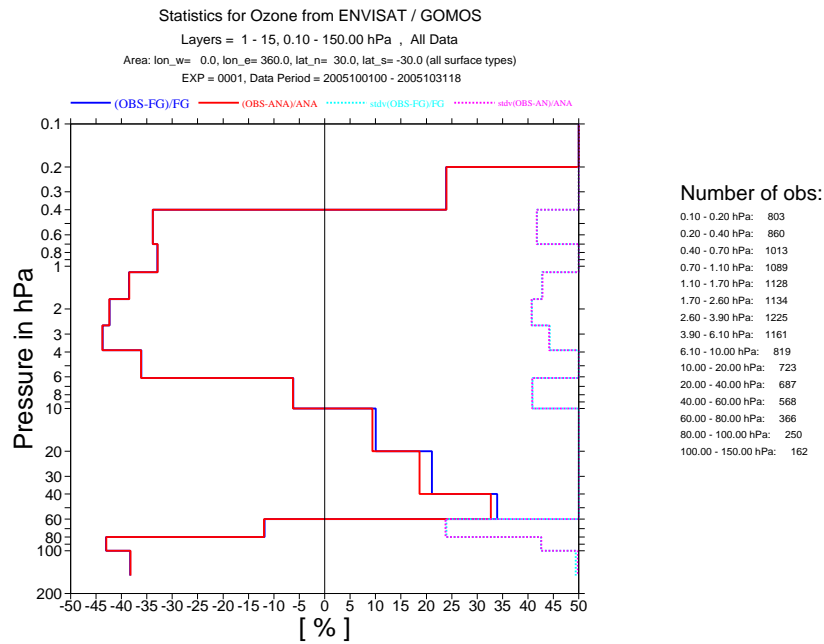
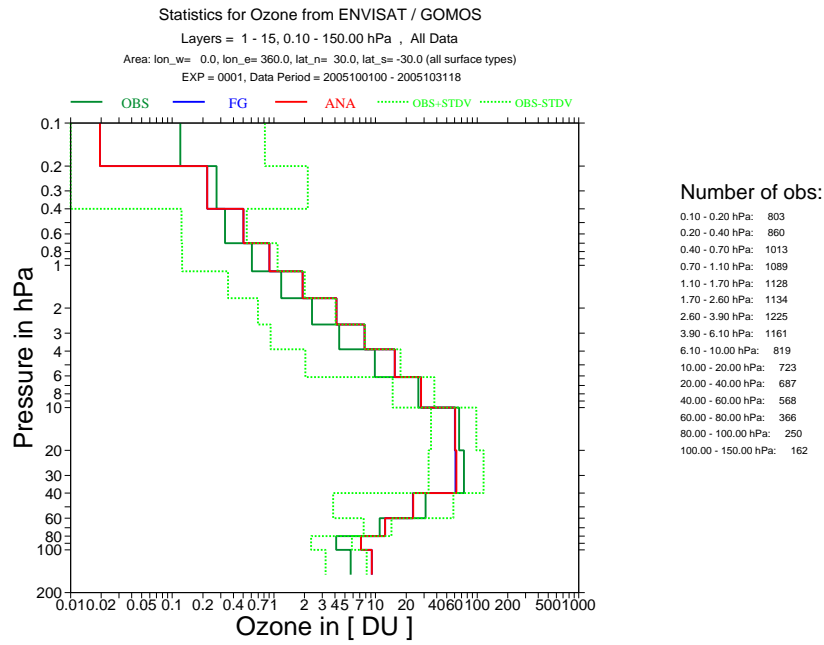


Fig. 6. As Fig. 3 but for 30N-30S.

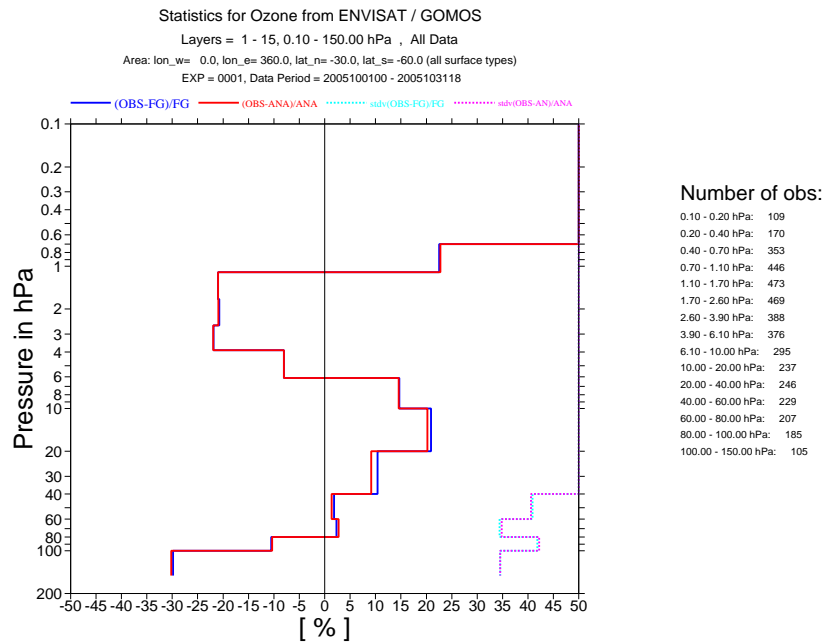
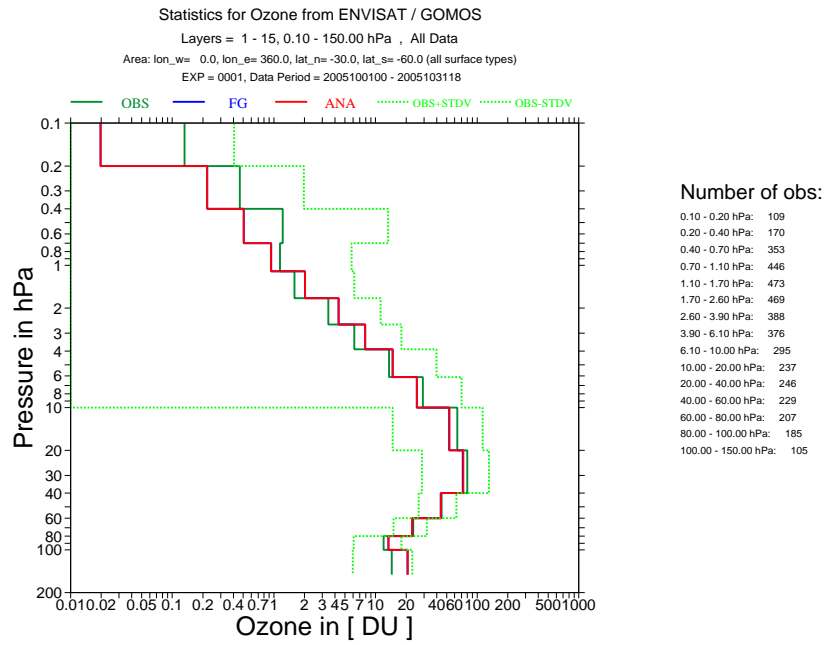


Fig. 7. As Fig. 3 but for 30S-60S.

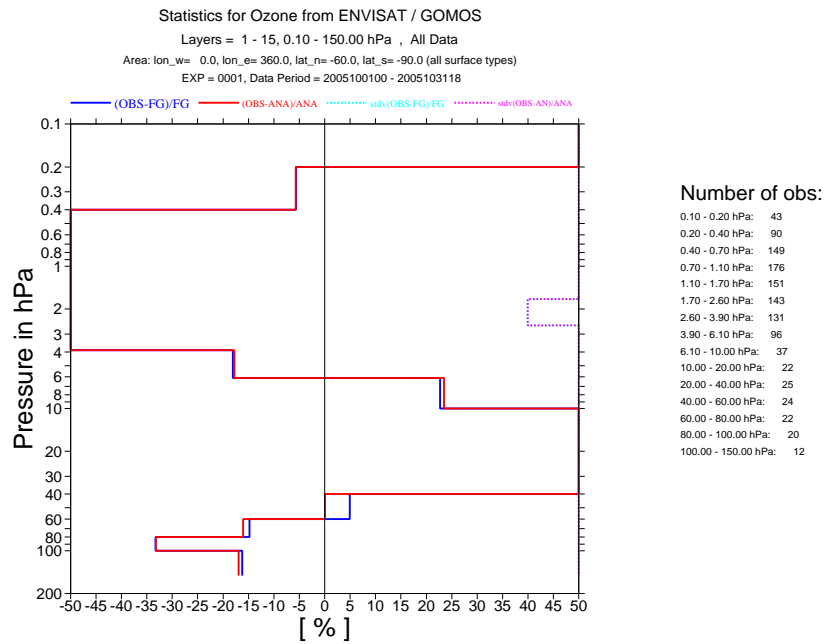
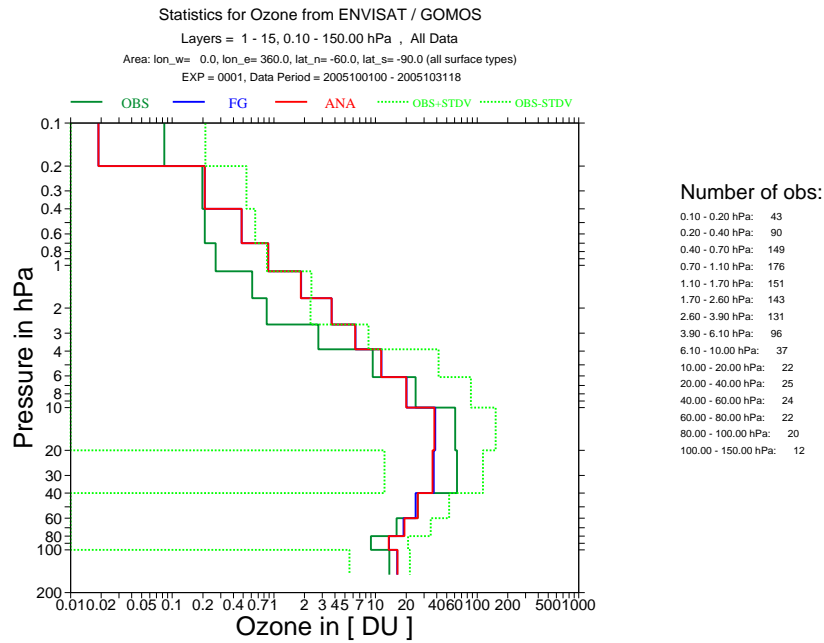


Fig. 8. As Fig. 3 but for 60-90S.

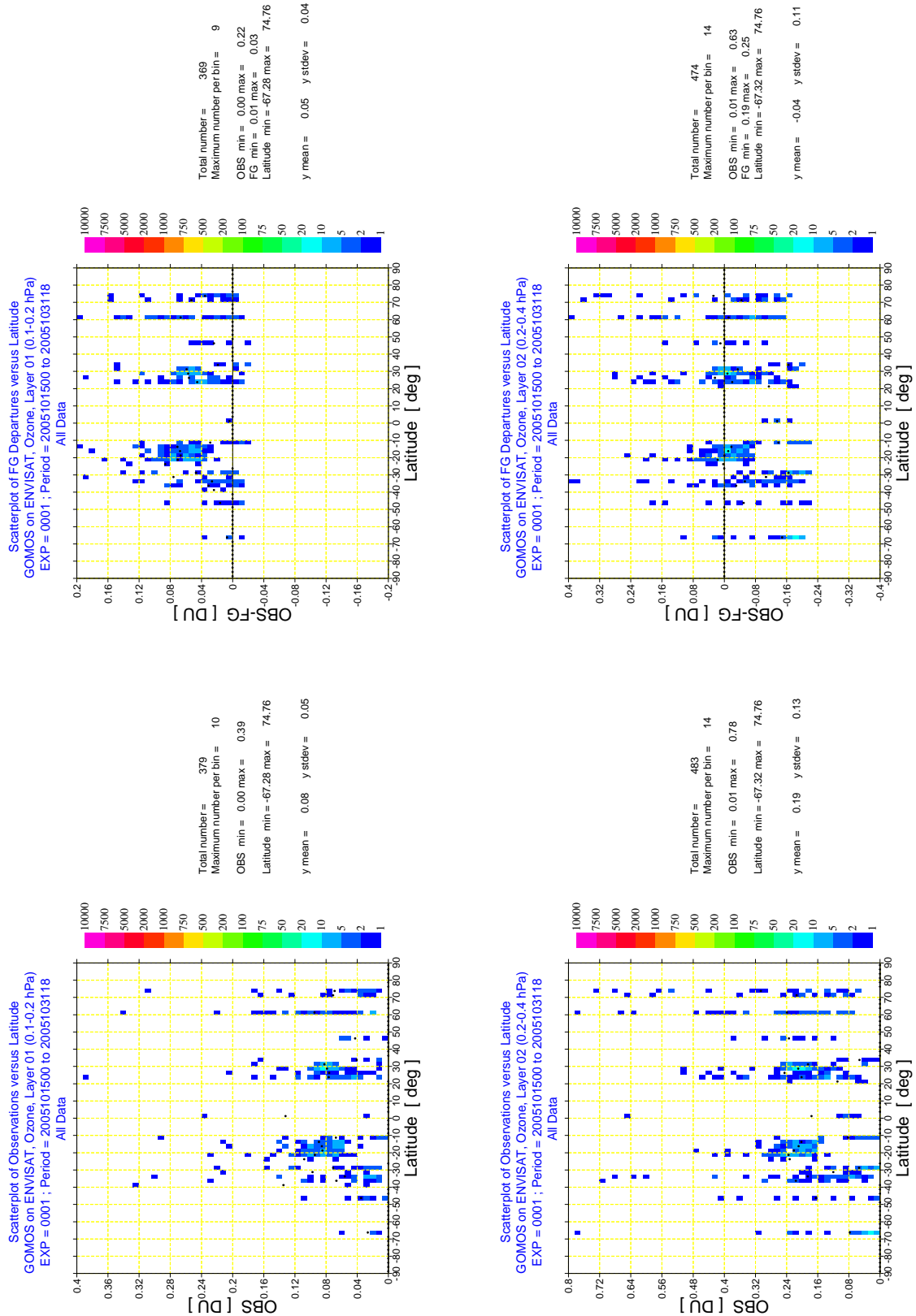


Fig. 9. Scatter plot of ENVISAT GOMOS NRT ozone data against latitude (right) and scatter plot of first-uess departures of ENVISAT GOMOS NRT ozone data against latitude (right) for October 2005 for layer 1 (0.1-0.2 hPa) and layer 2 (0.2-0.4 hPa). The colours show the number of data per bin, the black dots the mean value per bin.

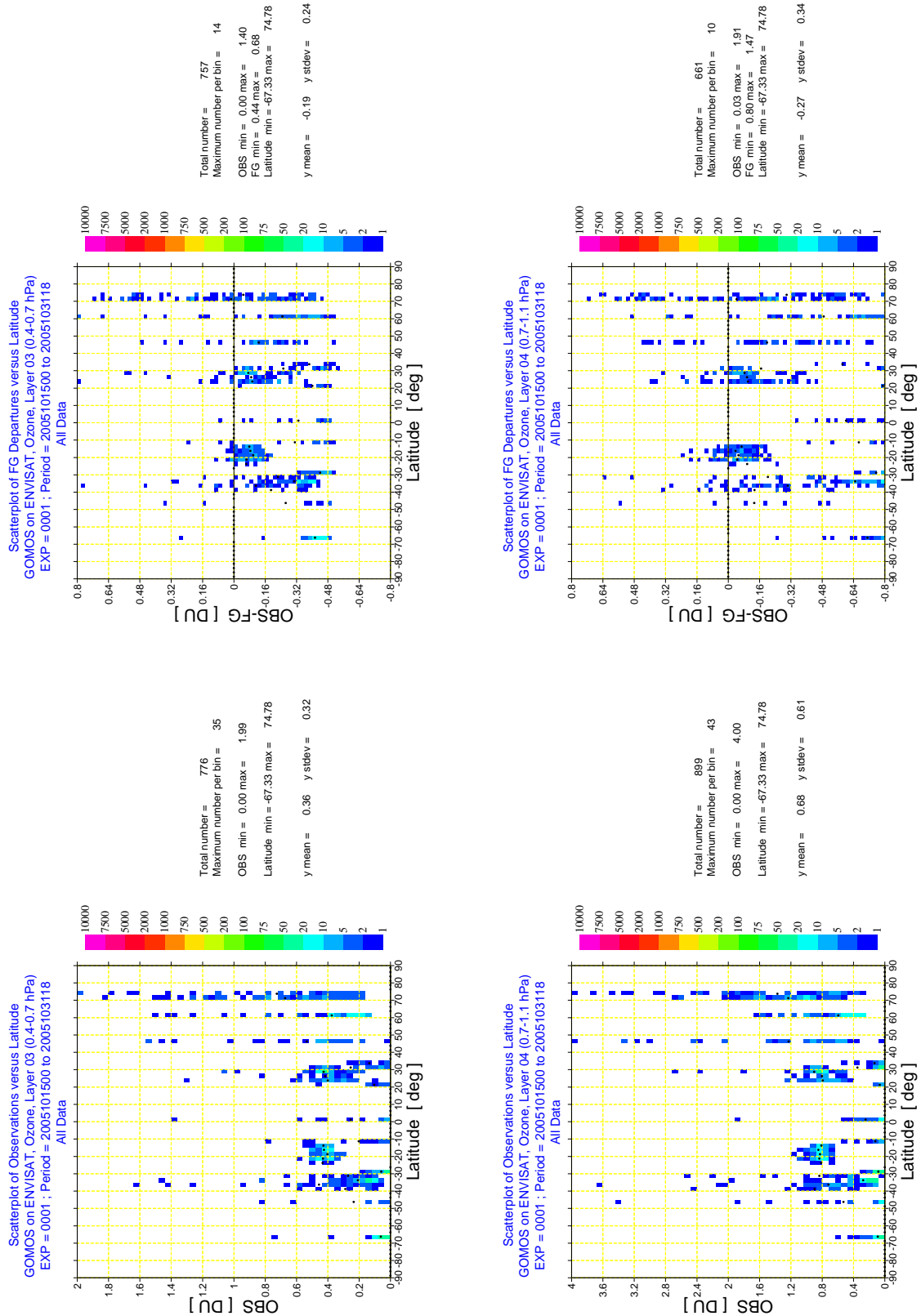


Fig. 10. As Fig. 9 but for layer 3 (0.4-0.7 hPa) and layer 4 (0.7-1.1 hPa).

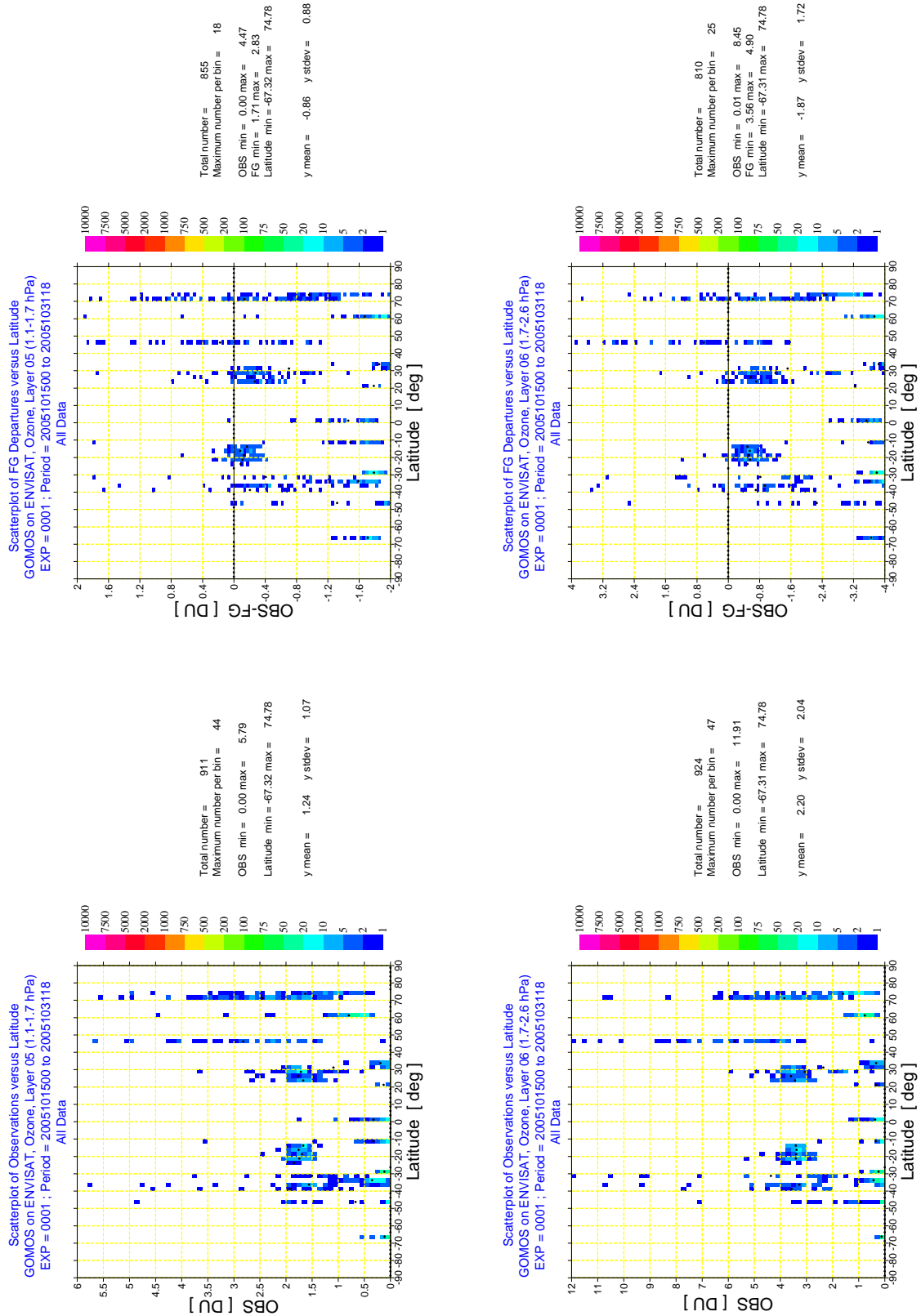


Fig. 11. As Fig. 9 but for layer 5 (1.1-1.7 hPa) and layer 6 (1.7-2.6 hPa).

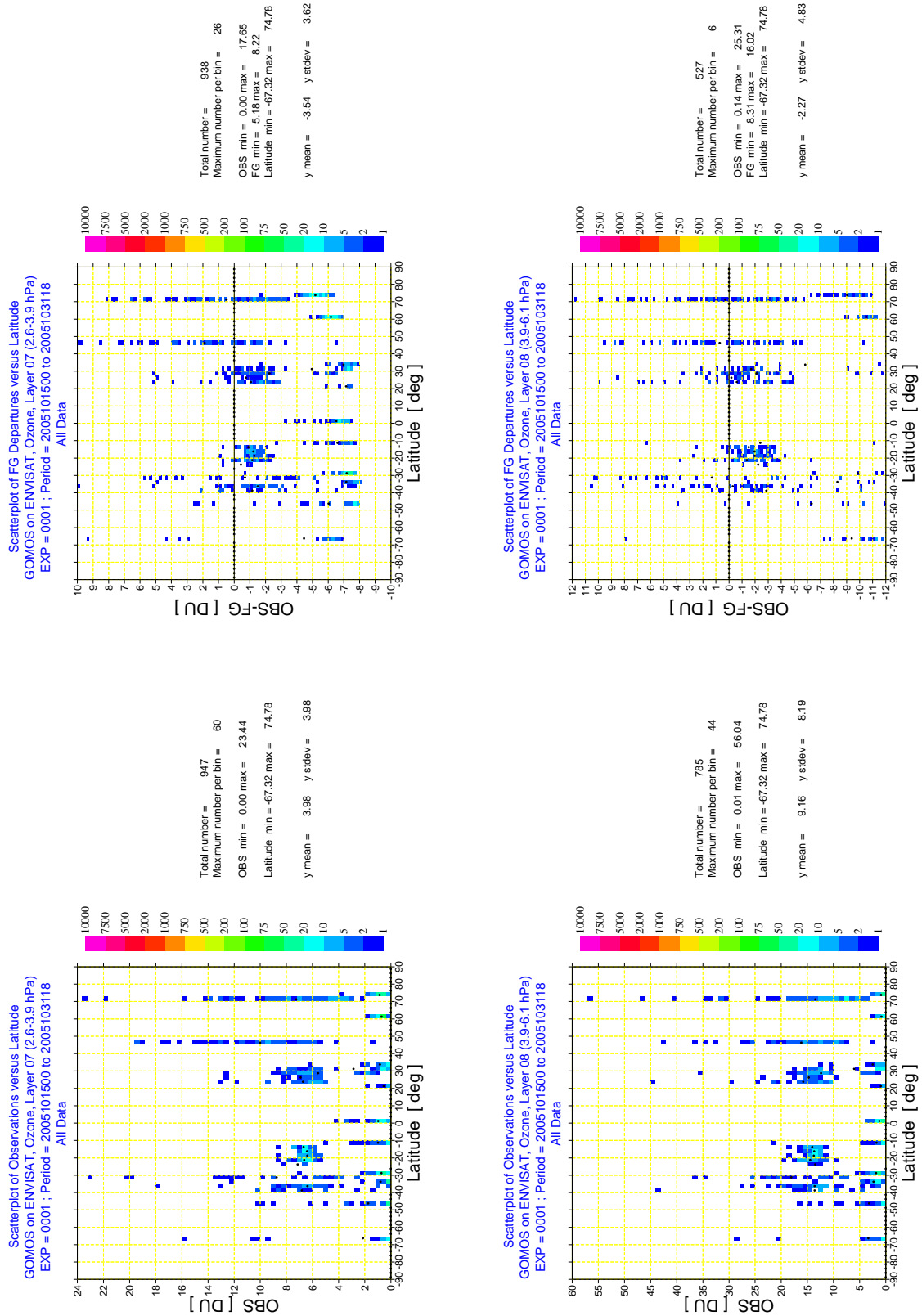


Fig. 12. As Fig. 9 but for layer 7 (2.6-3.9 hPa) and layer 8 (3.9-6.1 hPa).

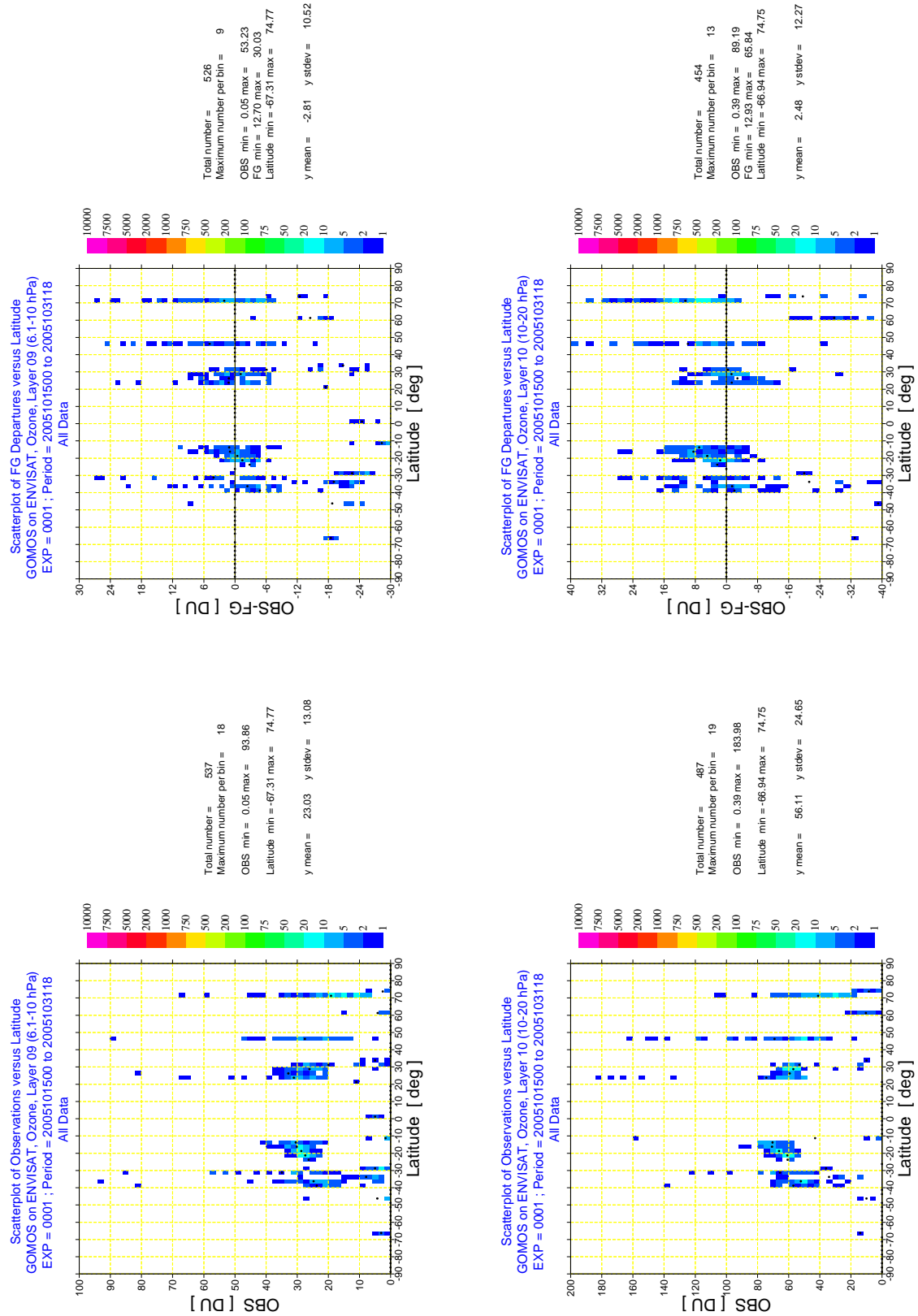


Fig. 13. As Fig. 9 but for layer 9 (6.1-10 hPa) and layer 10 (10-20 hPa).

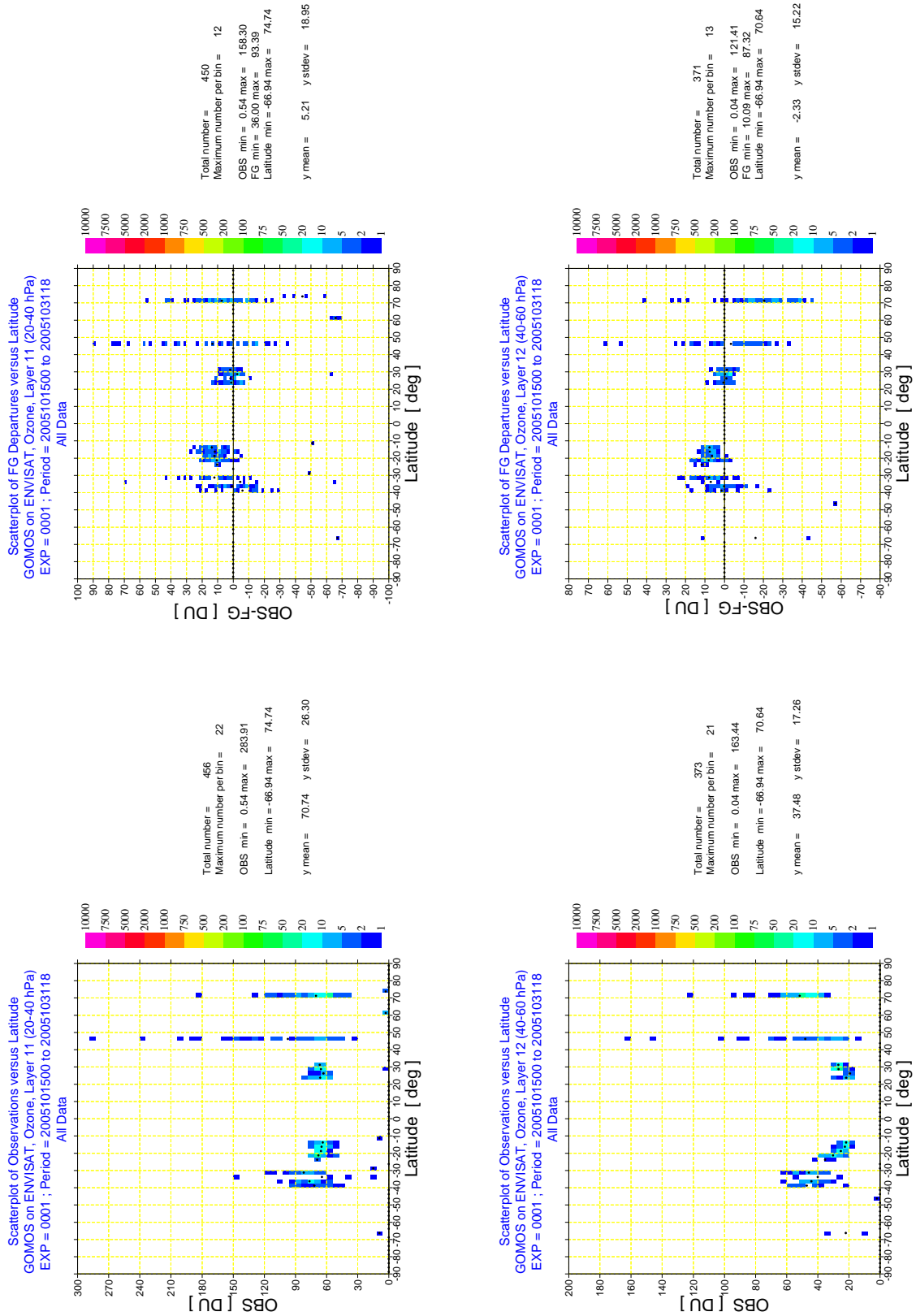


Fig. 14. As Fig. 9 but for layer 11 (20-40 hPa) and layer 12 (40-60 hPa).

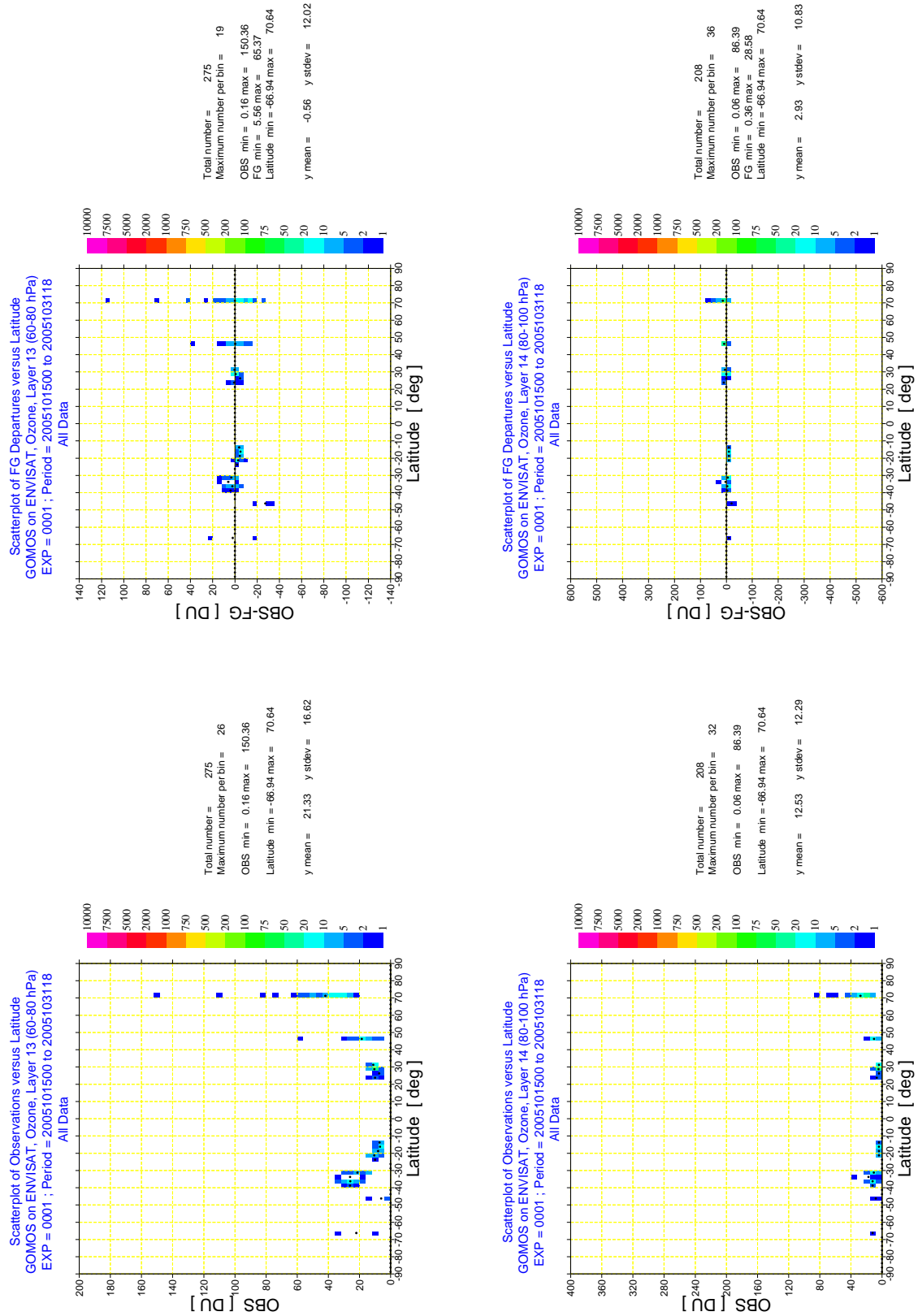


Fig. 15. As Fig. 9 but for layer 13 (60-80 hPa) and layer 14 (80-100 hPa).

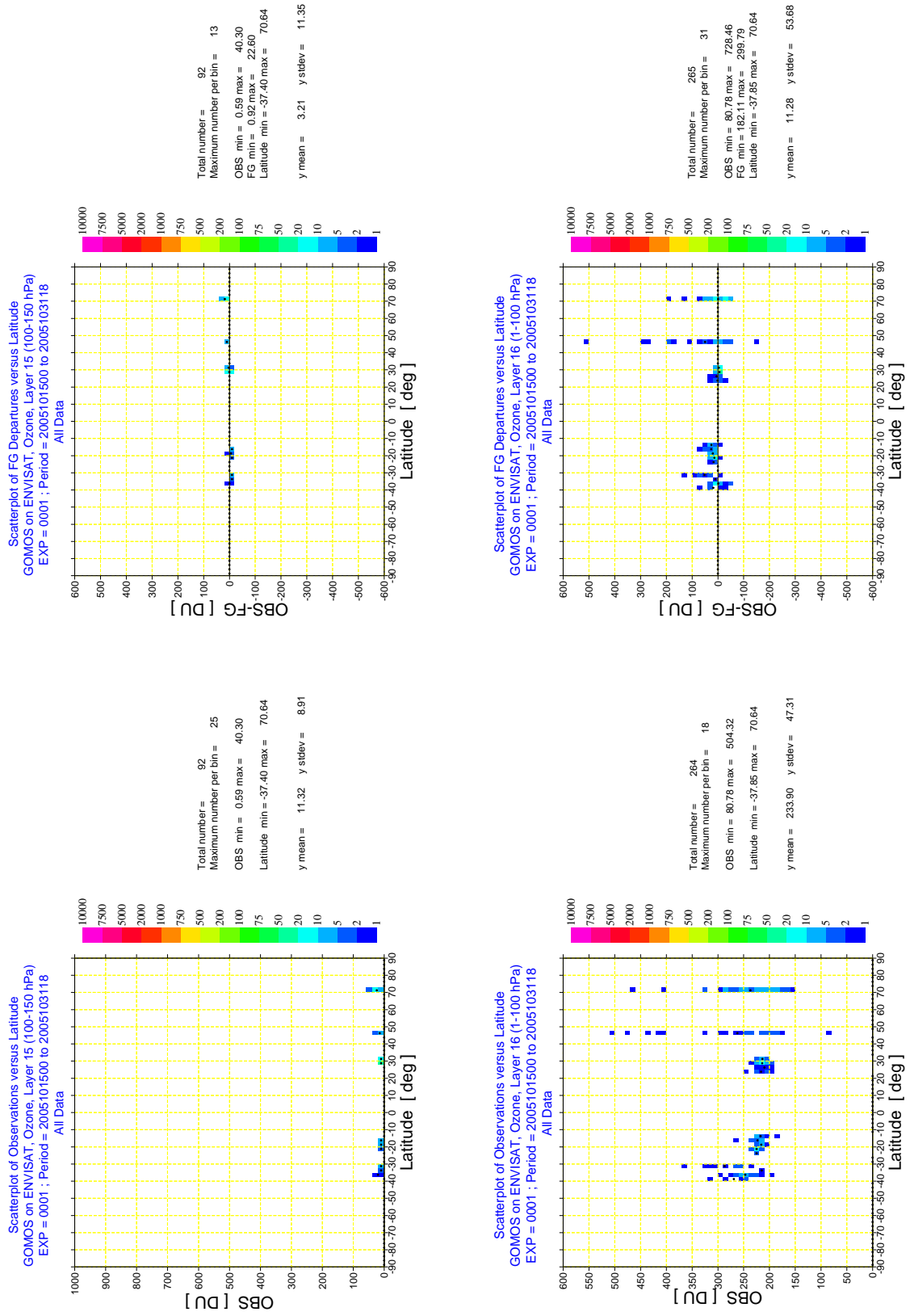


Fig. 16. As Fig. 9 but for layer 15 (100-150 hPa) and layer 16 (1-100 hPa).

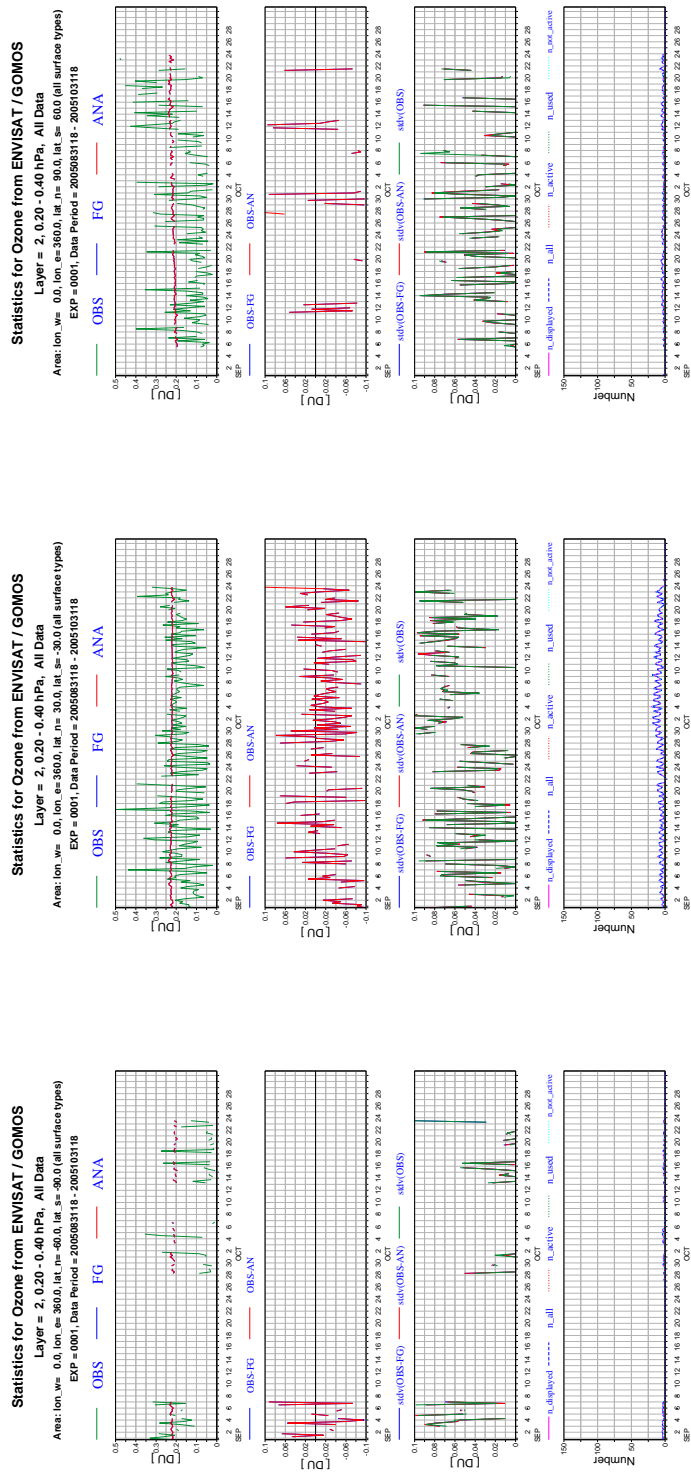


Fig. 17. Timeseries of mean ENVISAT GOMOS NRT ozone data, first guess and analysis values (top panels), first-guess and analysis departures (second panels), standard deviations (third panels) and number of data (bottom panels) per 6-hour cycle for layer 2 (0.2-0.4 hPa) 90-60N, 30N-30S, 60-90S for September and October 2005.

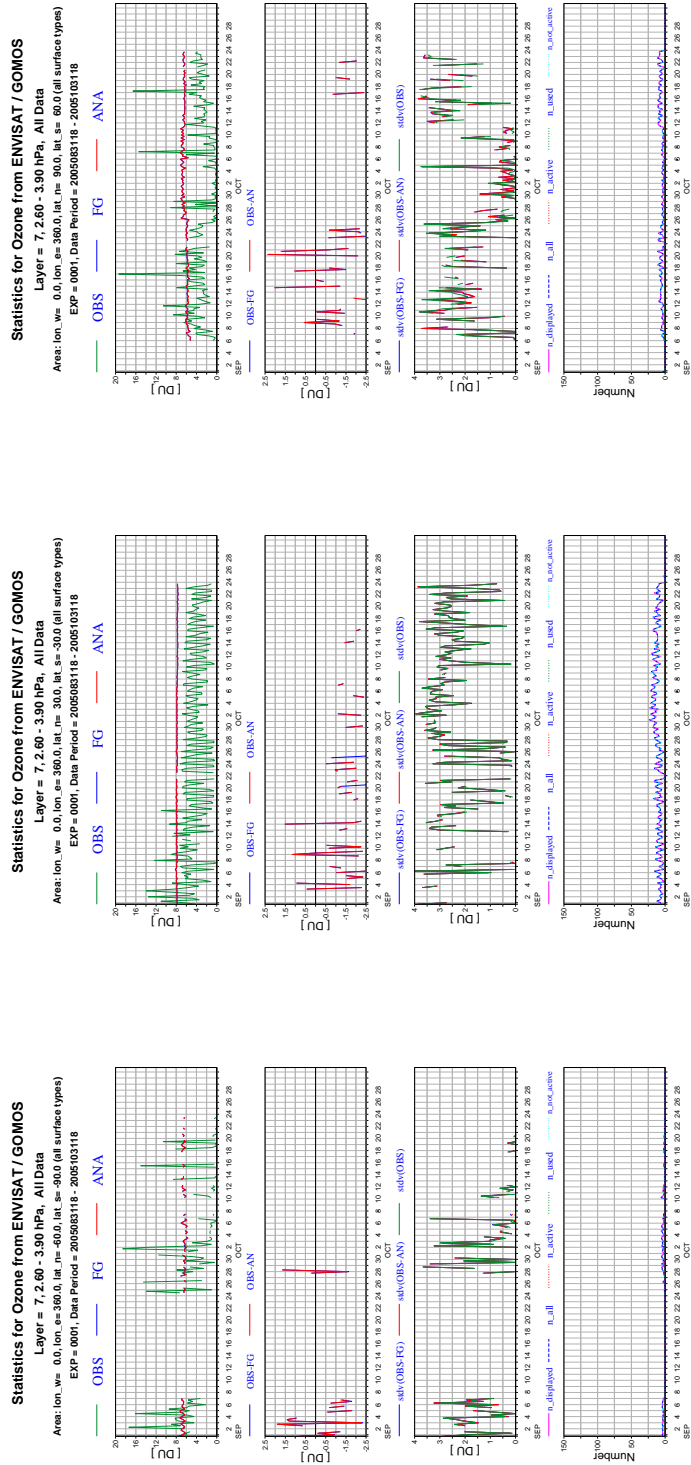


Fig. 18. As Figure 17, but for layer 7 (2.6-3.9 hPa).

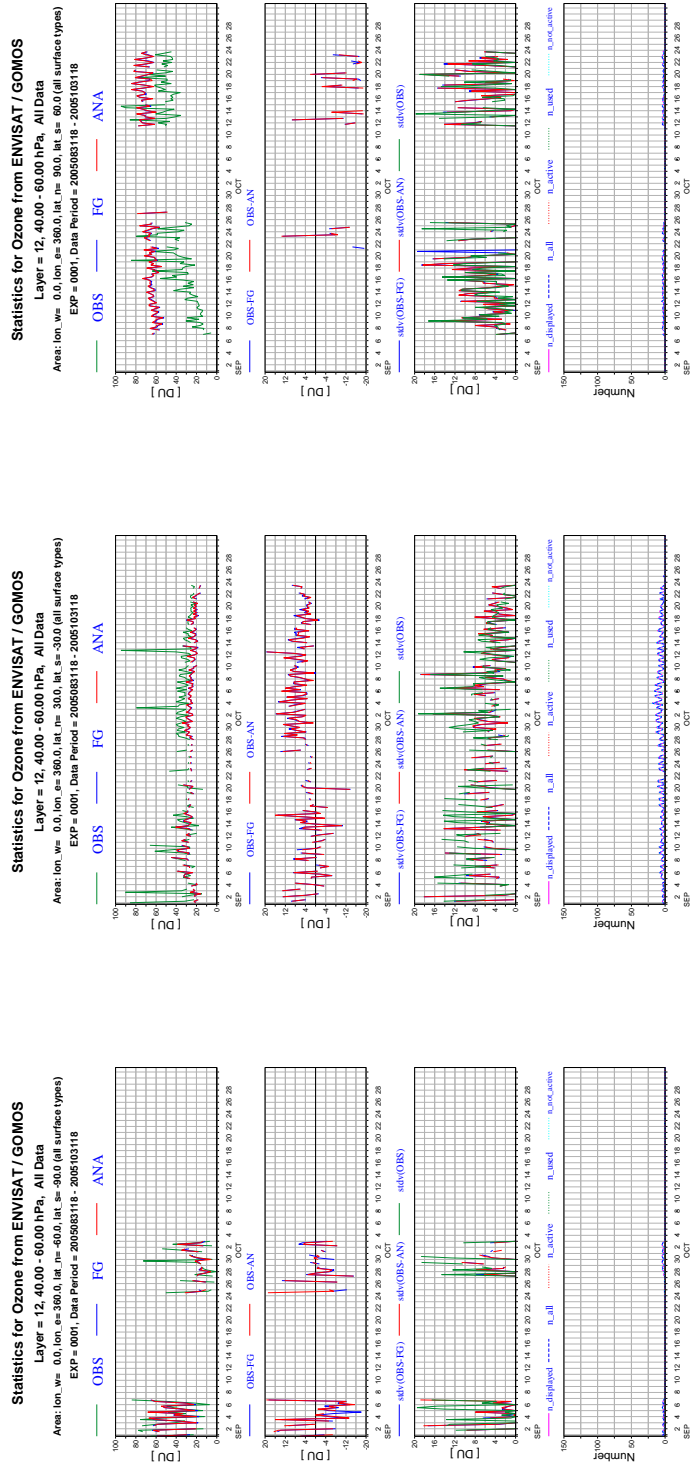


Fig. 19. As Figure 17, but for layer 12 (40-80 hPa).

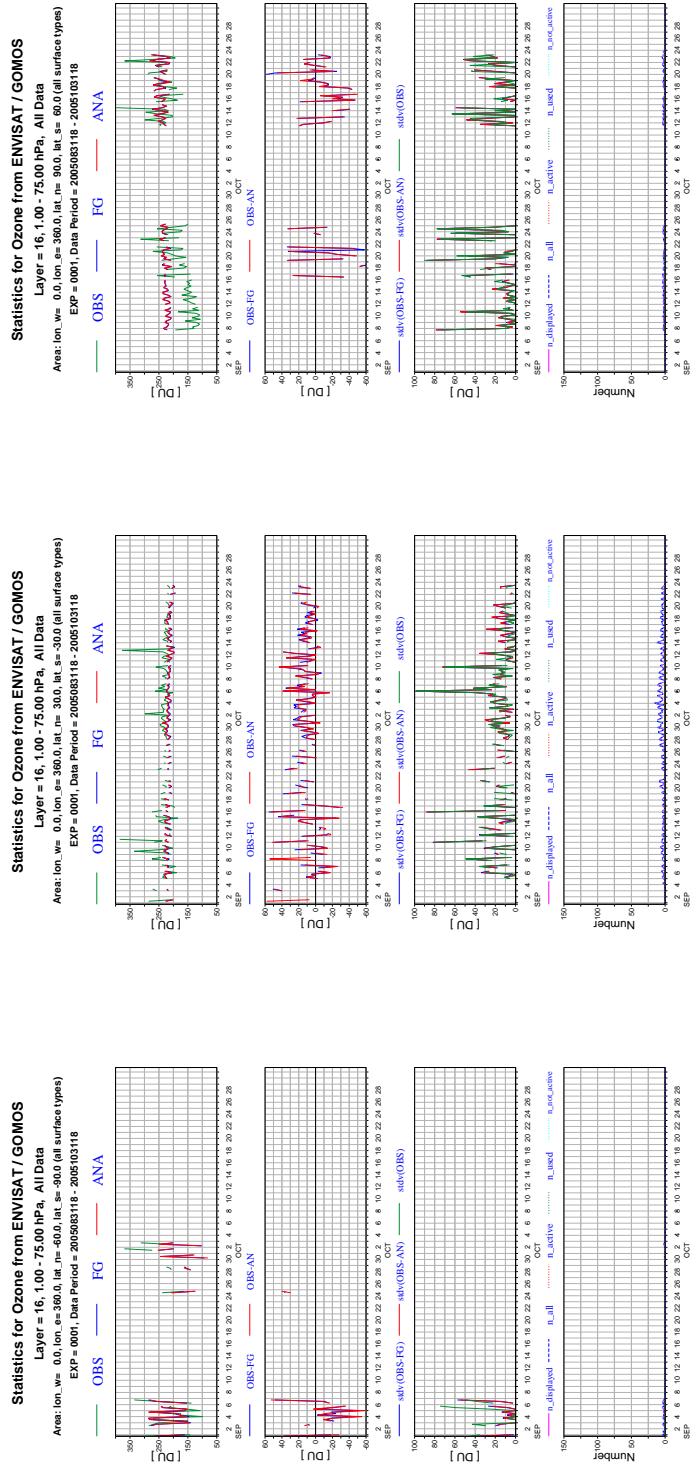


Fig. 20. As Figure 17, but for layer 16 (1-100 hPa).

REPORT ABOUT ENVISAT GOMOS NRT TEMPERATURE DATA (GOM.RR_2P) FOR OCTOBER 2005

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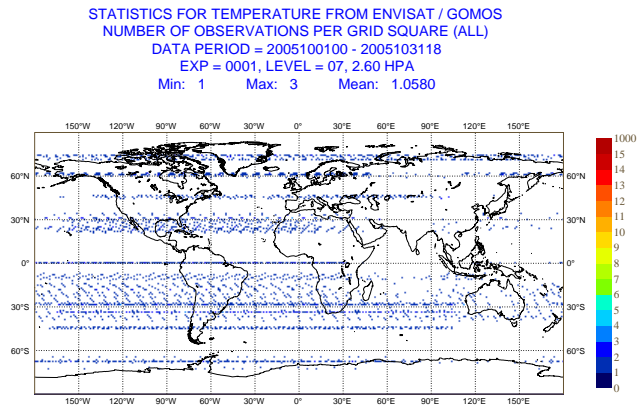


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for level 7 (2.6 hPa) for October 2005.

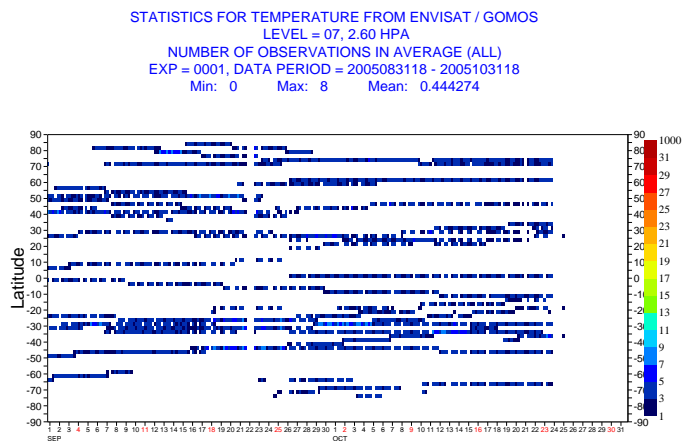


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for level 7 (2.6 hPa) for September and October 2005.

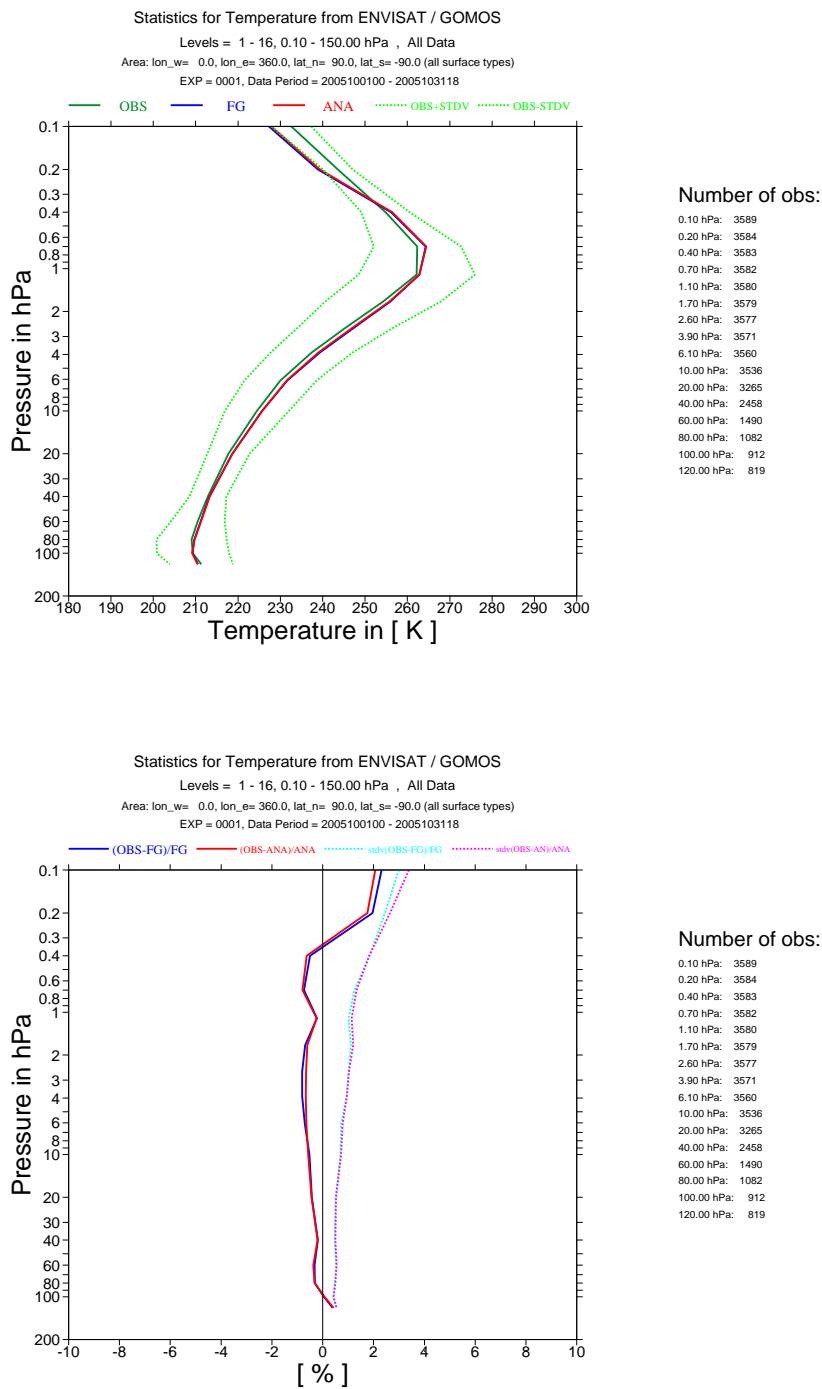


Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT temperature data in K for October 2005 (global mean). The top plot shows the mean analysis values (red), the mean first-guess (blue), the mean observation (green), and the mean observation +/- 1 standard deviation (green dotted lines). The bottom plot shows the departures and the standard deviation of the departures in %. Plotted are the partial columns for the 16 levels listed to the right of the diagrams.

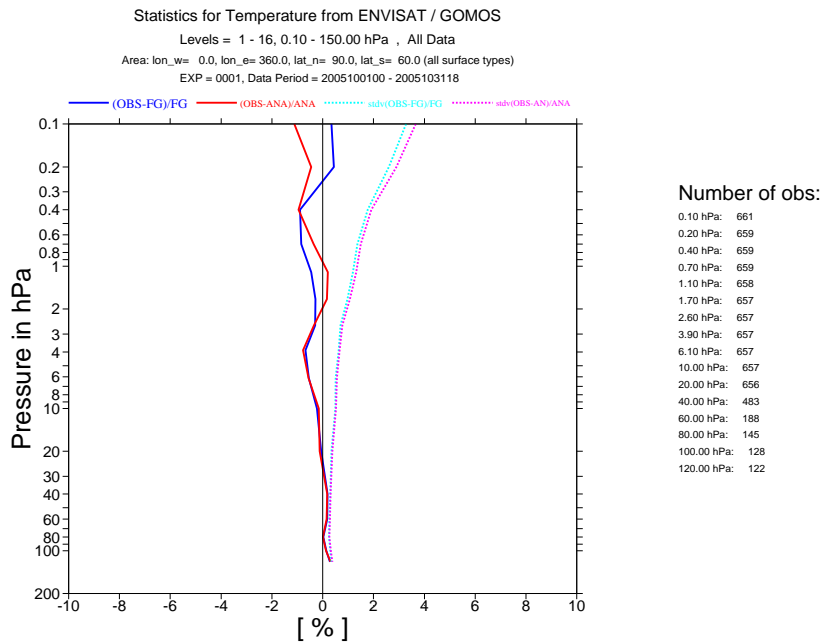
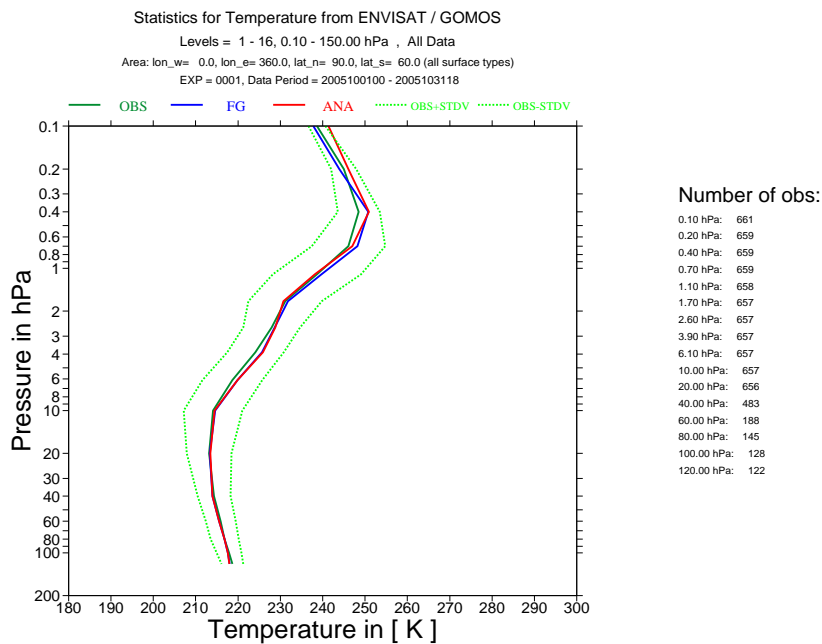


Fig. 4. As Fig. 3 but for 90N-60N.

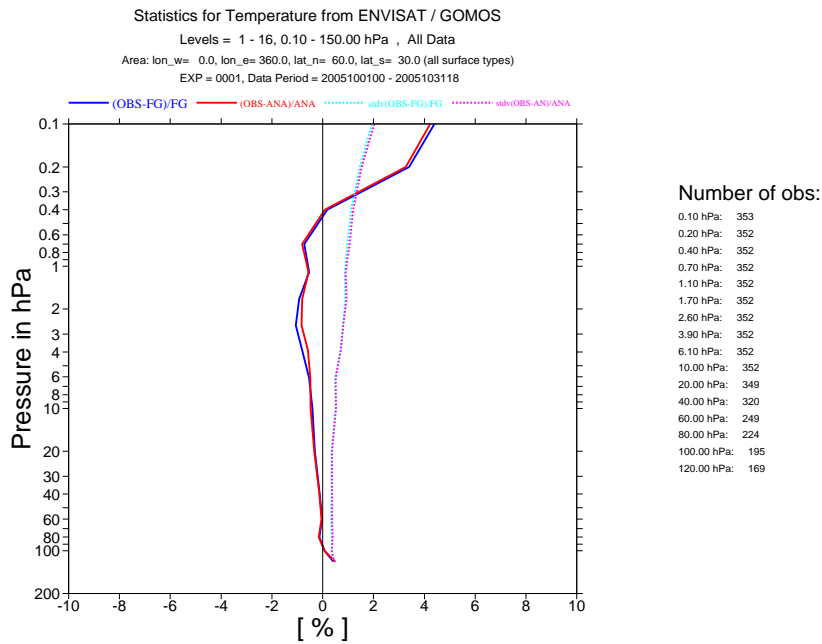
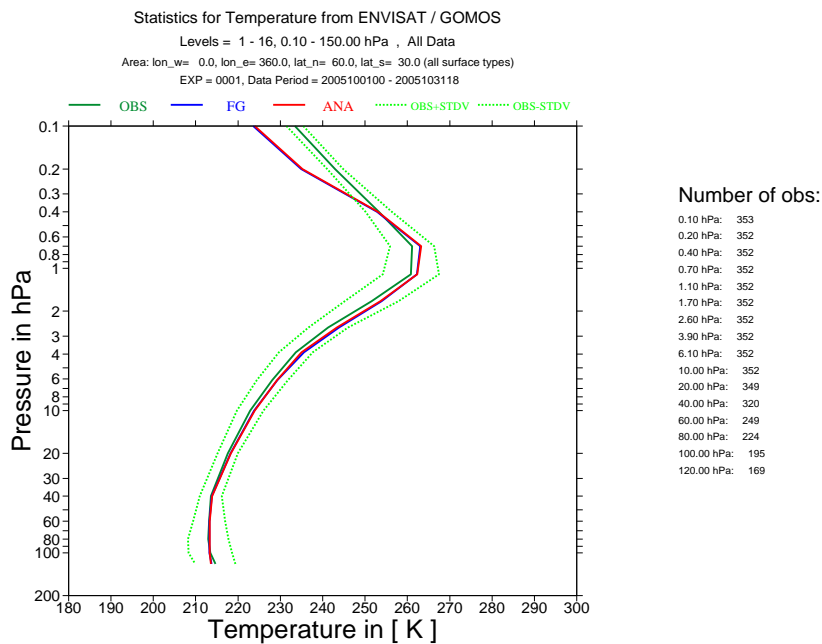


Fig. 5. As Fig. 3 but for 60-30N.

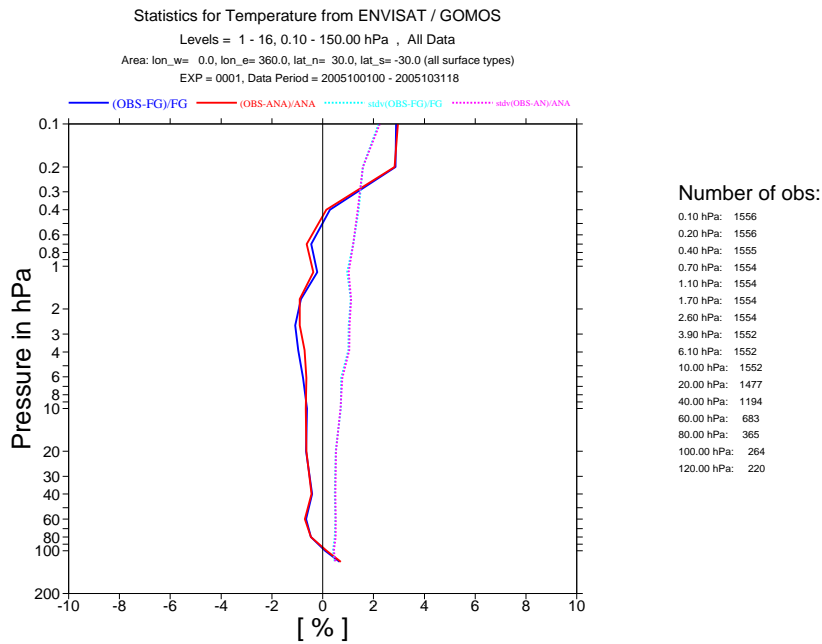
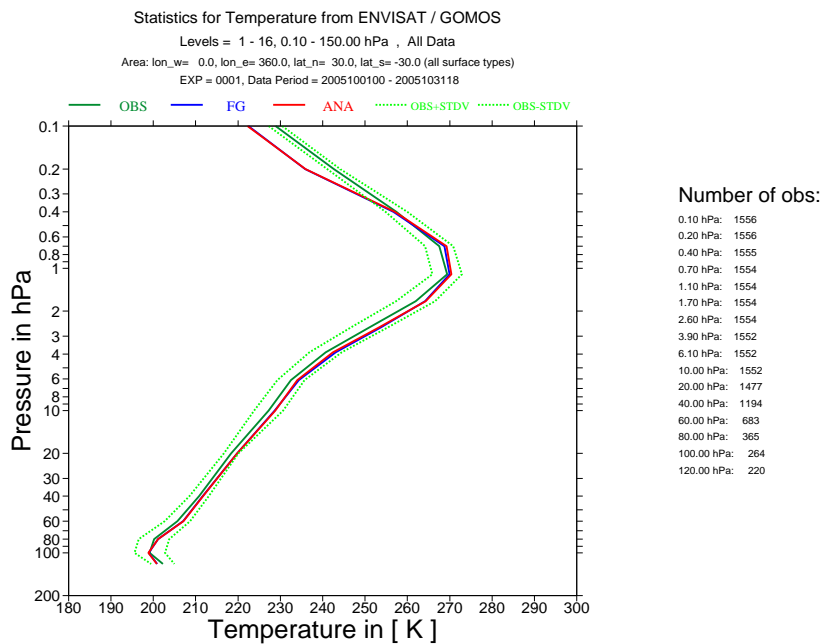


Fig. 6. As Fig. 3 but for 30N-30S.

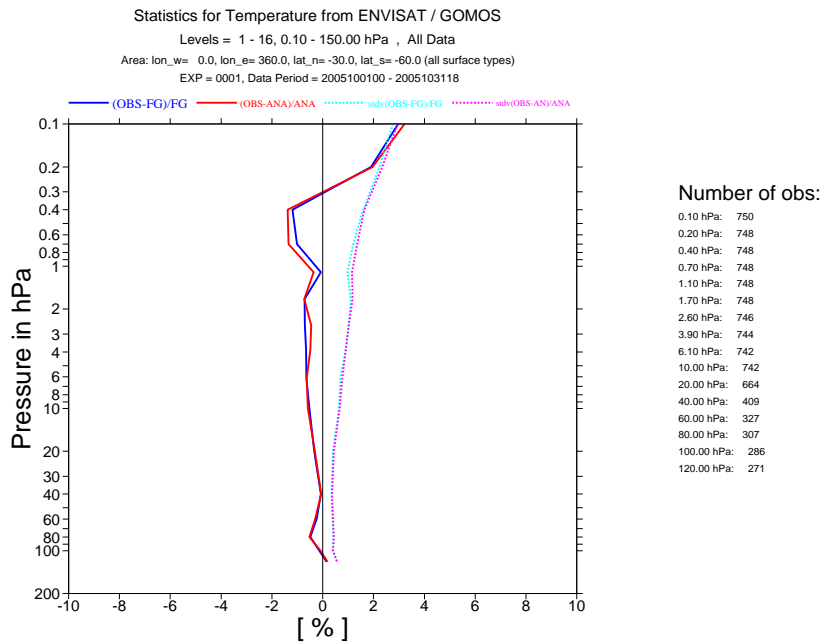
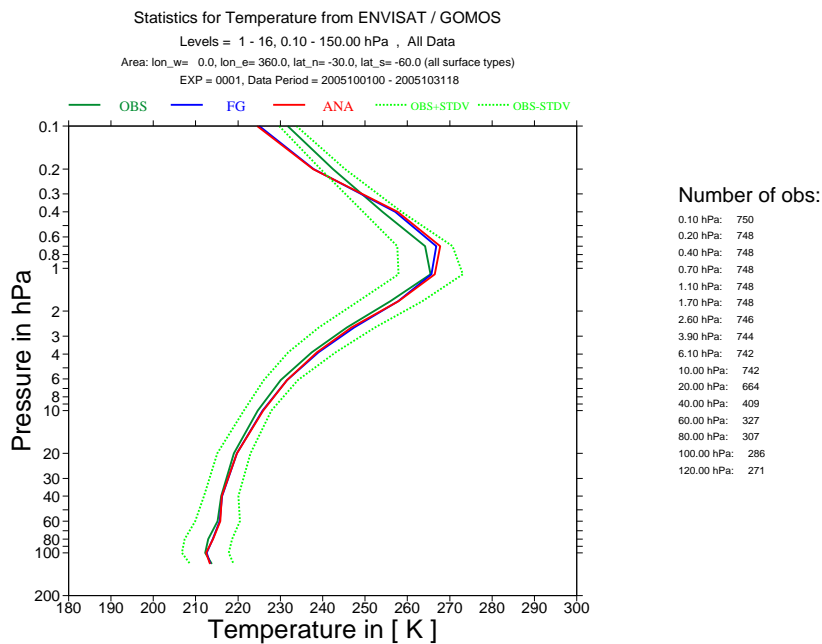


Fig. 7. As Fig. 3 but for 30-60S.

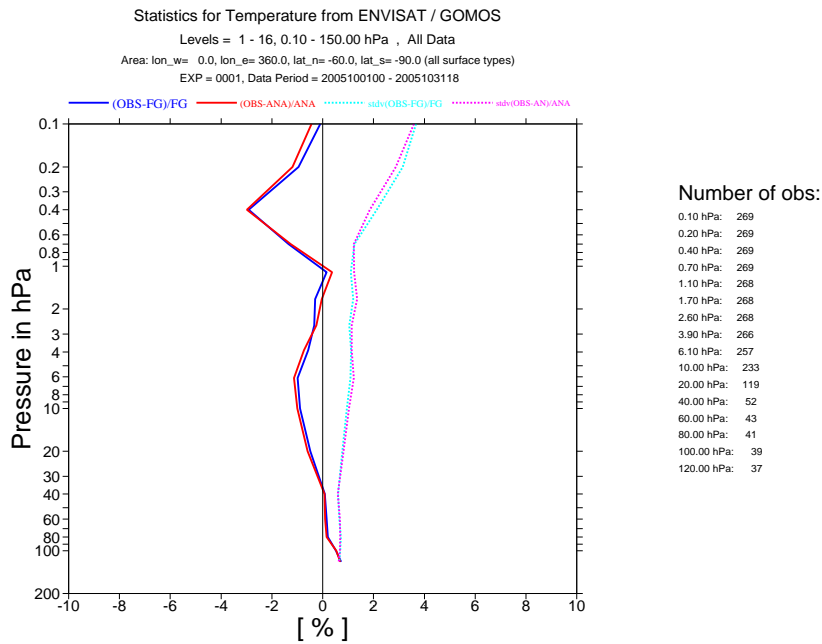
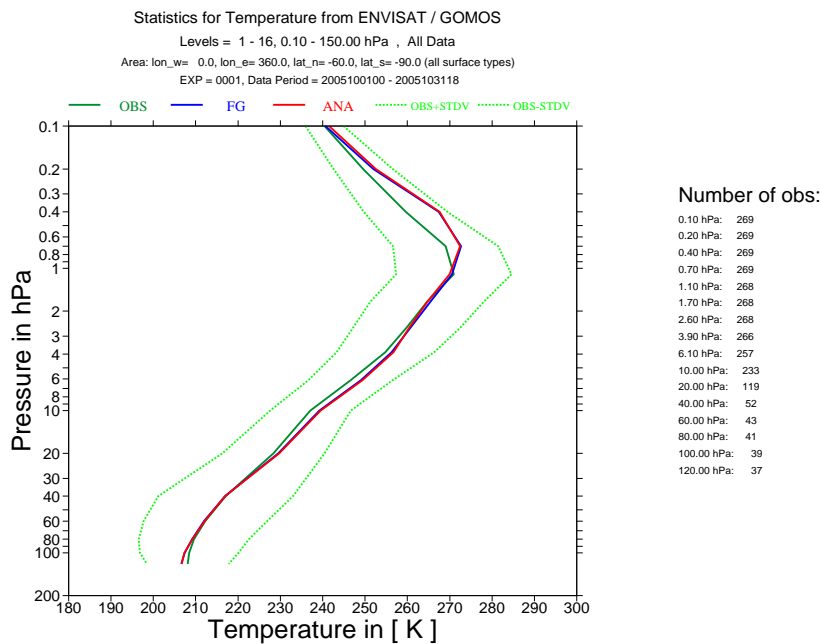


Fig. 8. As Fig. 3 but for 60-90S.

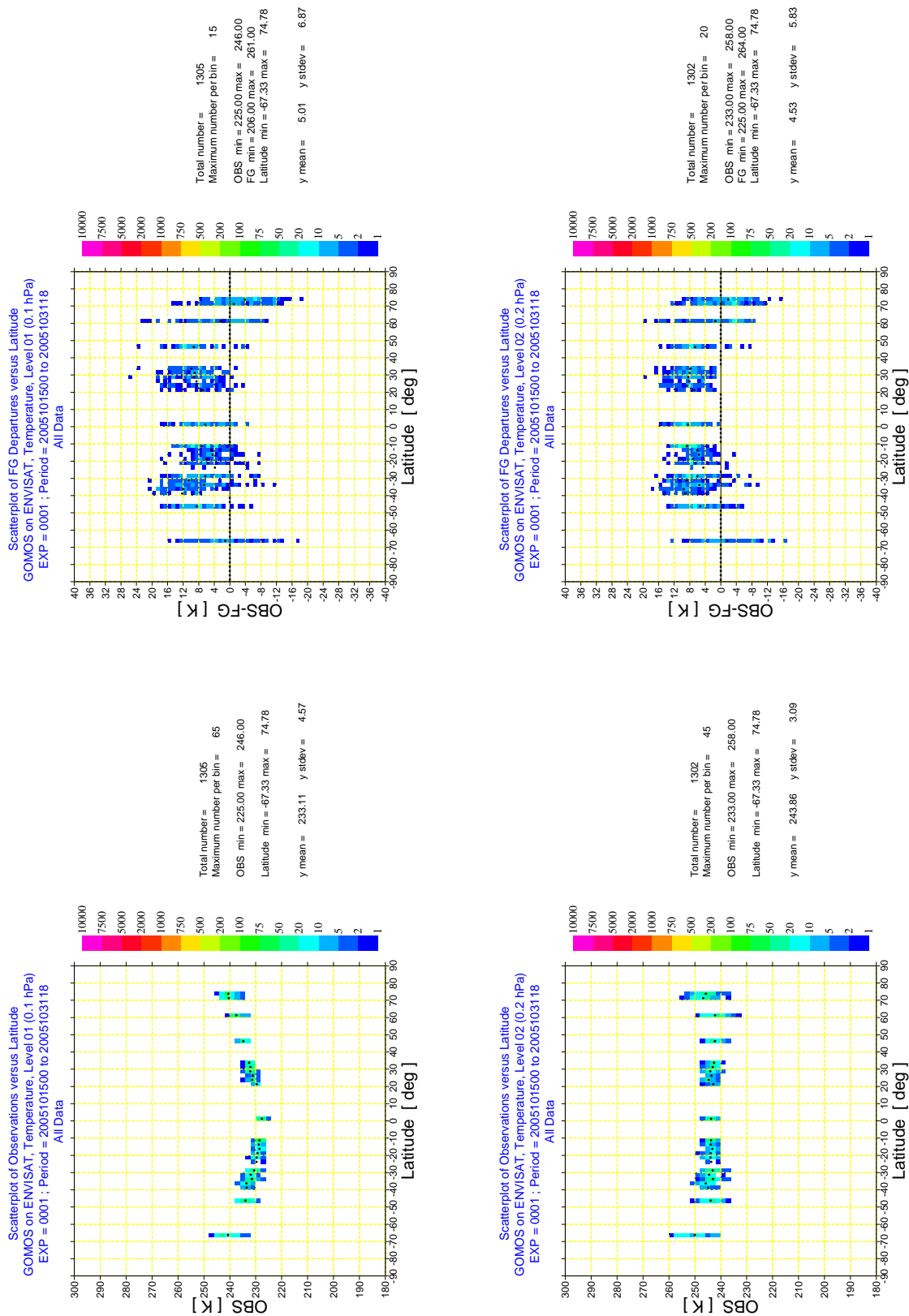


Fig. 9. Scatter plot of ENVISAT GOMOS NRT temperature data against latitude (left) and scatter plot of first-guess departures of ENVISAT GOMOS NRT temperature data against latitude (right) for October 2005 for level 1 (0.1 hPa) and level 2 (0.2 hPa). The colours show the number of data per bin, and the black dots the mean value per bin.

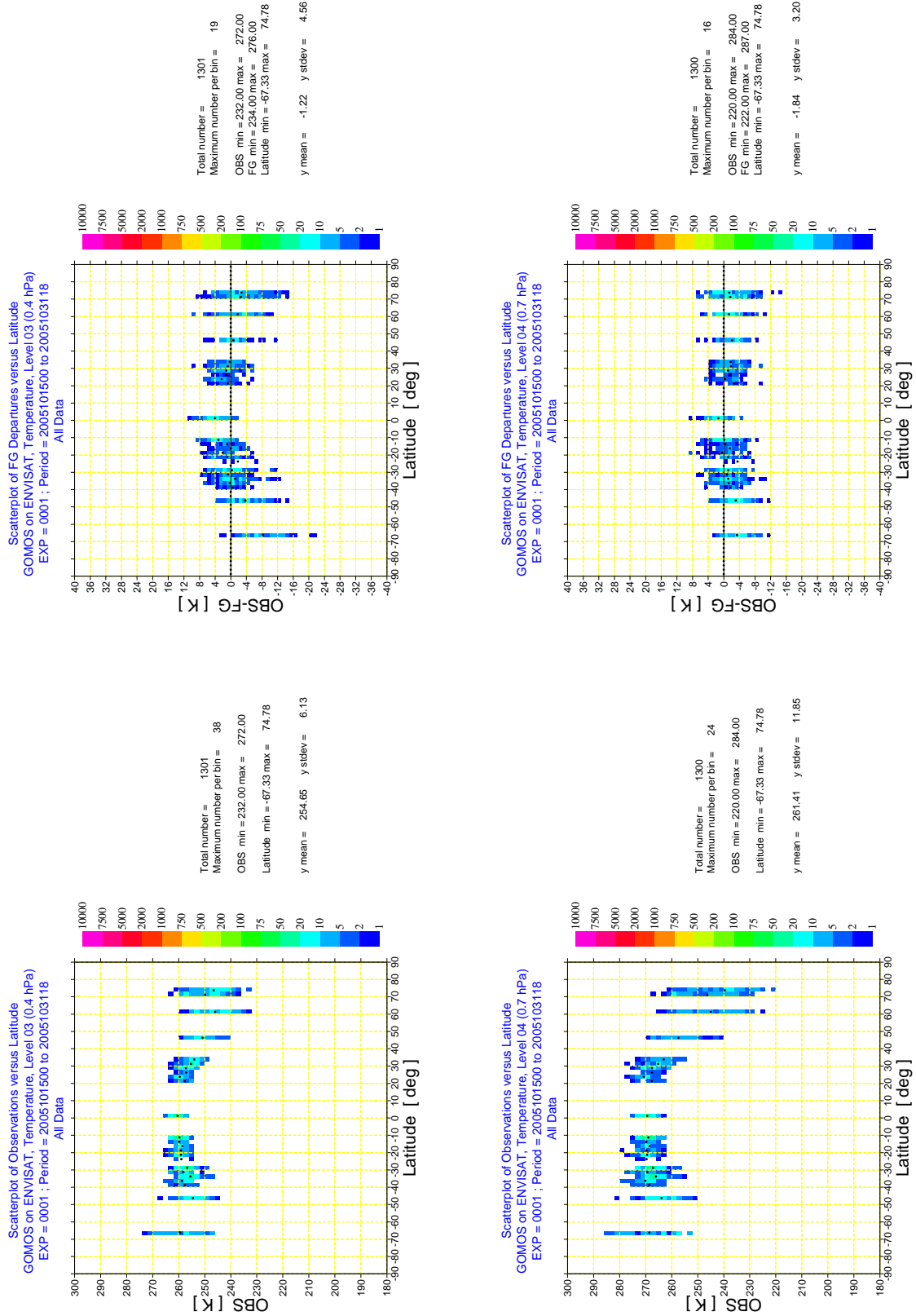


Fig. 10. As Fig. 9 but for level 3 (0.4 hPa) and level 4 (0.7 hPa).

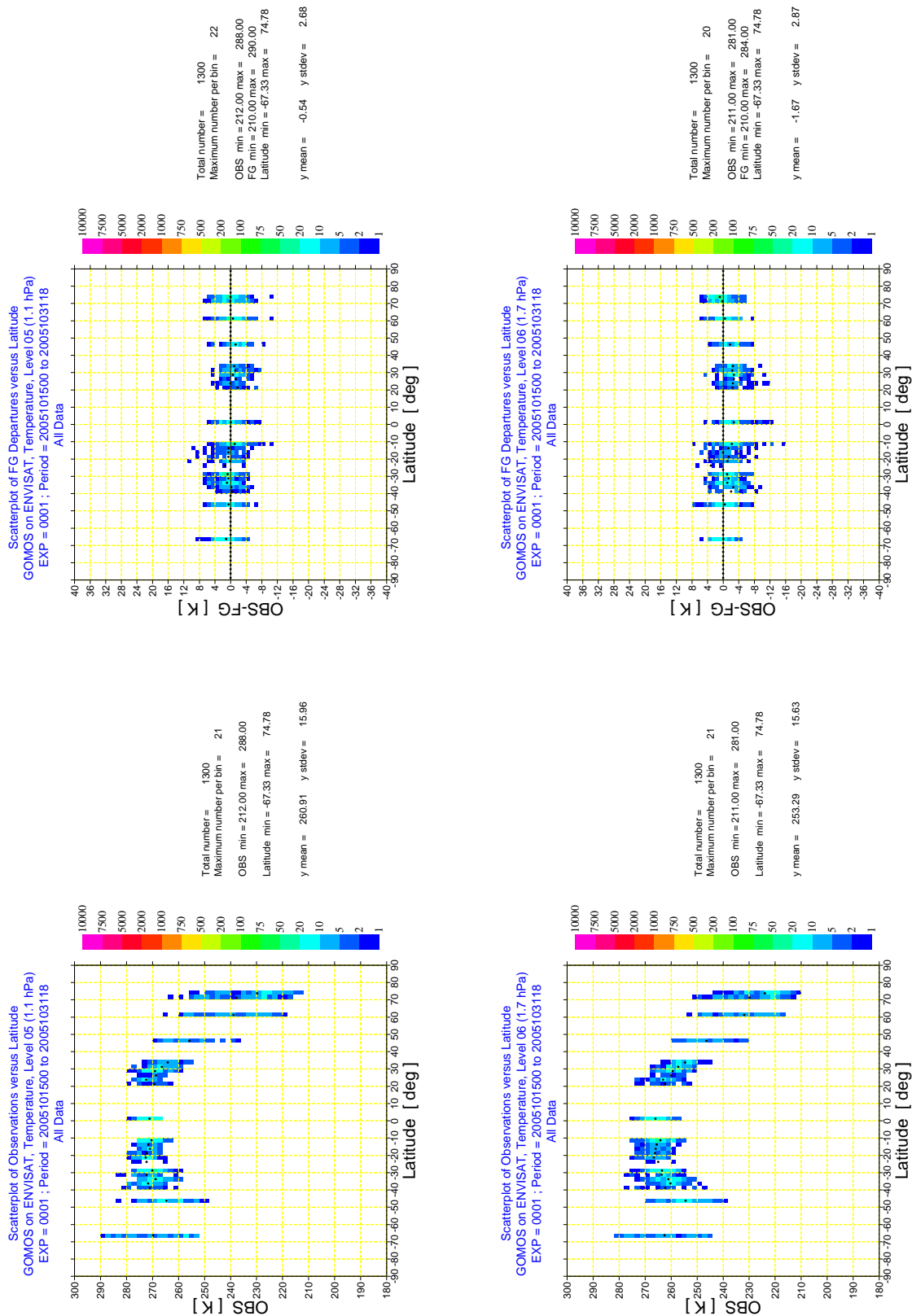


Fig. 11. As Fig. 9 but for level 5 (1.1 hPa) and level 6 (1.7 hPa).

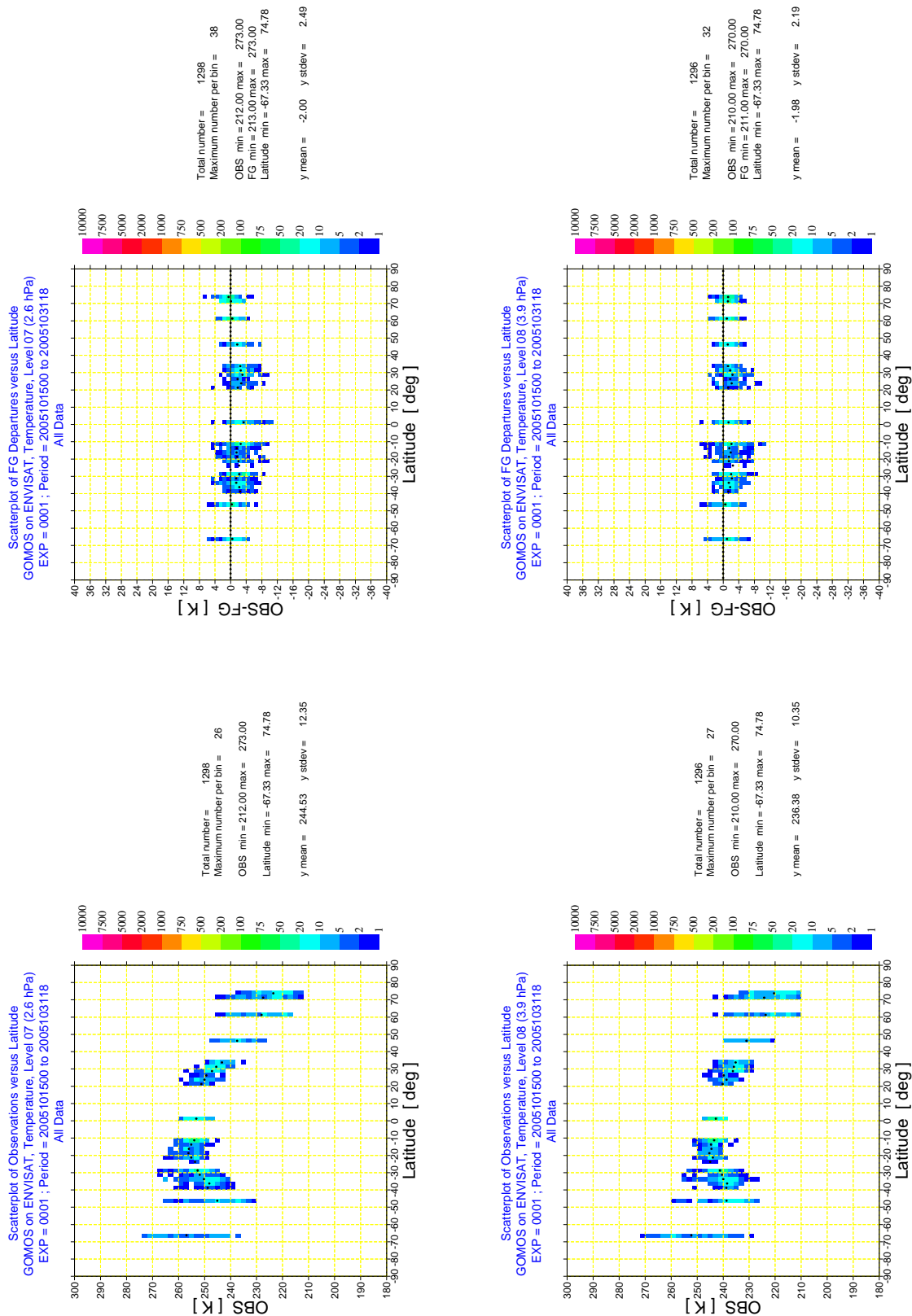


Fig. 12. As Fig. 9 but for level 7 (2.6 hPa) and level 8 (3.9 hPa).

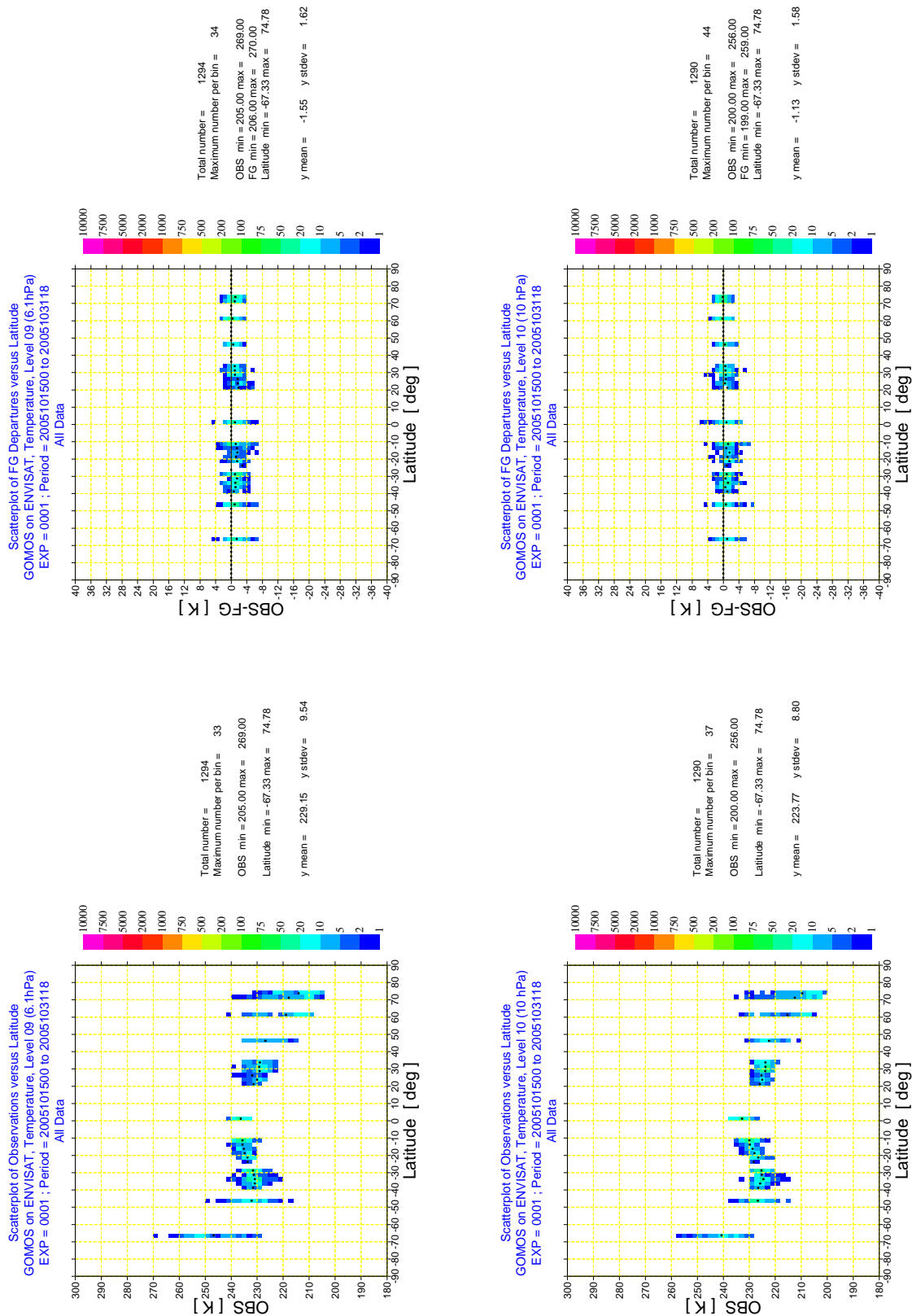


Fig. 13. As Fig. 9 but for level 9 (6.1 hPa) and level 10 (10 hPa).

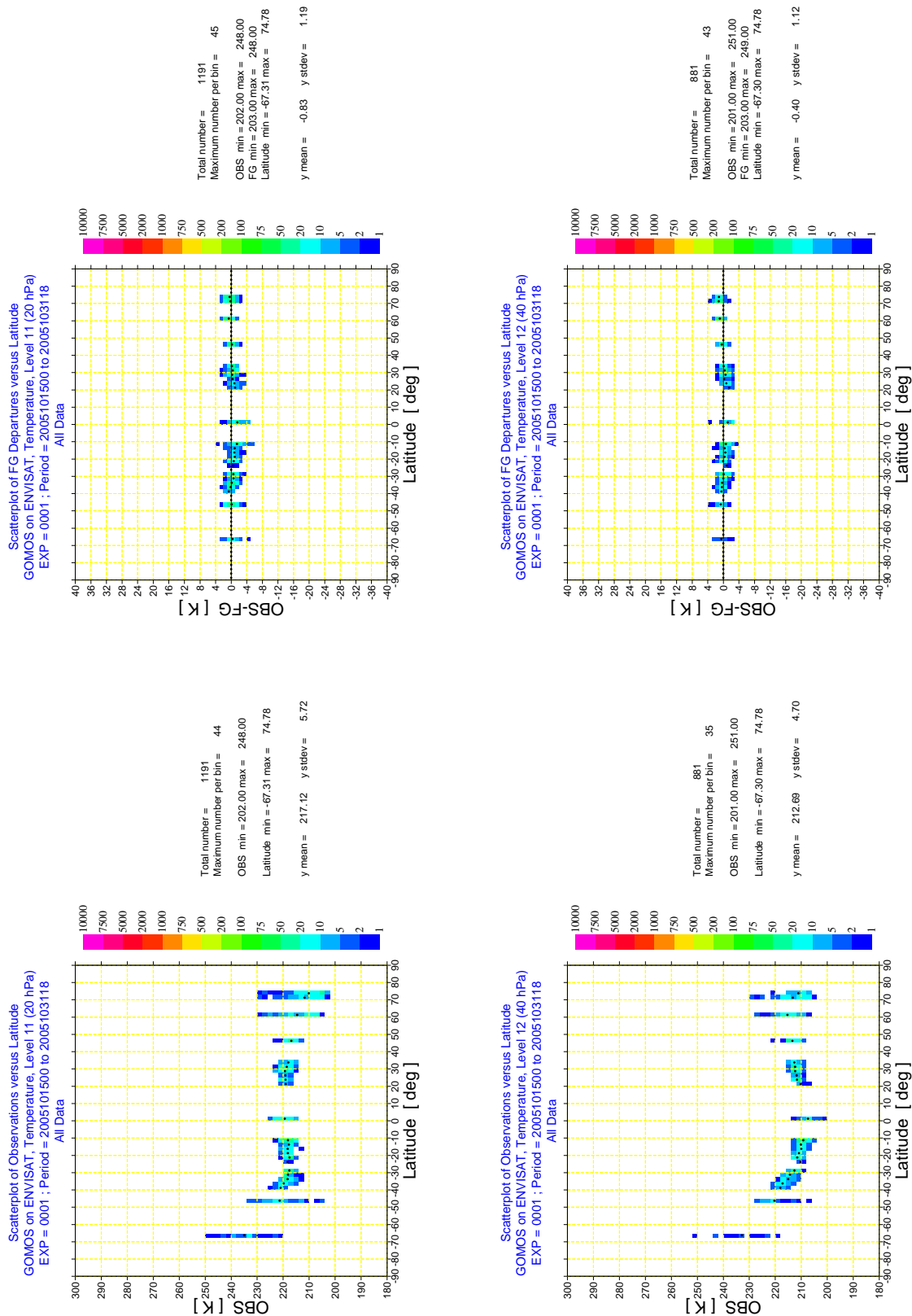


Fig. 14. As Fig. 9 but for level 11 (20 hPa) and level 12 (40 hPa).

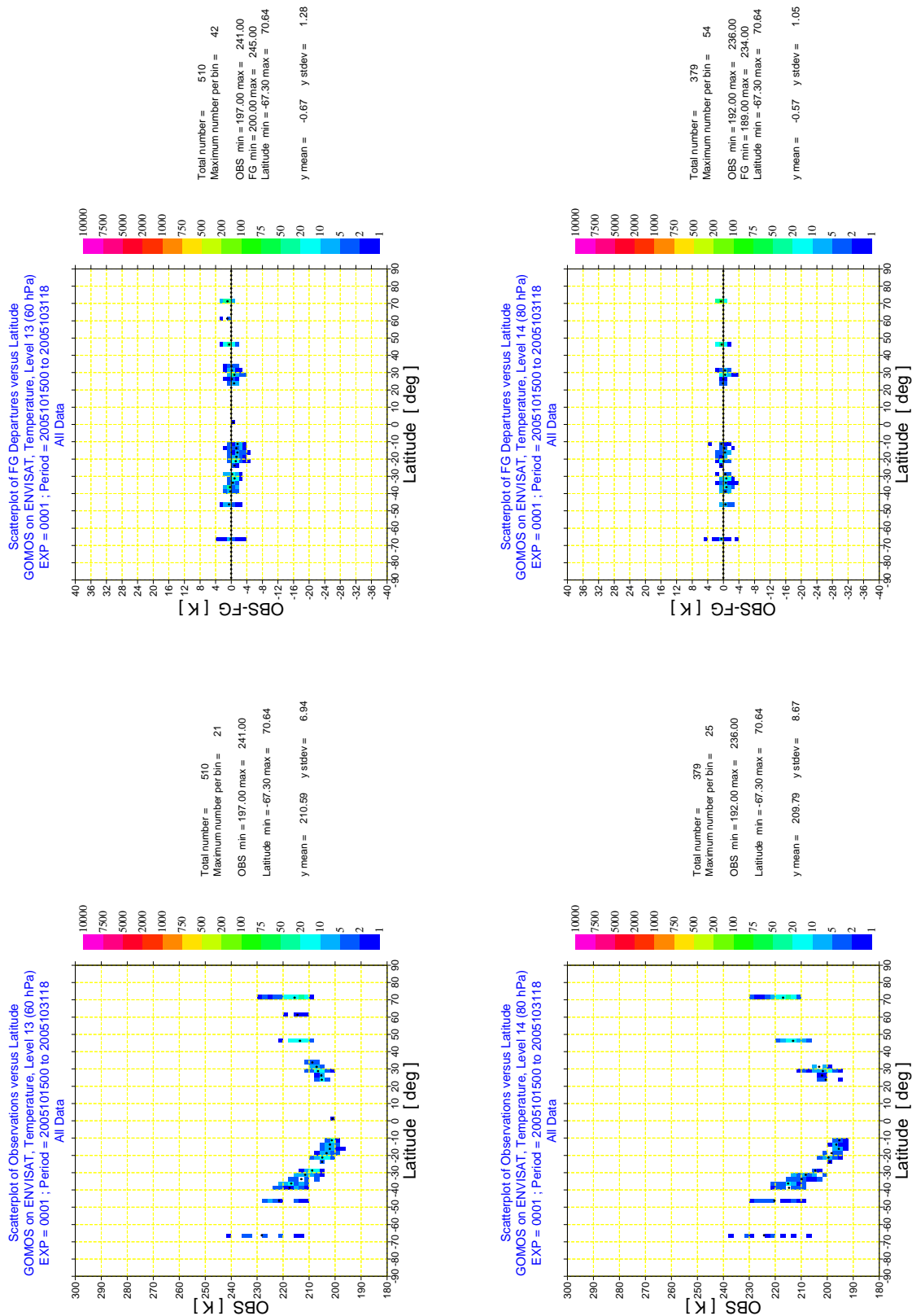


Fig. 15. As Fig. 9 but for level 13 (60 hPa) and level 14 (80 hPa).

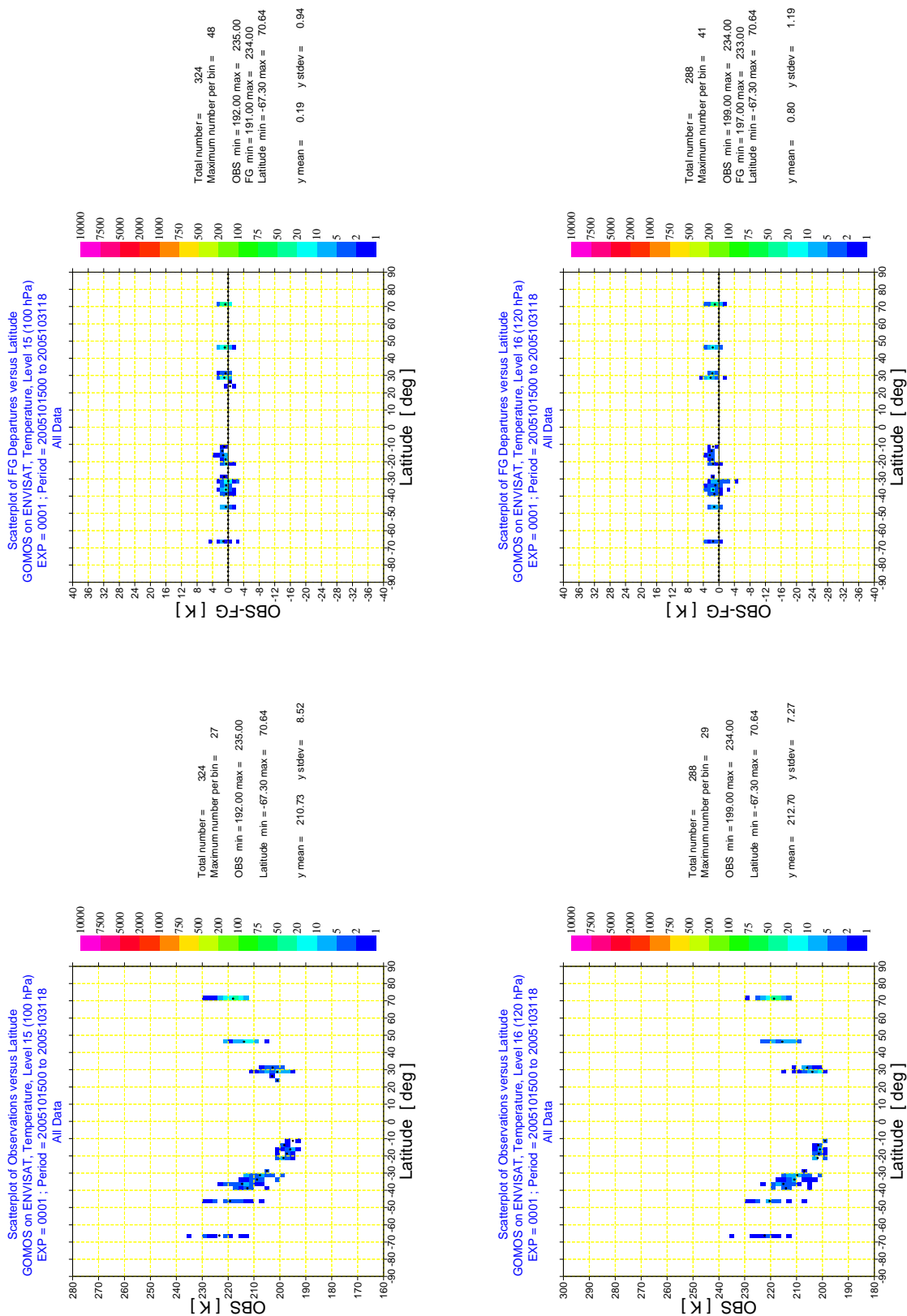


Fig. 16. As Fig. 9 but for level 15 (100 hPa) and level 16 (120 hPa).

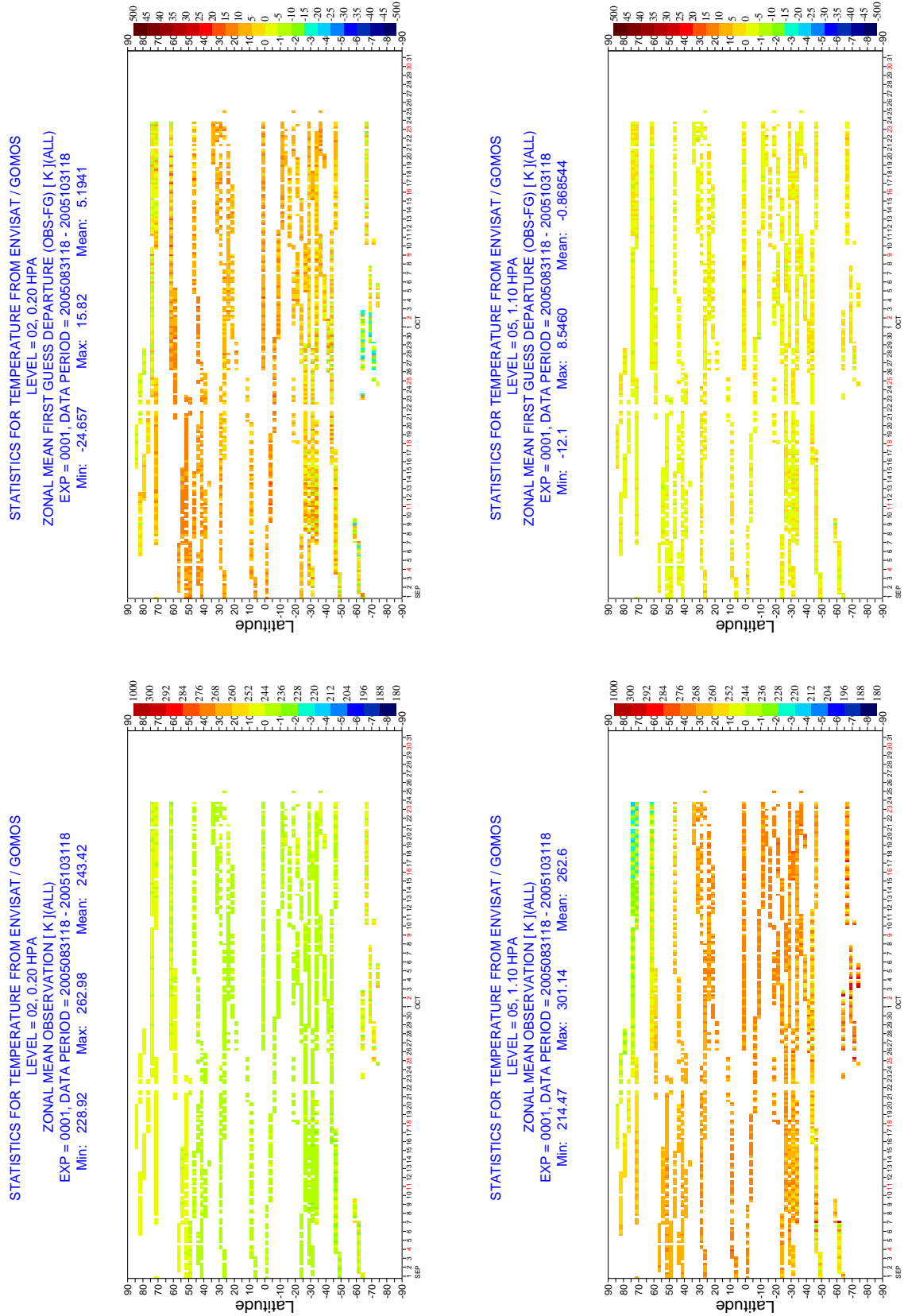


Fig. 17. Hovmoeller diagram of zonal mean ENVISAT GOMOS NRT temperature data per 6-hour cycle and of the zonal mean first-guess departures for level 2 (0.2 hPa) and level 5 (1.1 hPa) for September and October 2005.

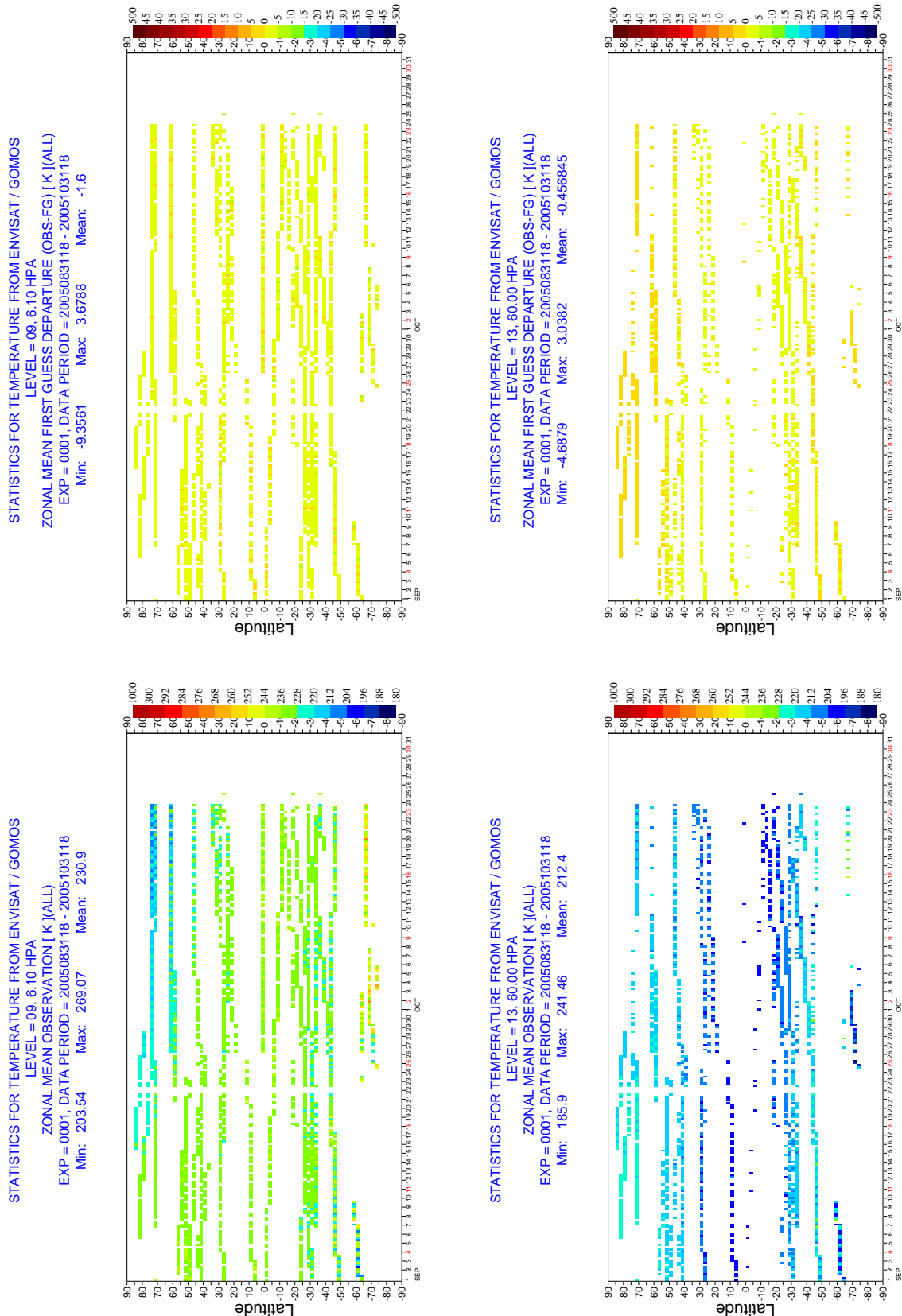


Fig. 18. As Fig. 17 but for level 9 (6.1 hPa) and level 13 (60 hPa).

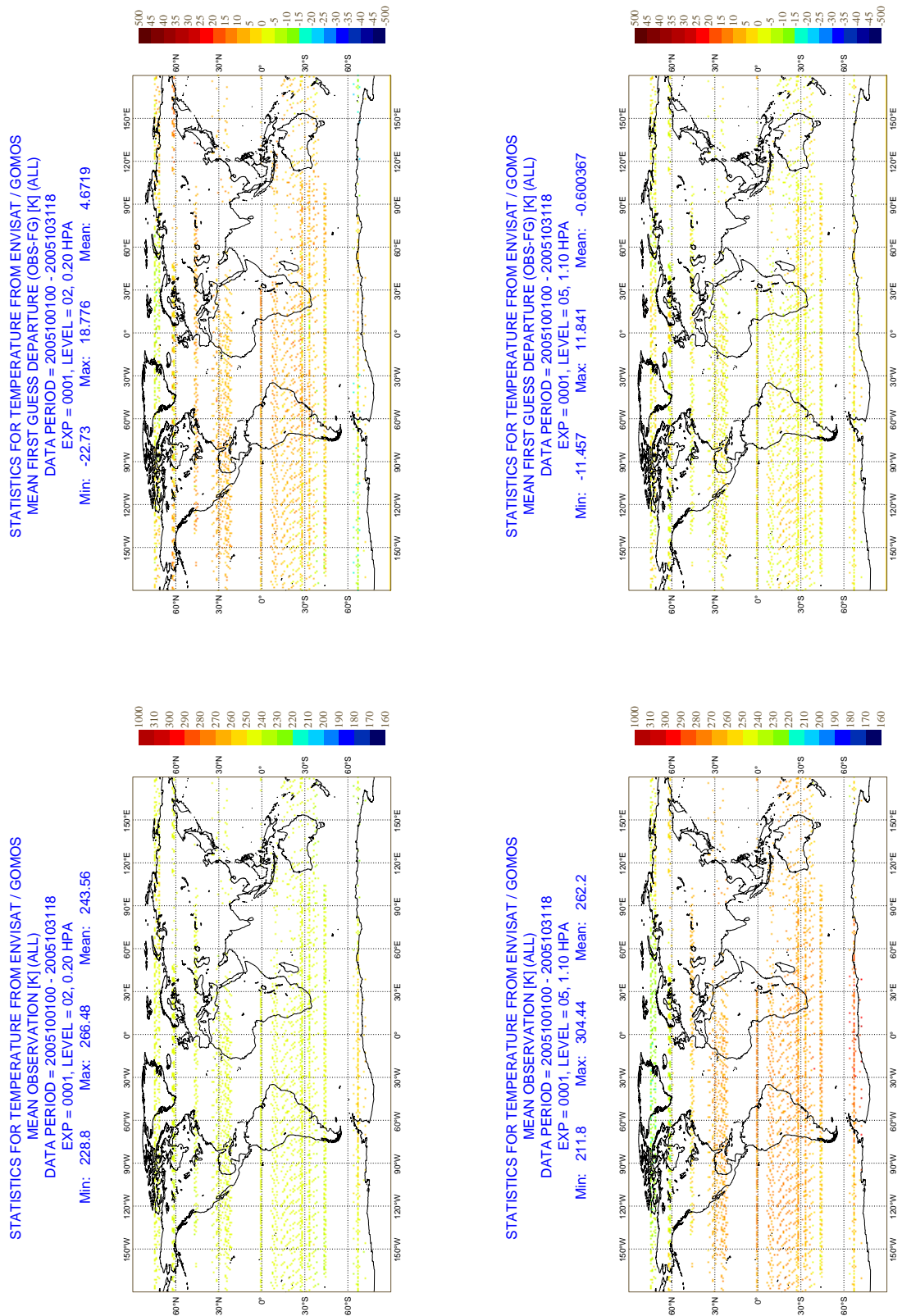


Fig. 19. Geographical distribution of mean ENVISAT GOMOS NRT temperature data and mean first-guess departures for level 2 (0.2 hPa) and level 5 (1.1 hPa) for October 2005.

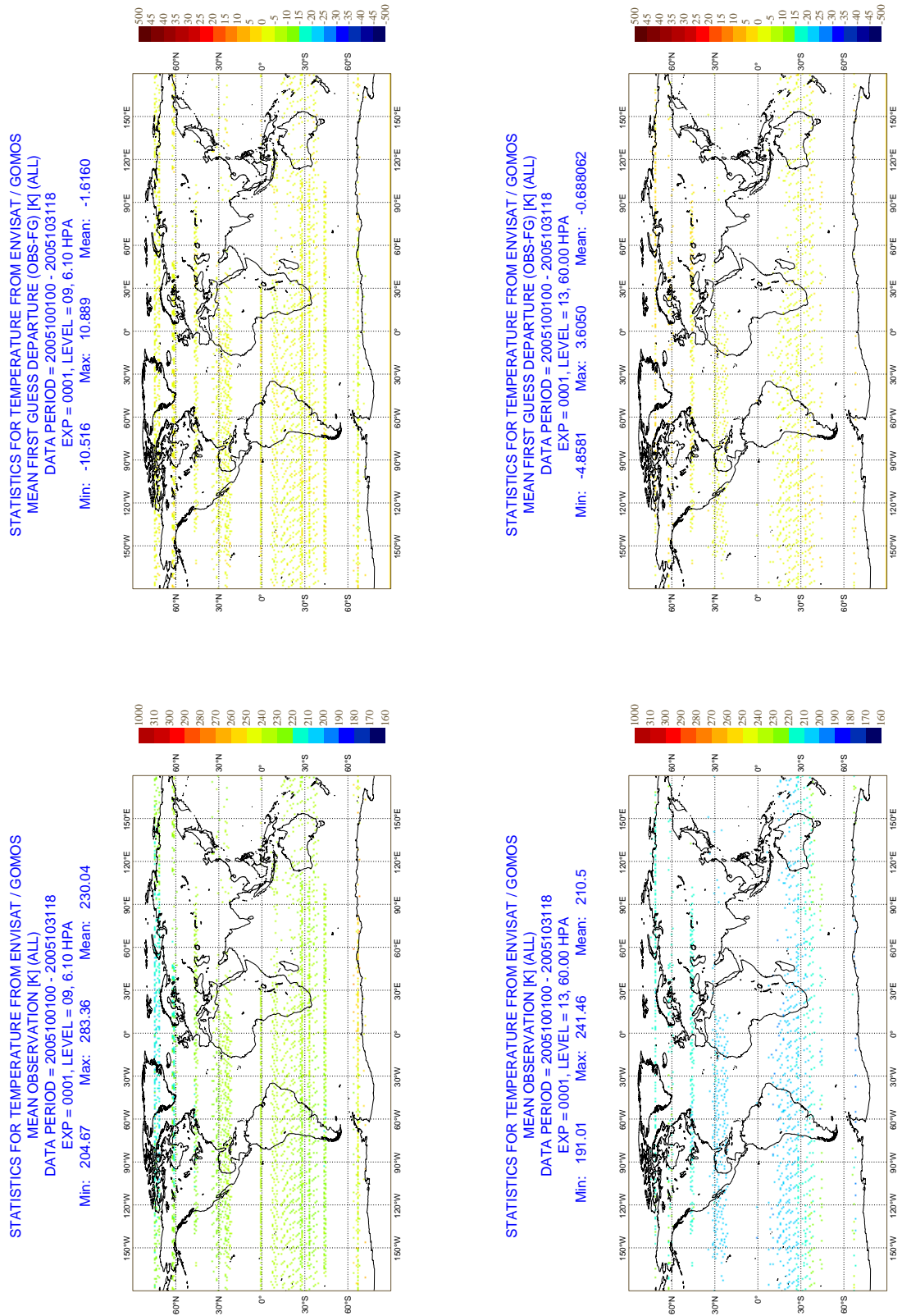


Fig. 20. As Fig. 19 but for level 9 (6.10 hPa) and level 13 (60 hPa).

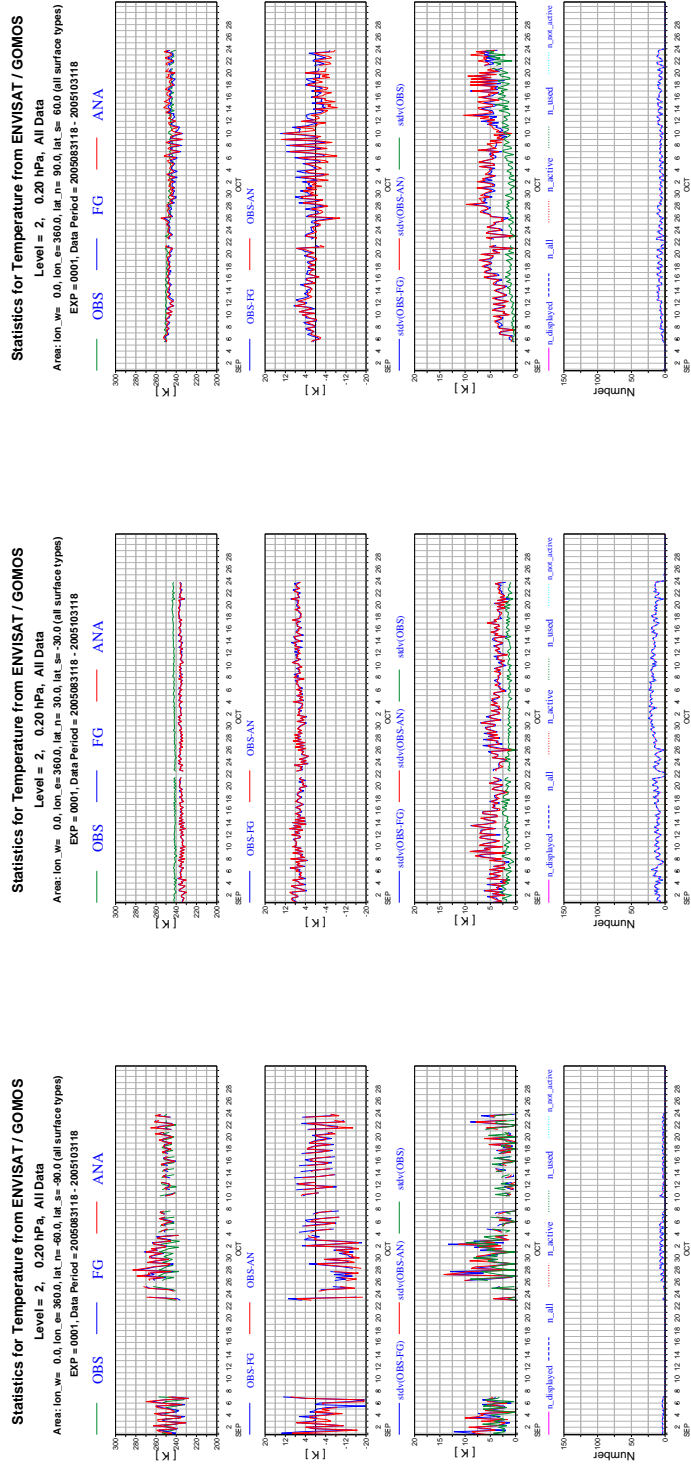


Fig. 21. Timeseries of mean ENVISAT GOMOS NRT temperature data, first guess and analysis values (top panels), first-guess and analysis departures (second panels), standard deviations (third panels) and number of data (bottom panels) per 6-hour cycle for level 2 (0.2 hPa) 90-60N, 30N-30S, 60-90S for September and October 2005.

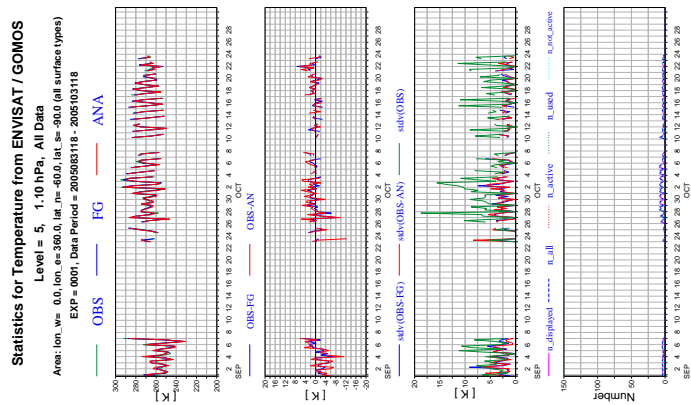
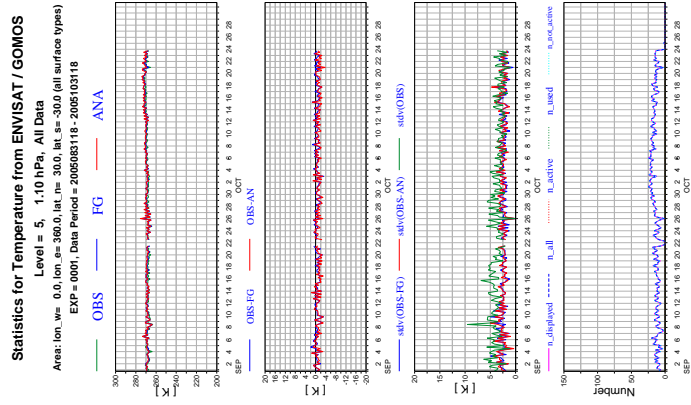
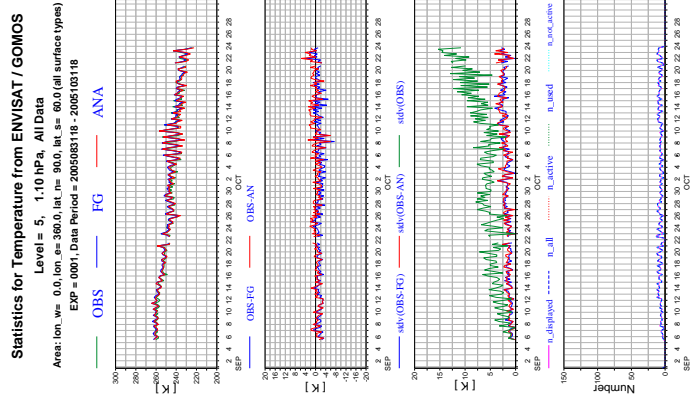


Fig. 22. As Figure 21, but for level 5 (1.1 hPa).

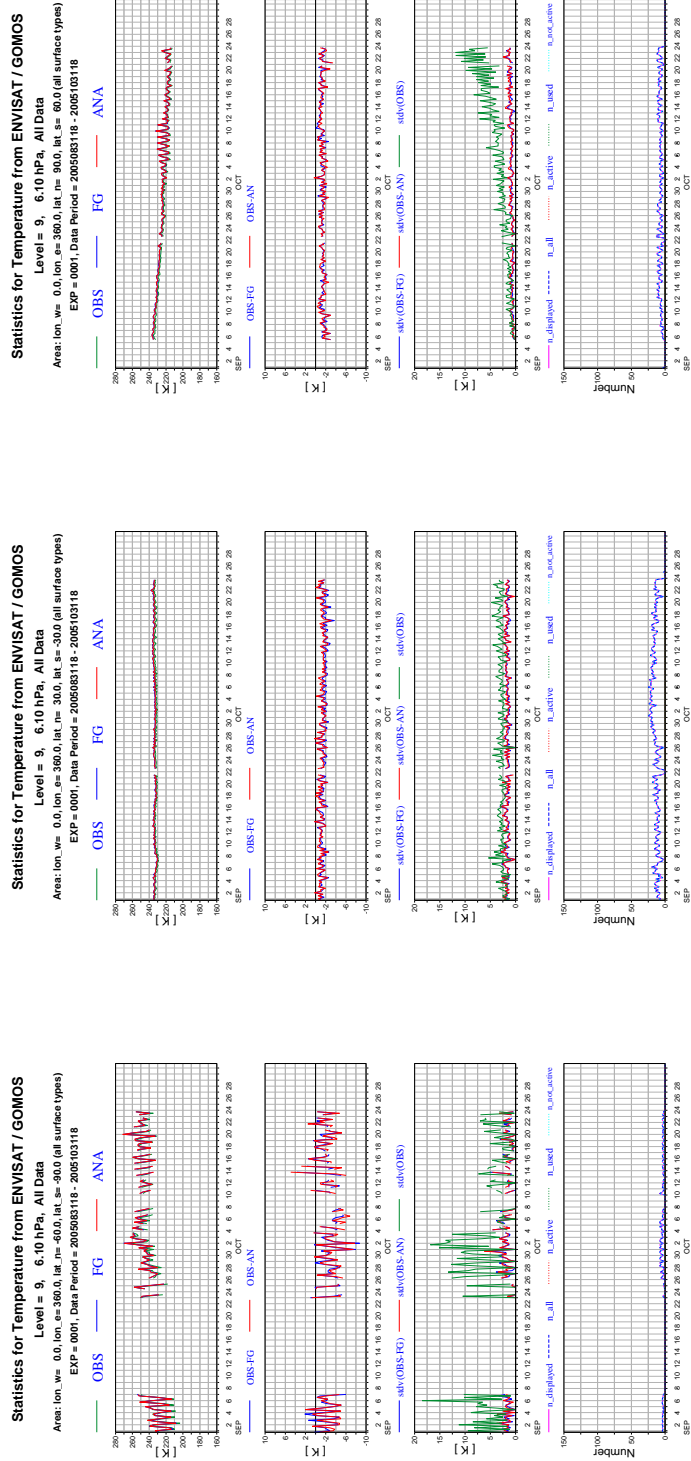


Fig. 23. As Figure 21, but for level 9 (6.1 hPa).

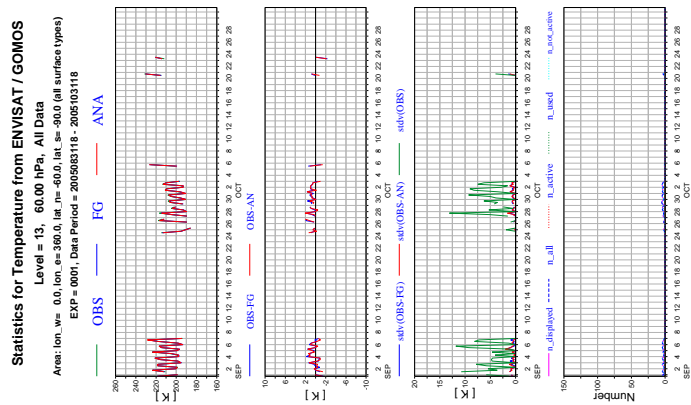
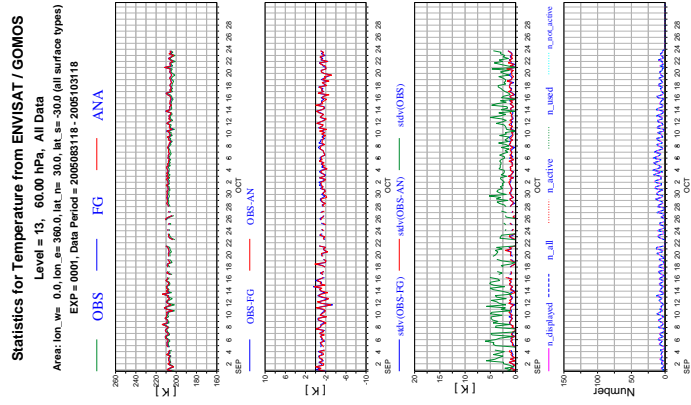
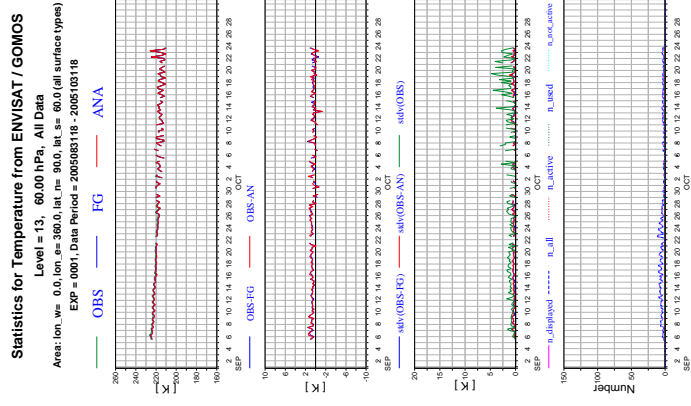


Fig. 24. As Figure 21, but for level 13 (60 hPa).