

# REPORT ABOUT ENVISAT GOMOS NRT DATA (GOM\_RL\_2P) FOR JUNE 2004

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July 15, 2004

## 1. Key points for June 2004

- Good agreement between GOMOS and ECMWF temperatures.
- GOMOS temperatures are lower than ECMWF temperatures in the stratosphere, but area mean departures are less than 1% in most of the stratosphere. Larger departures are found at the model top.
- Large differences between GOMOS and ECMWF ozone values (places over 50%).
- Large scatter of GOMOS ozone data.
- Scatter plots show some unrealistically low GOMOS ozone values.
- No water vapour data in NRT GOMOS BUFR files.
- The monitoring statistics for June were produced with the operational ECMWF model.

## 2. Amount of received data

This report covers ENVISAT GOMOS NRT data for June 2004. Data coverage and amount of received data are shown in Figures 1 and 2. There are fewer data available during the midnight 0z cycles than during the other cycles, because not all data from ftp-ops.pde.envisat.esa.int are available in NRT, and some come too late for the operational ECMWF analysis. 7732 GOMOS observations are available this month (see number of observations in Figures 3 of the temperature and ozone reports). The largest number of observations is available in the mesosphere and upper stratosphere, fewer observations are available in the lower stratosphere.

## 3. GOMOS temperature data

The profile plots (temperature report: Figures 3-8) show that over most of the stratosphere and mesosphere the area averaged GOMOS temperatures are lower than ECMWF values, with departures less than 1%. In 60-90°S GOMOS temperature values are larger than ECMWF temperatures below 10 hPa, but still agree to within 1%. Larger departures up to -4% are found at the model top. The scatter plots (temperature report: Figures 9-16) show the behaviour of the GOMOS temperatures and the departures at several levels more clearly.

Timeseries (temperature report: Figures 17, 18, 21-23) of GOMOS temperatures and departures at several levels are shown in Figures 17, 18, 21-23 of the temperature report.

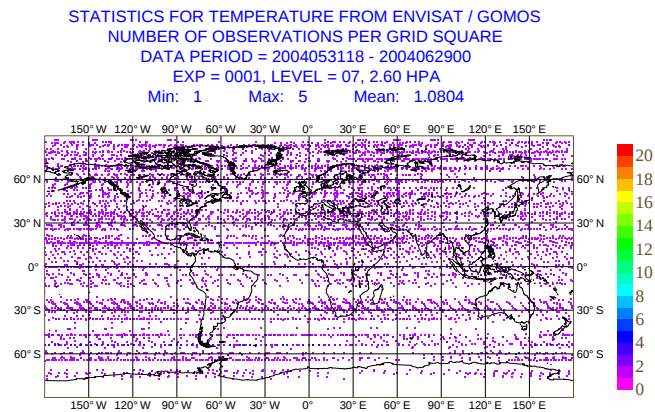


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for June 2004.

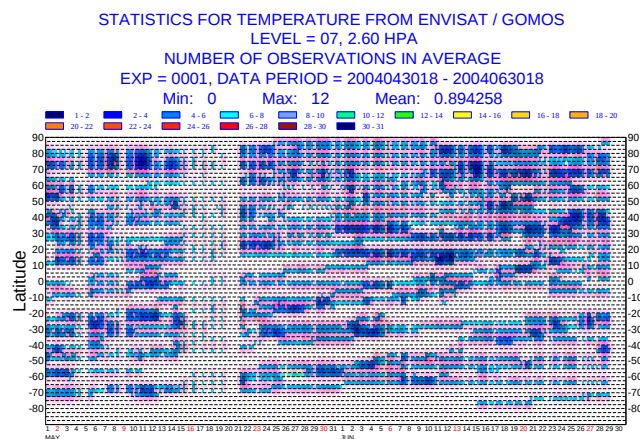


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for February and June 2004.

#### 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 between 1-10 hPa at 90-60°N. Departures larger than 50% are also found below 80 hPa in 30°N-30°S and in 30-60°S. In the other areas mean departures are slightly smaller (below 30%), but standard deviations of the departures and of the GOMOS ozone data are large (much larger than 50%) over most of the profiles.

The scatter plots (ozone report: Figures 9-16) confirm that there is a very large scatter in the GOMOS ozone data. The plots also show unrealistically low (around 0DU) GOMOS ozone values above 40 hPa.

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 (CY28R1). In CY28R1, ozone layers from SBUV/2 from NOAA-16 are actively assimilated.

All ozone values are in Dobson Units (DU), temperatures in K, and water vapour values in mg/m<sup>2</sup>.

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

REPORT ABOUT ENVISAT GOMOS NRT TEMPERATURE DATA  
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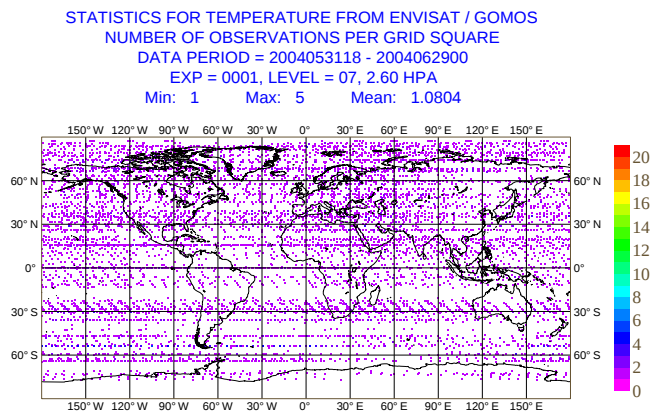


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT temperature data for June 2004.

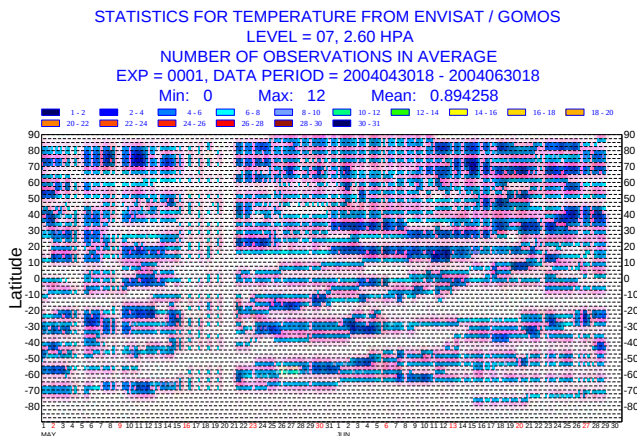


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT temperature data per 6-hour cycle for May and June 2004.

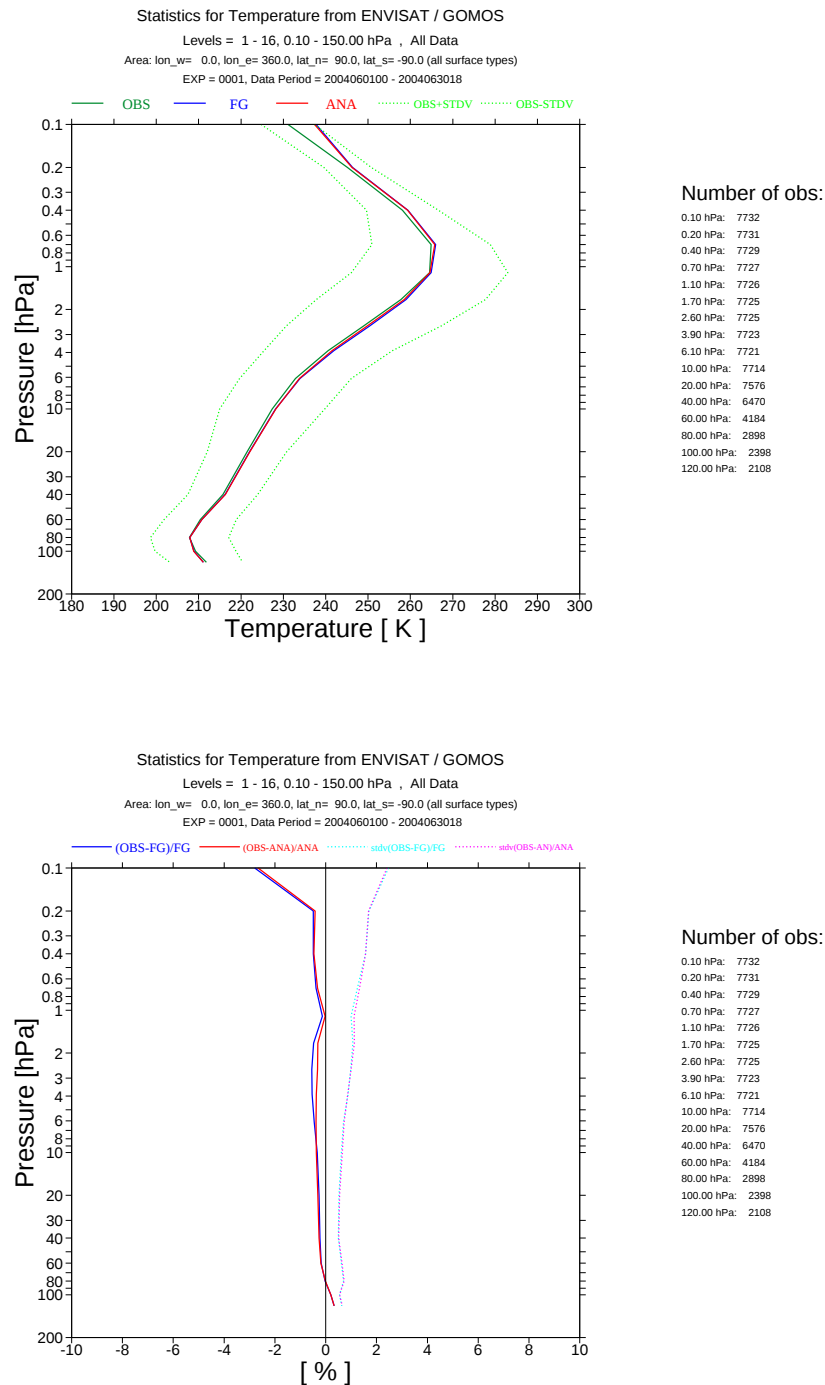


Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT temperature data in K for June 2004 (global mean). The top plot shows the mean analysis values (blue), the mean observation (red), and the mean observation +/- 1 standard deviation (dotted lines). The bottom plot shows the departures and the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

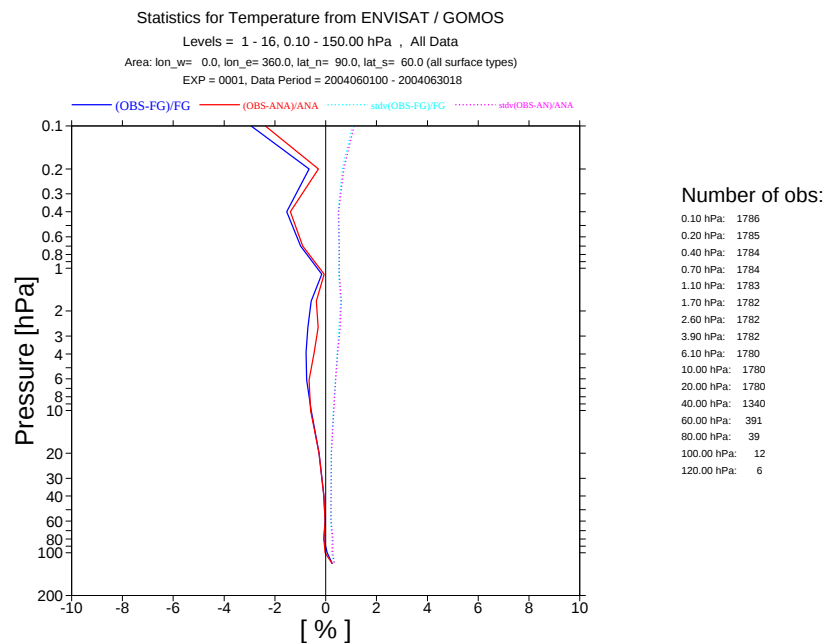
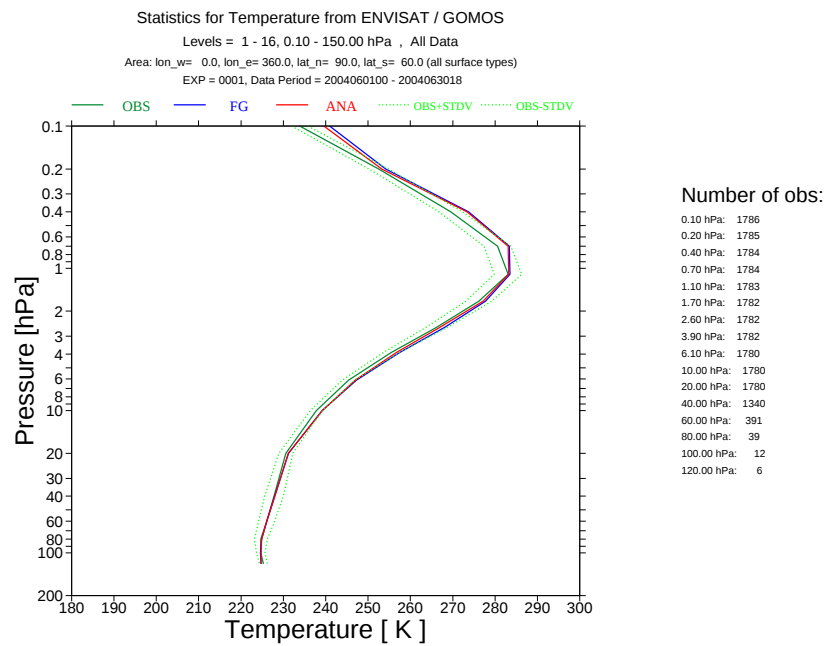


Fig. 4. As Fig. 3 but for 90N-60N.

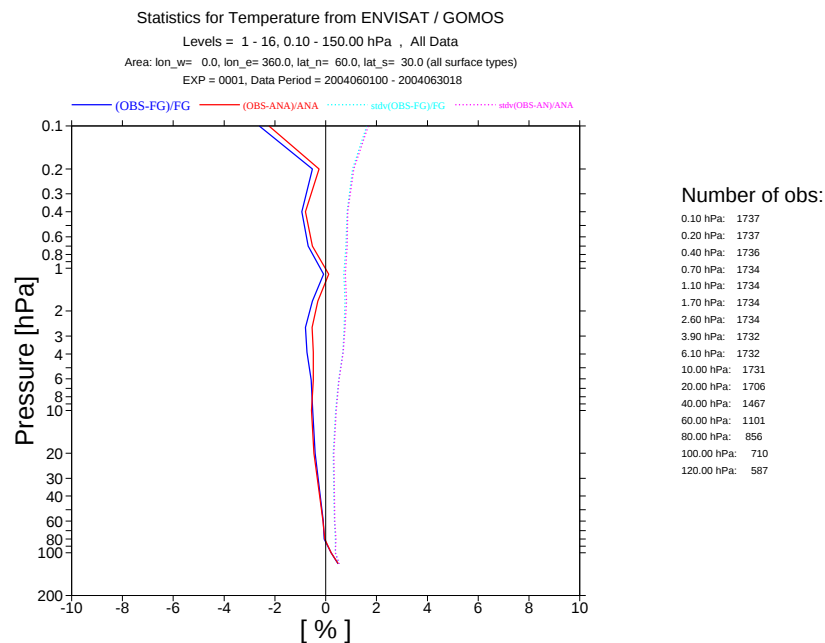
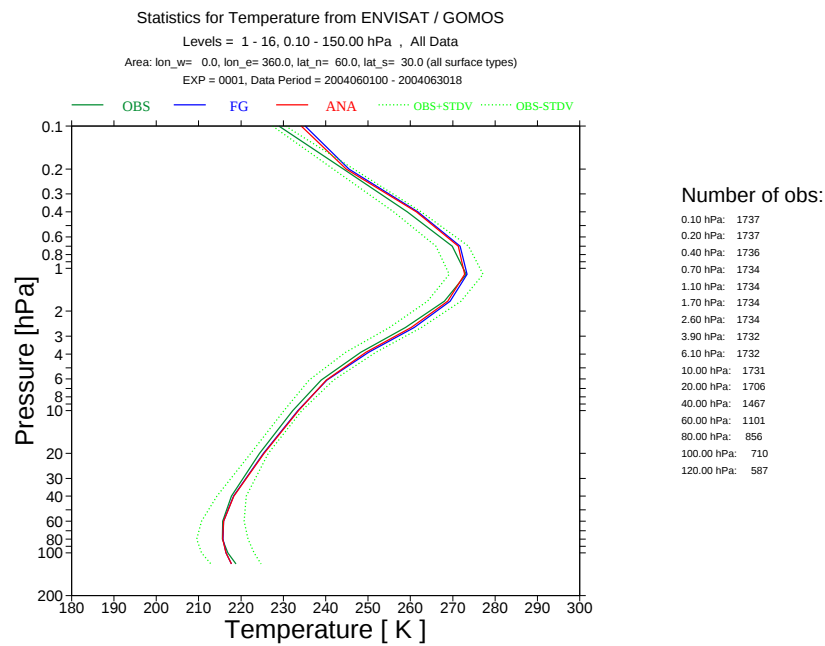


Fig. 5. As Fig. 3 but for 60-30N.

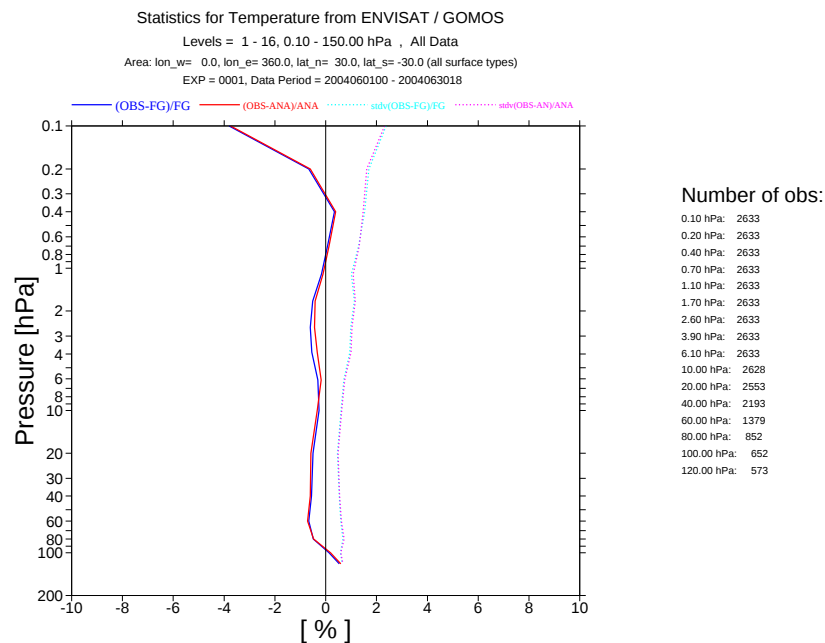
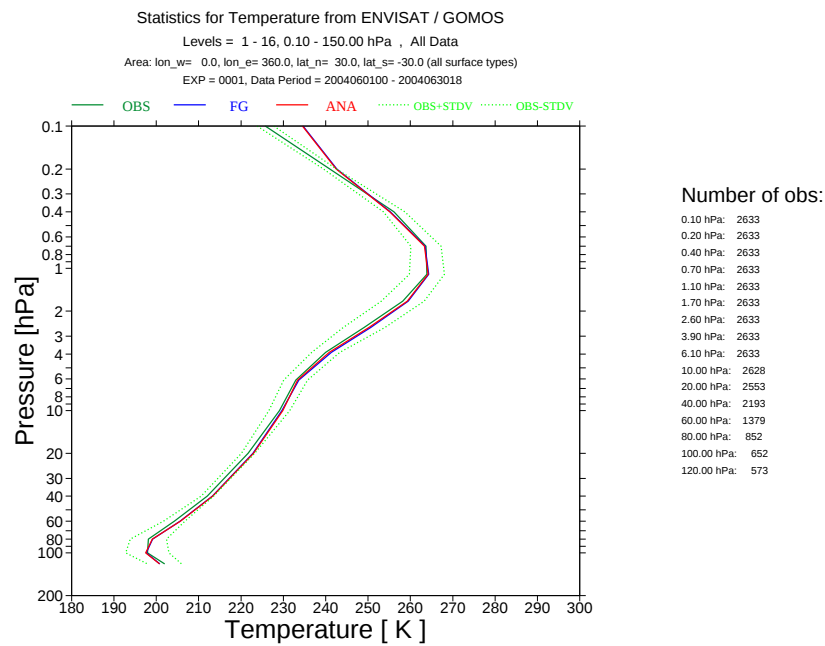


Fig. 6. As Fig. 3 but for 30N-30S.

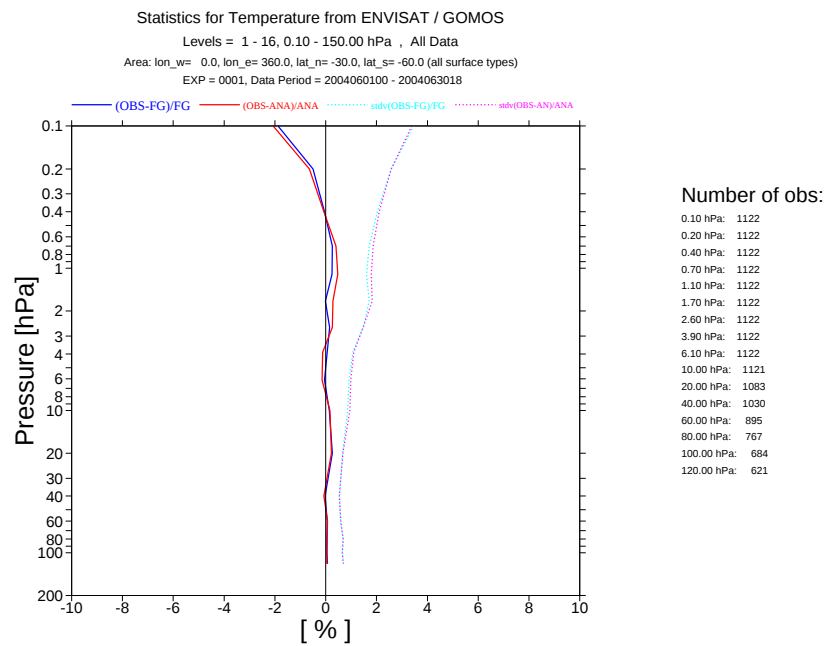
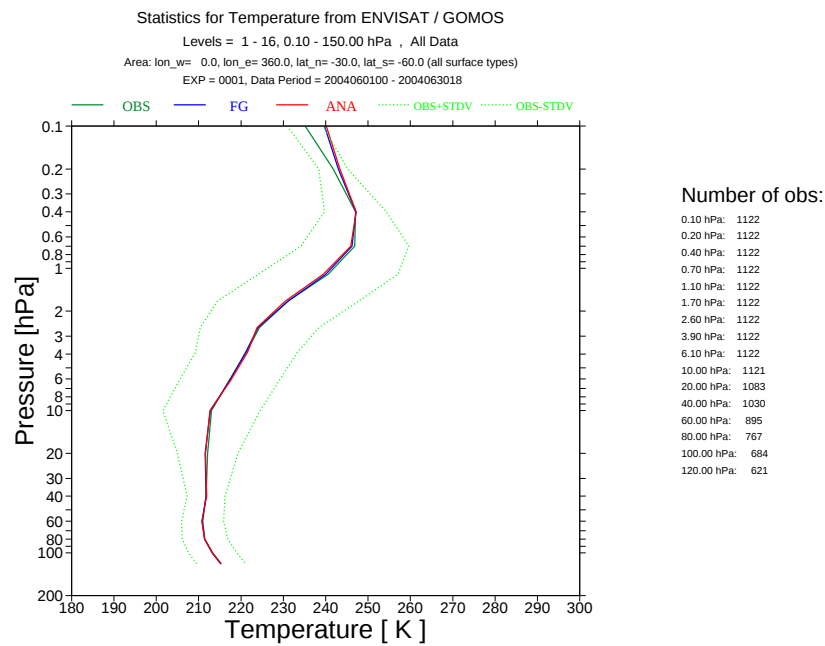


Fig. 7. As Fig. 3 but for 30-60S.

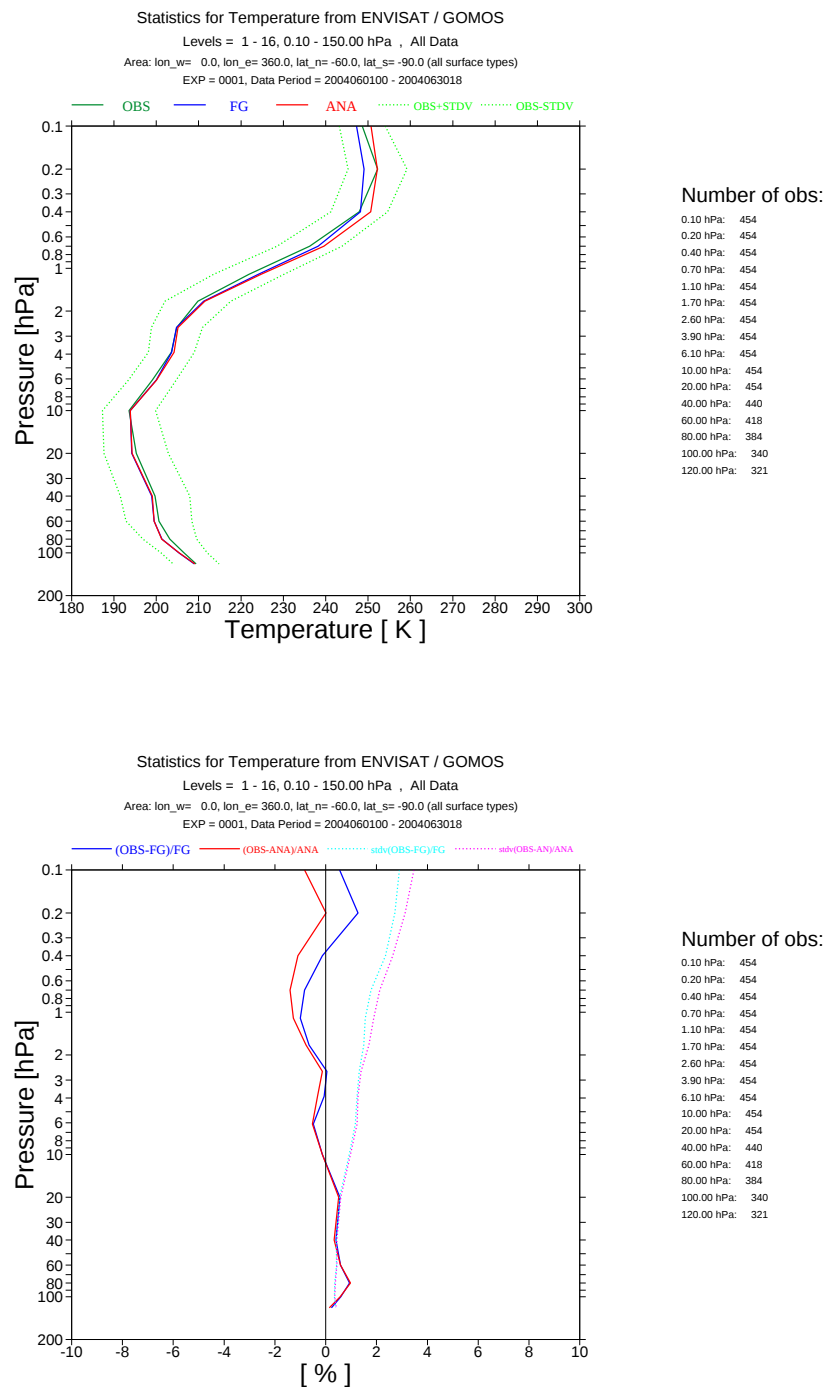


Fig. 8. As Fig. 3 but for 60-90S.

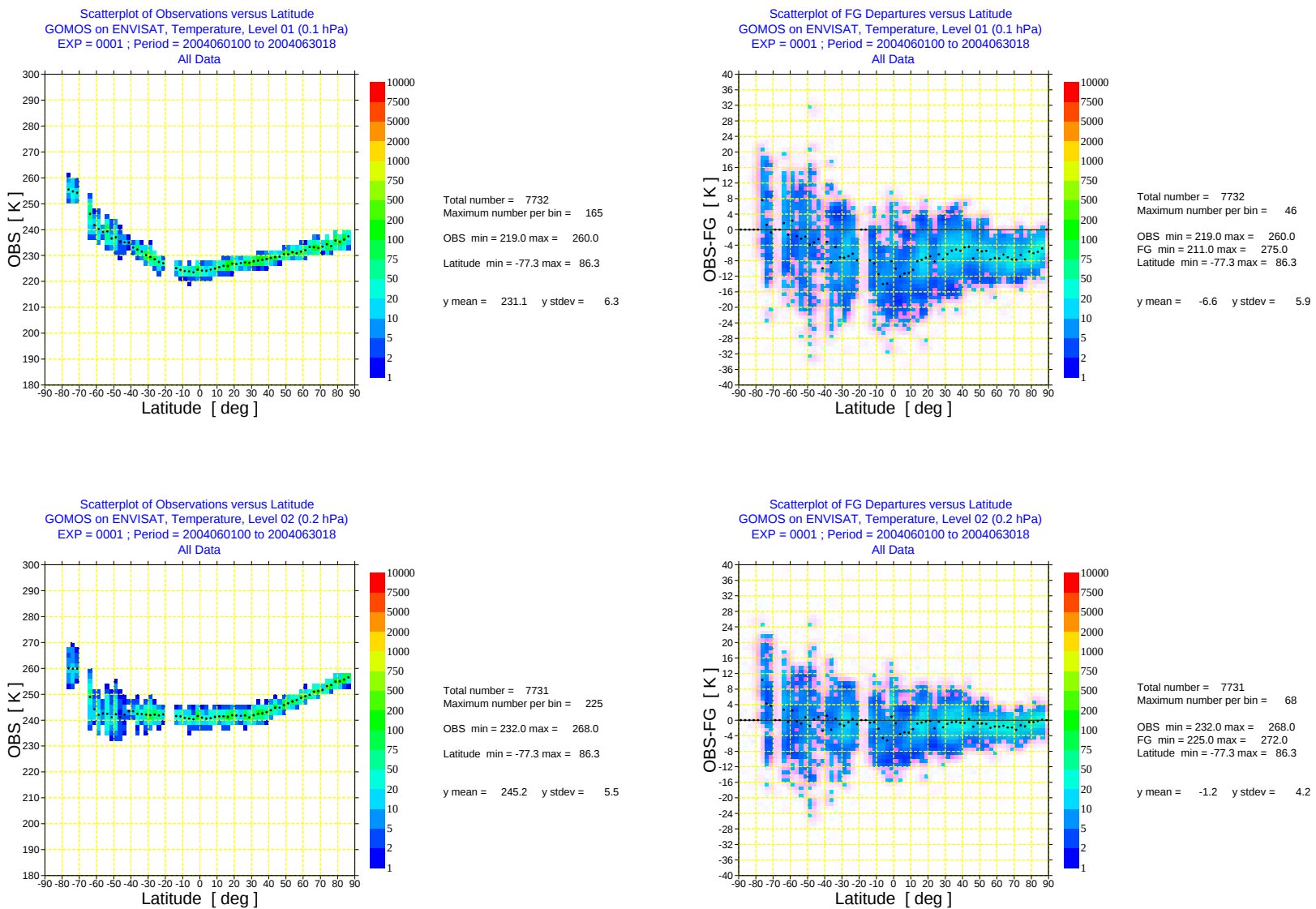


Fig. 9. Scatter plot of ENVISAT GOMOS NRT temperature data against latitude and scatter plot of first-guess departures of ENVISAT GOMOS NRT temperature data (right) against latitude for June 2004 for level 1 (0.1 hPa) and level 2 (0.2 hPa). The colours show the number of data per bin, the black dots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

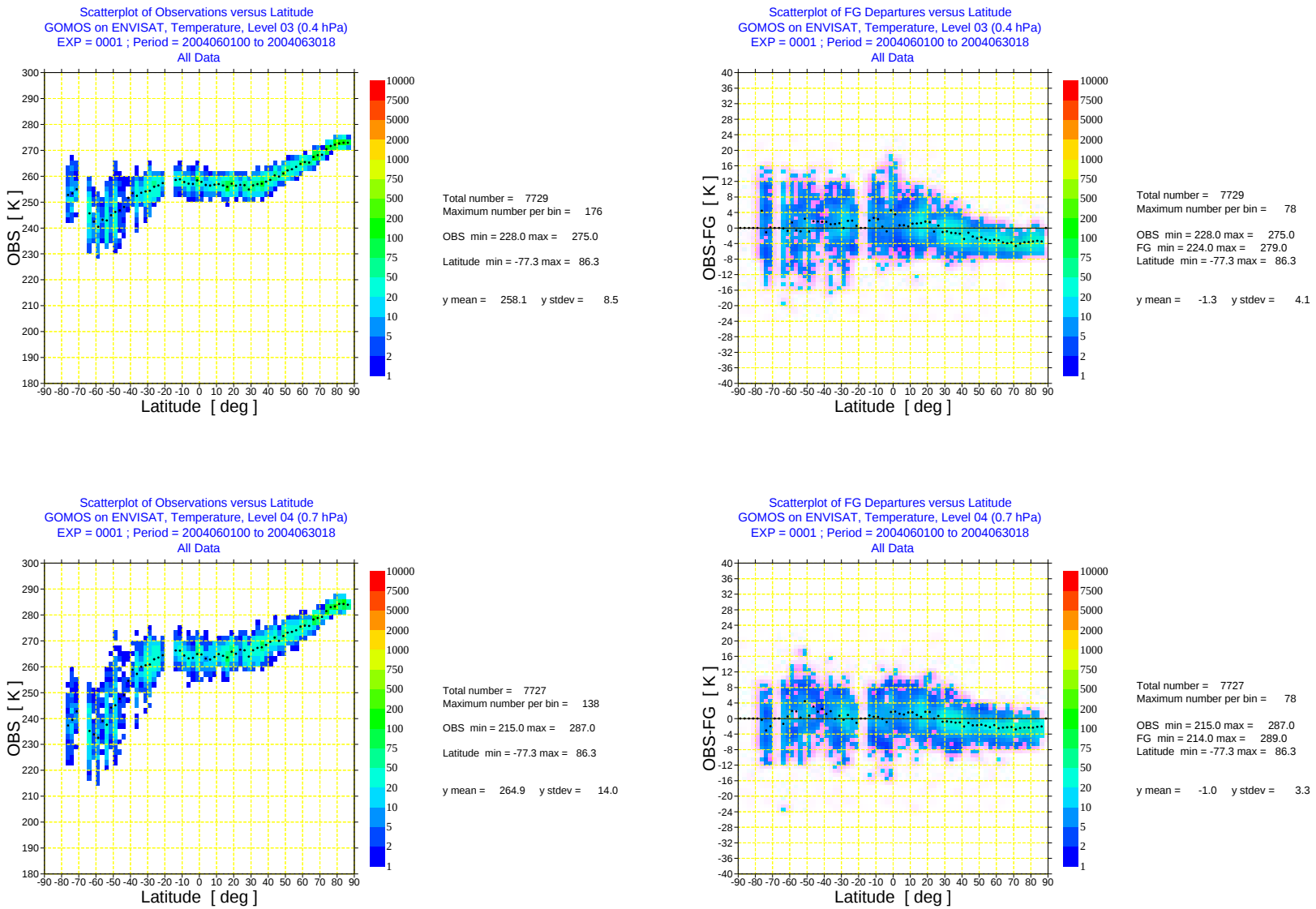


Fig. 10. As Fig. 9 but for level 3 (0.4 hPa) and level 4 (0.7 hPa).

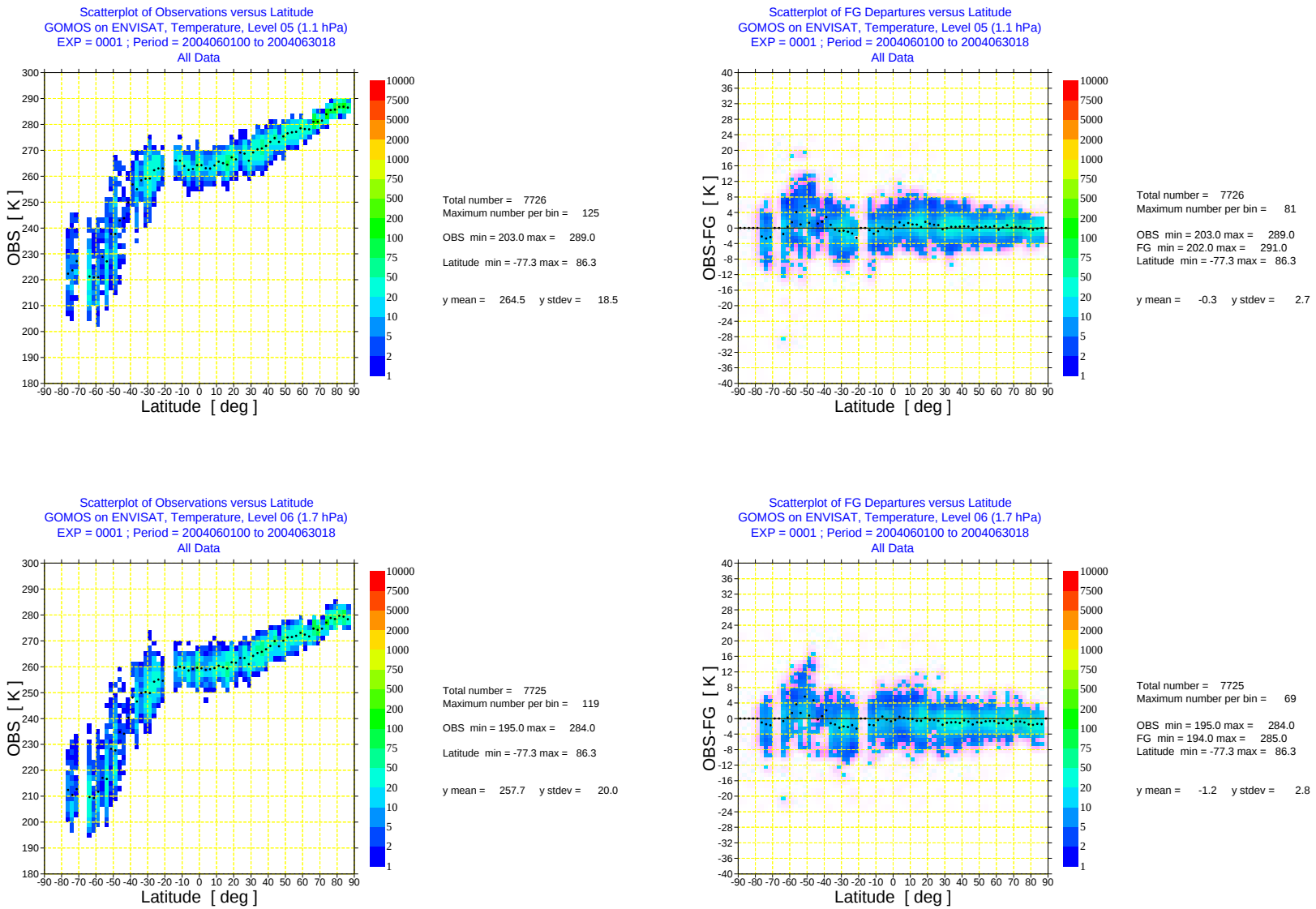


Fig. 11. As Fig. 9 but for level 5 (1.1 hPa) and level 6 (1.7 hPa).

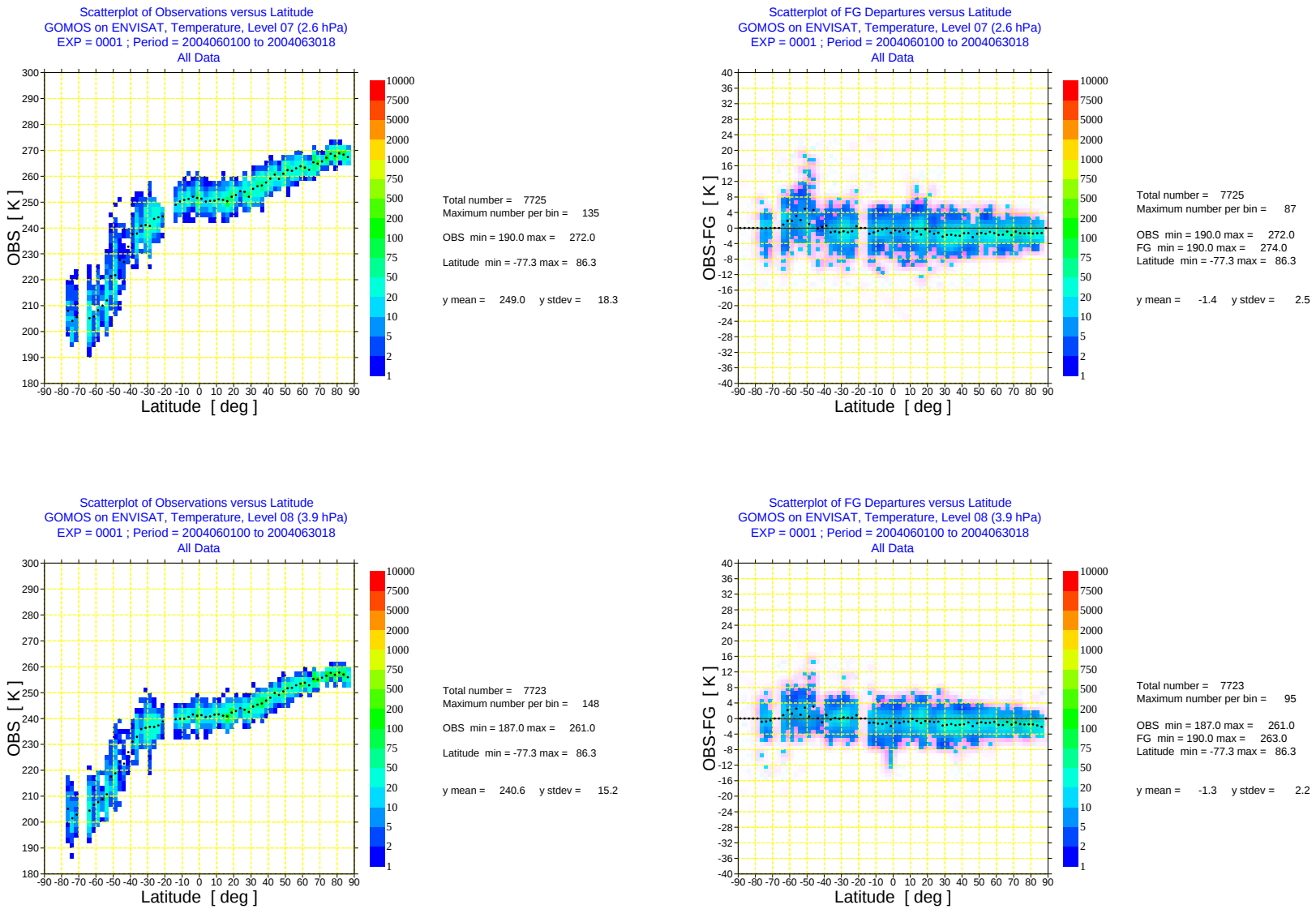


Fig. 12. As Fig. 9 but for level 7 (2.6 hPa) and level 8 (3.9 hPa).

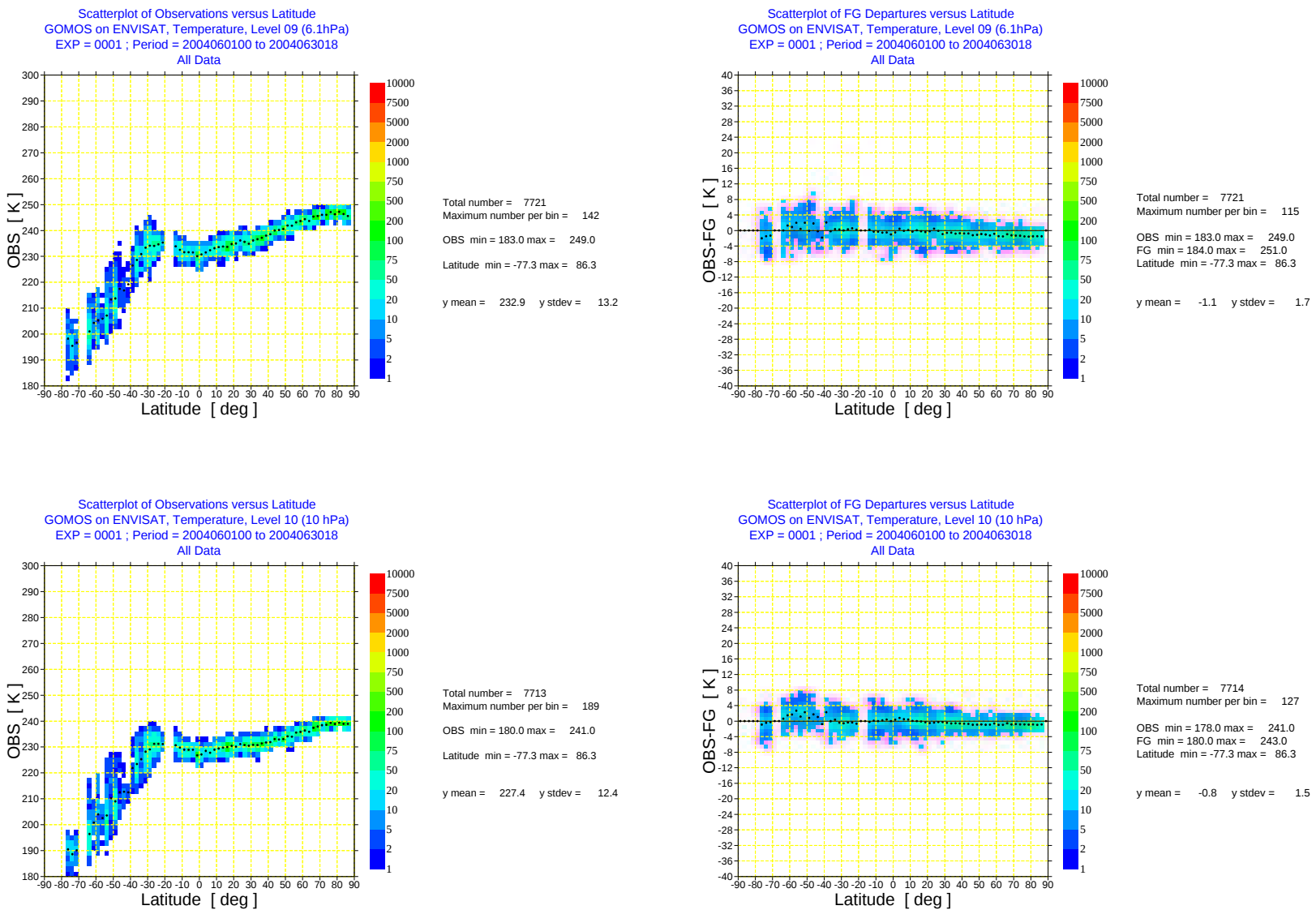


Fig. 13. As Fig. 9 but for level 9 (6.1 hPa) and level 10 (10 hPa).

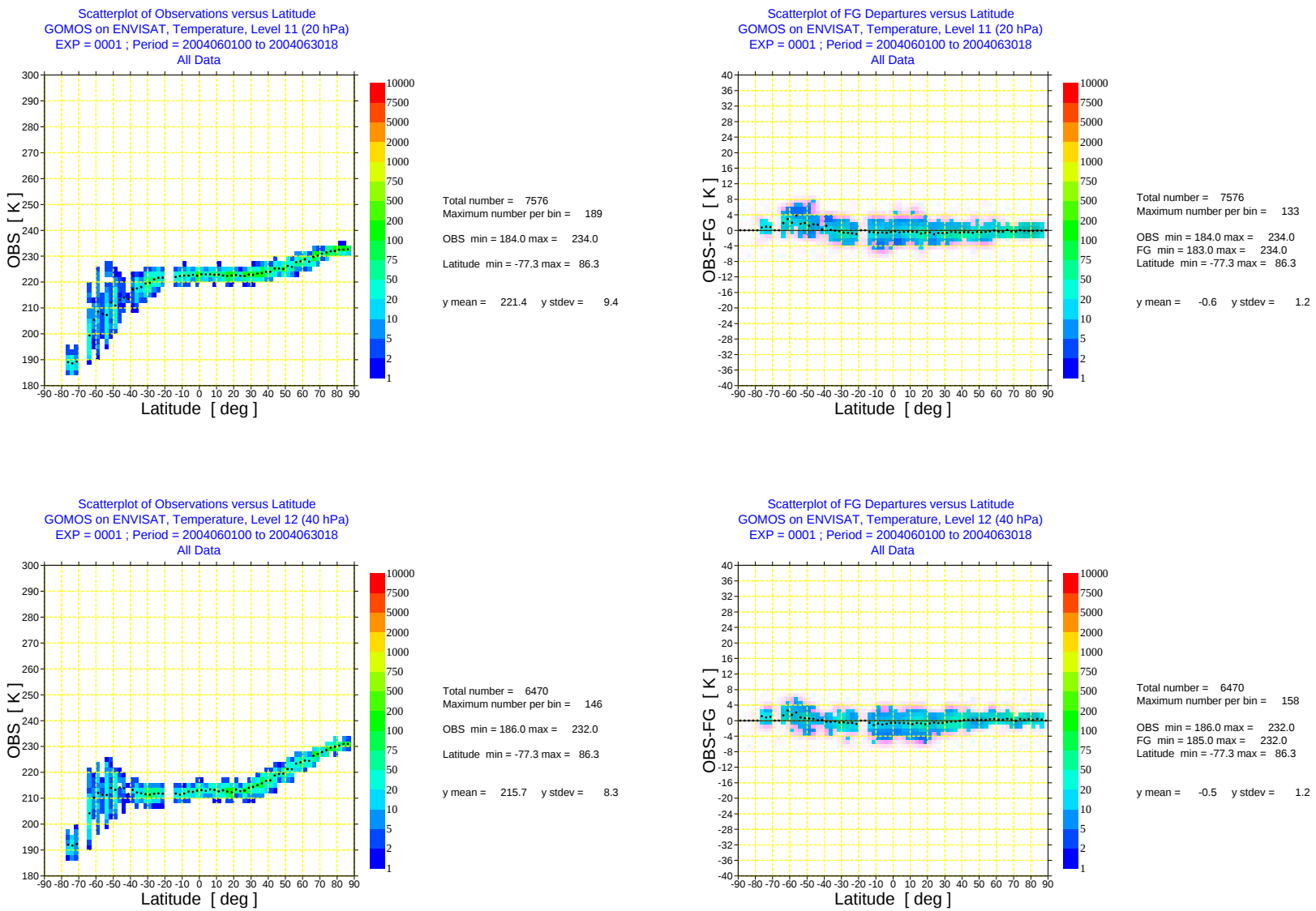


Fig. 14. As Fig. 9 but for level 11 (20 hPa) and level 12 (40 hPa).

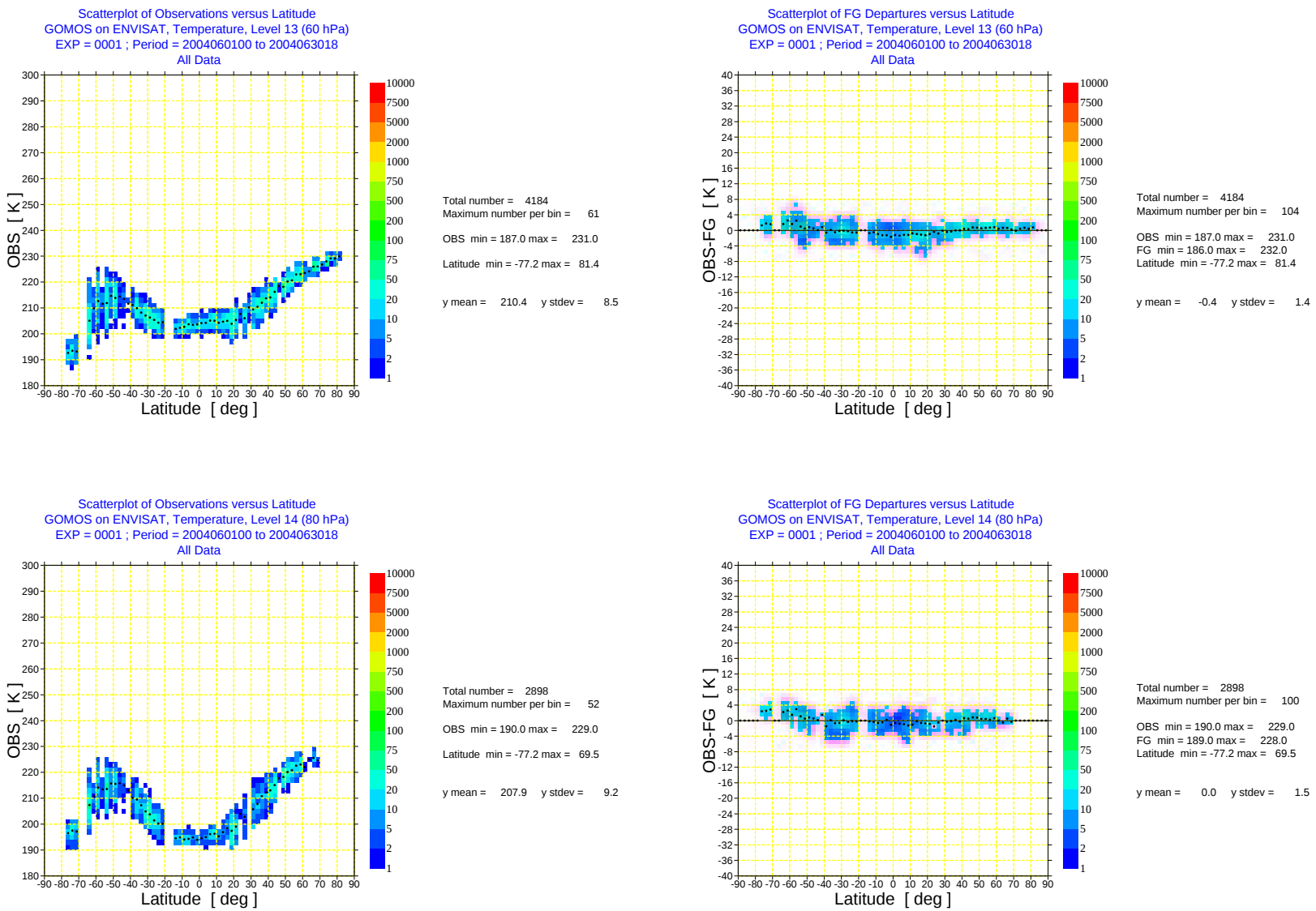


Fig. 15. As Fig. 9 but for level 13 (60 hPa) and level 14 (80 hPa).

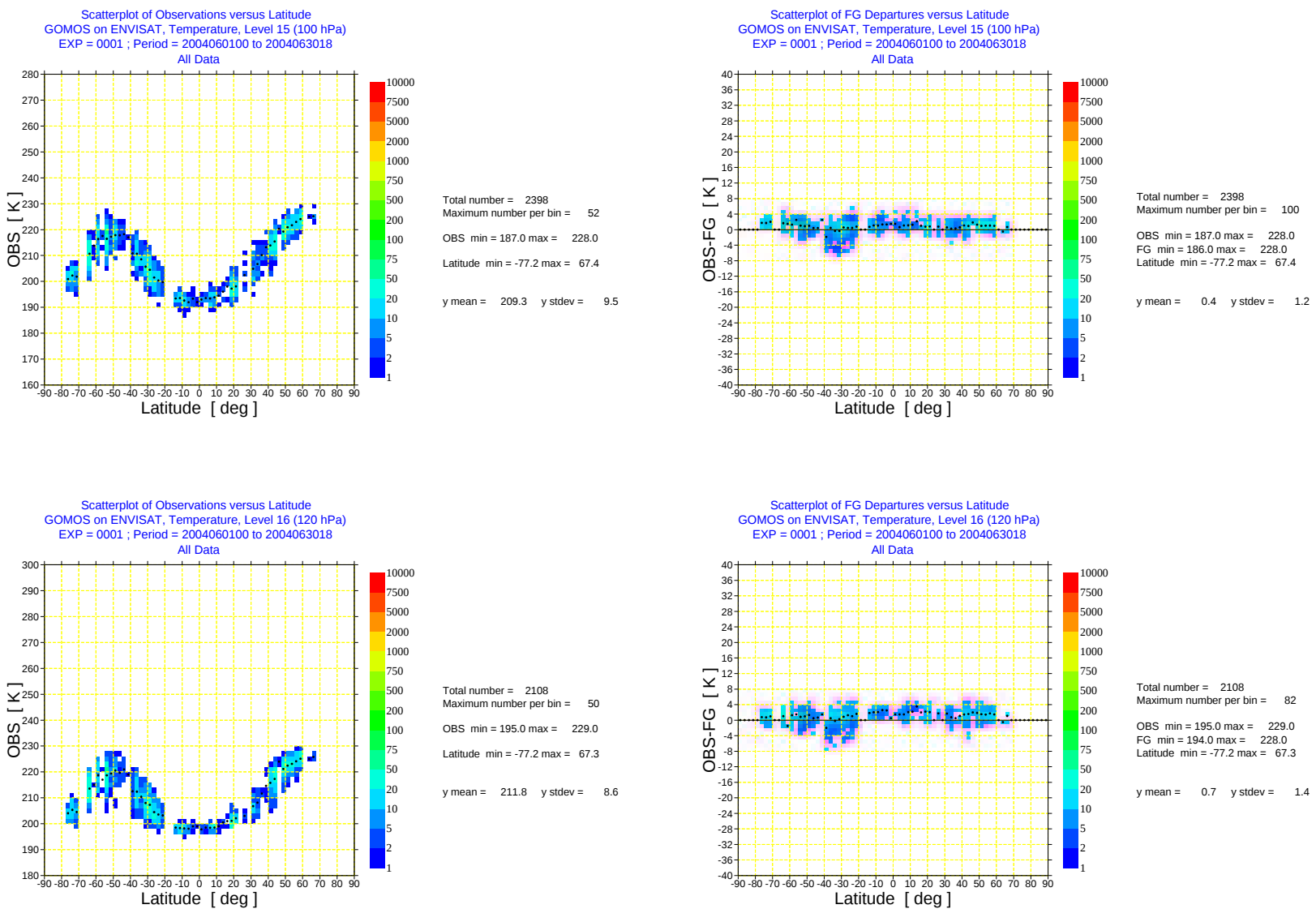


Fig. 16. As Fig. 9 but for level 15 (100 hPa) and level 16 (120 hPa).

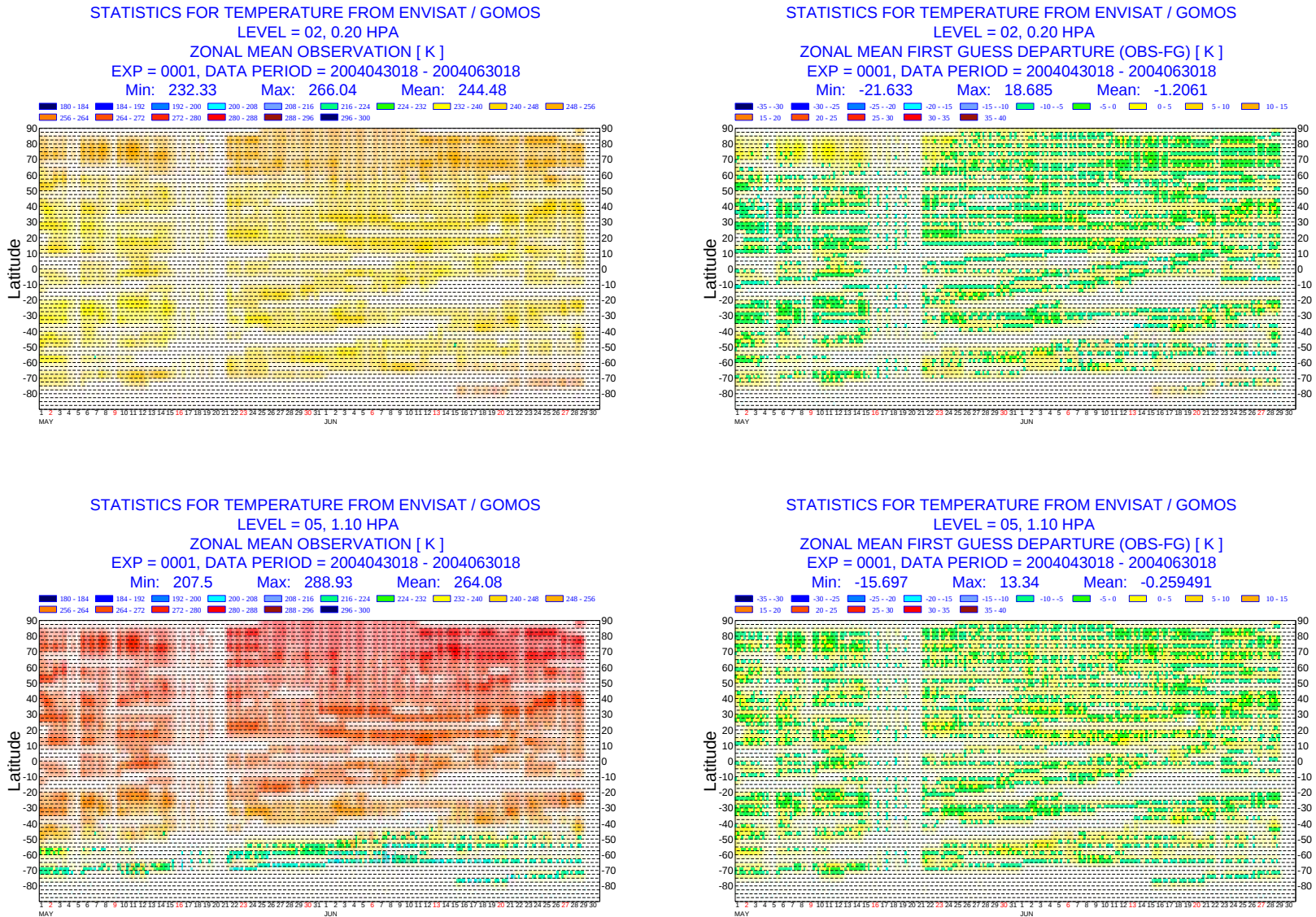


Fig. 17. Homoeoller diagram of zonal mean ENVISAT GOMOS NRT temperature data per 6-hour cycle for May and June 2004 and of the zonal mean first-guess departures for level 2 (0.2 hPa) and level 5 (1.1 hPa).

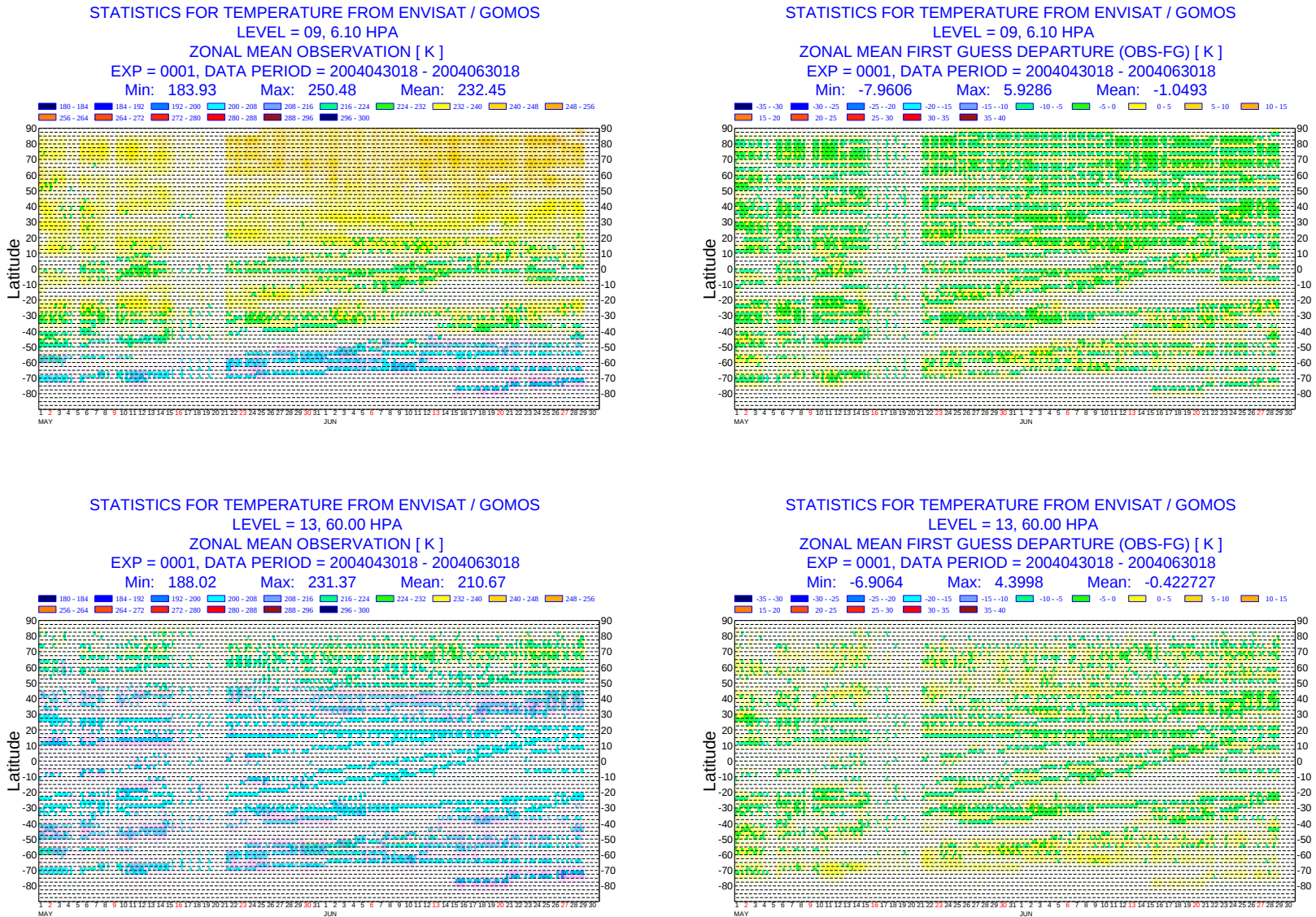


Fig. 18. As Fig. 17 but for level 9 (6.1 hPa) and level 13 (60 hPa).

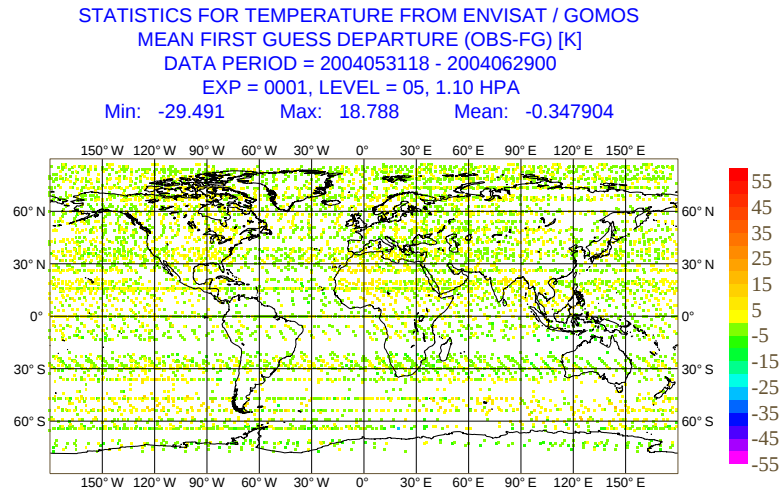
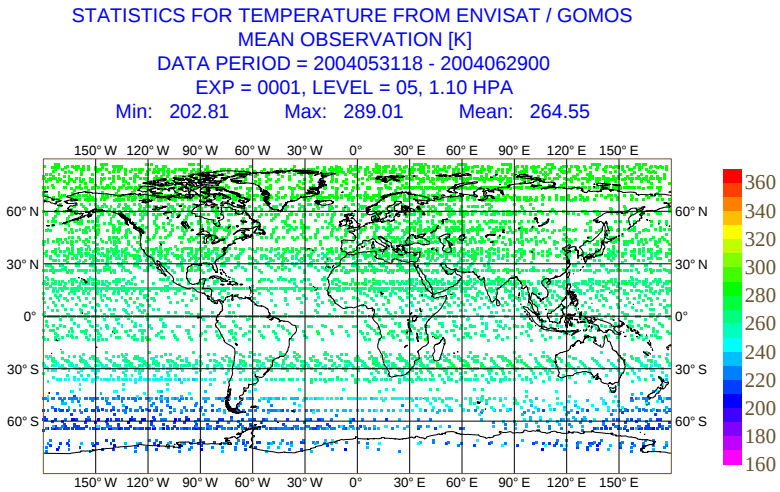
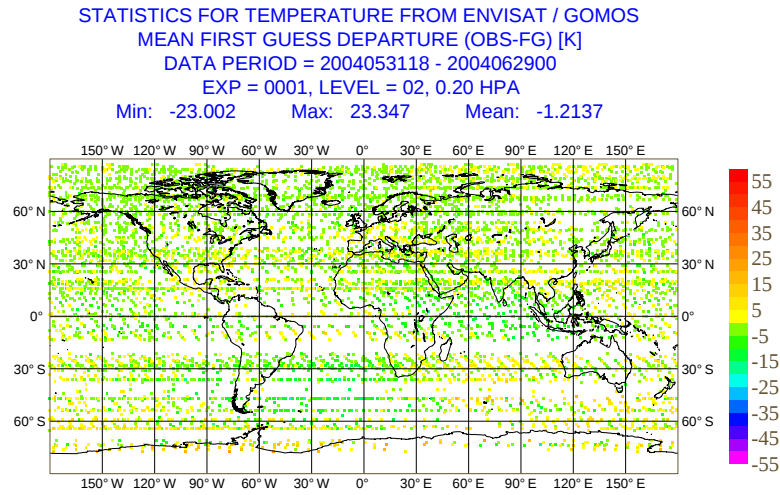
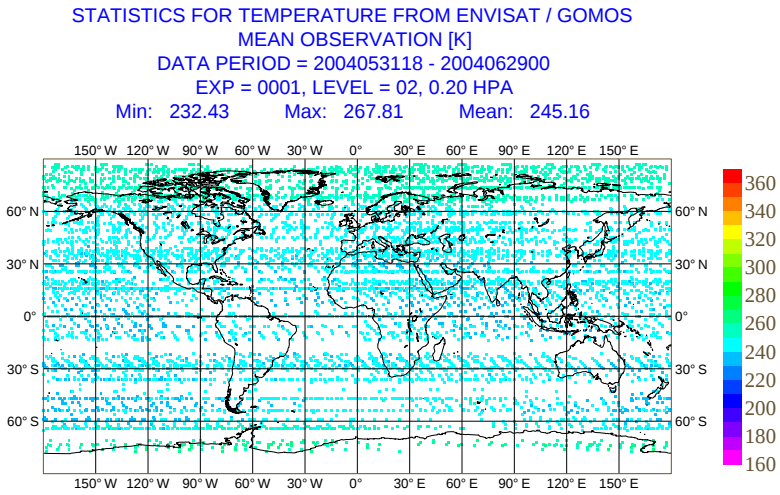


Fig. 19. Geographical distribution of mean ENVISAT GOMOS NRT temperature data and mean first-guess departures for June 2004 for level 2 (0.2 hPa) and level 5 (1.1 hPa).

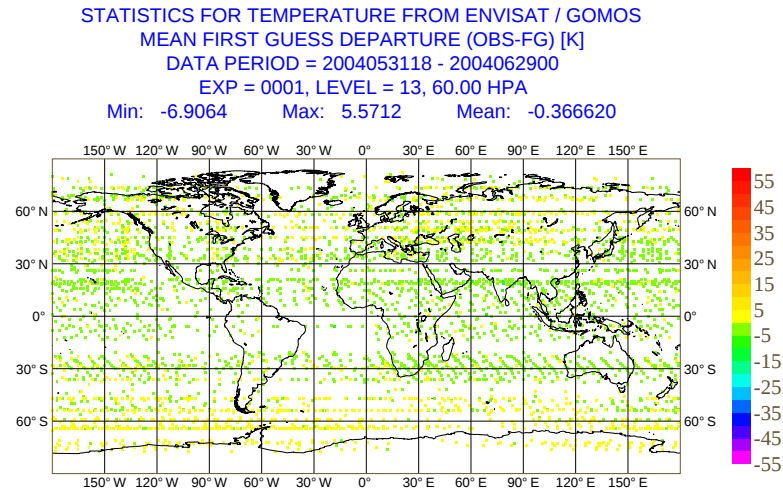
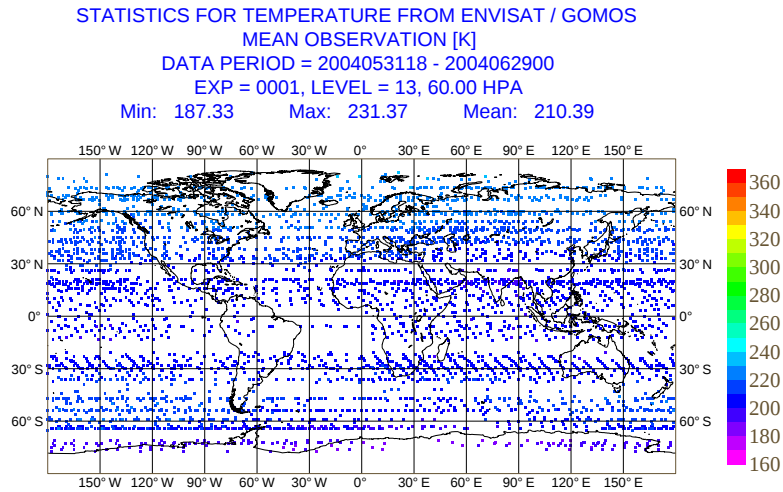
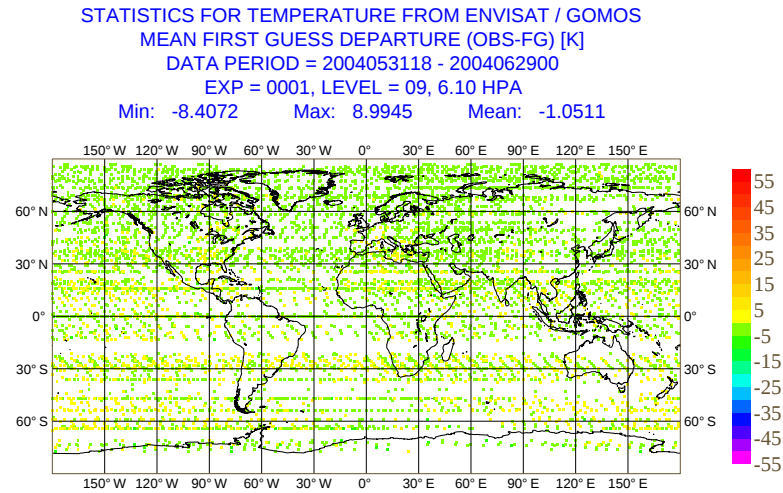
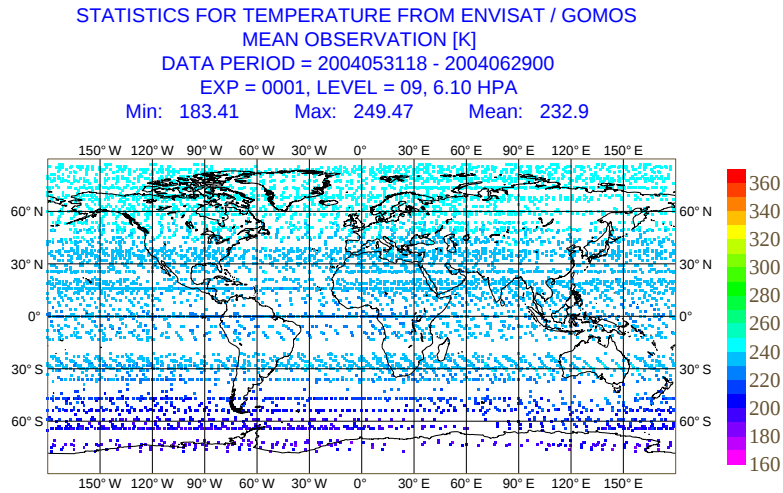


Fig. 20. As Fig. 19 but for level 9 (6.1 hPa) and level 13 (60 hPa).

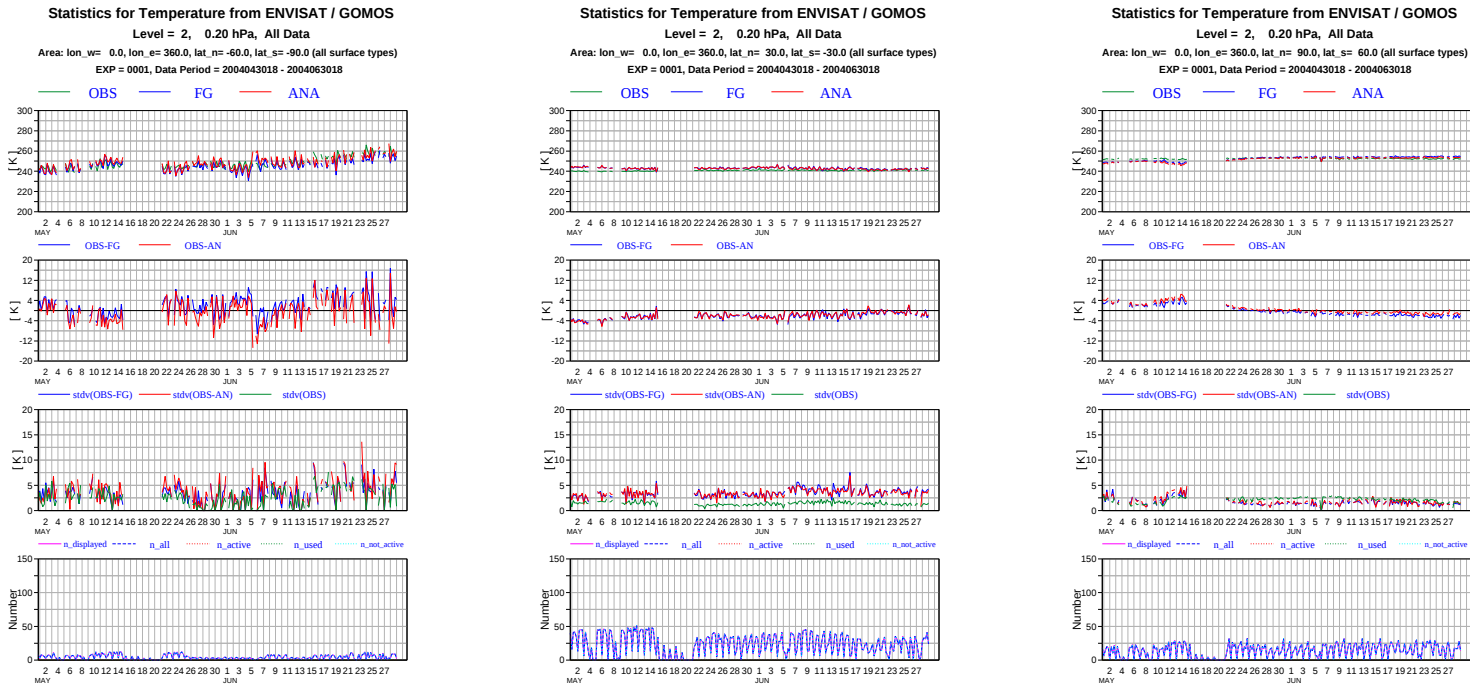


Fig. 21. Time series of mean ENVISAT GOMOS NRT temperature data, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for level 2 (0.2 hPa) 90-60N, 30N-30S, 60-90S for May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

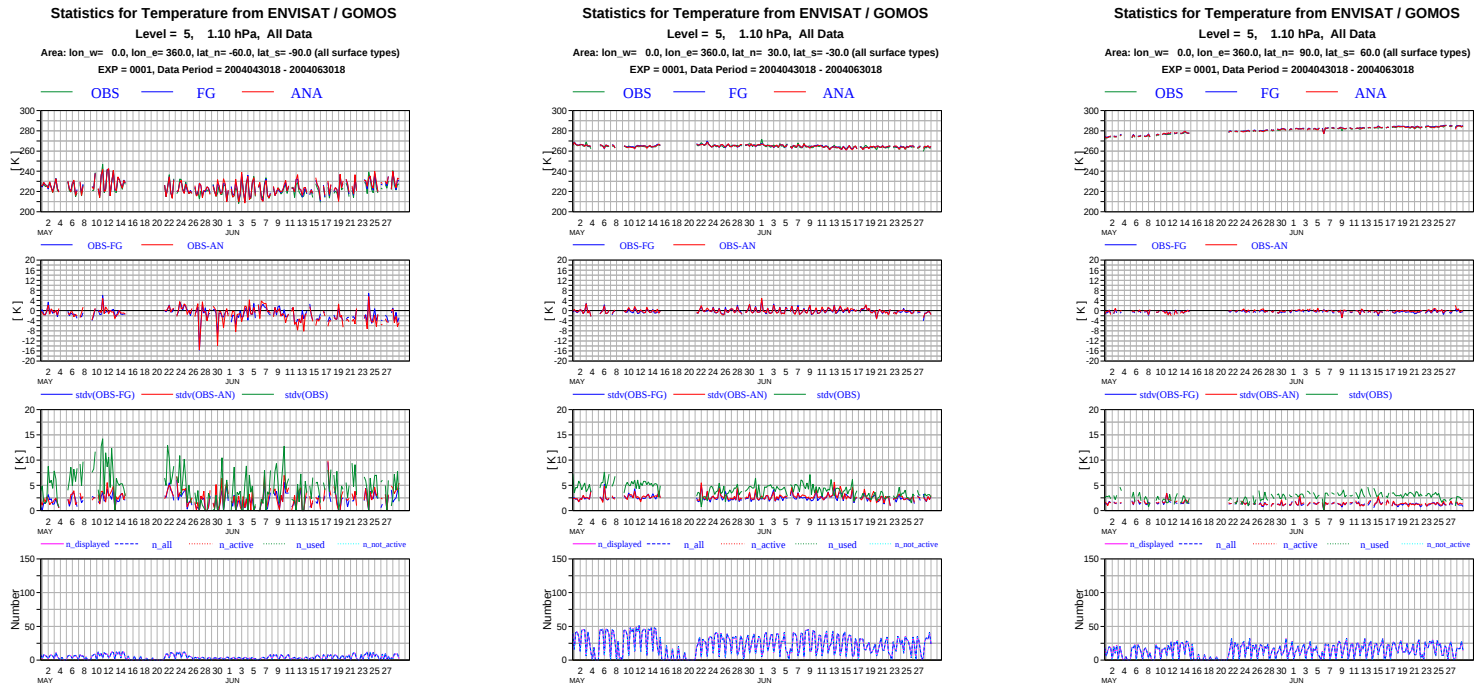


Fig. 22. As Figure 21, but for level 5 (1.1 hPa).

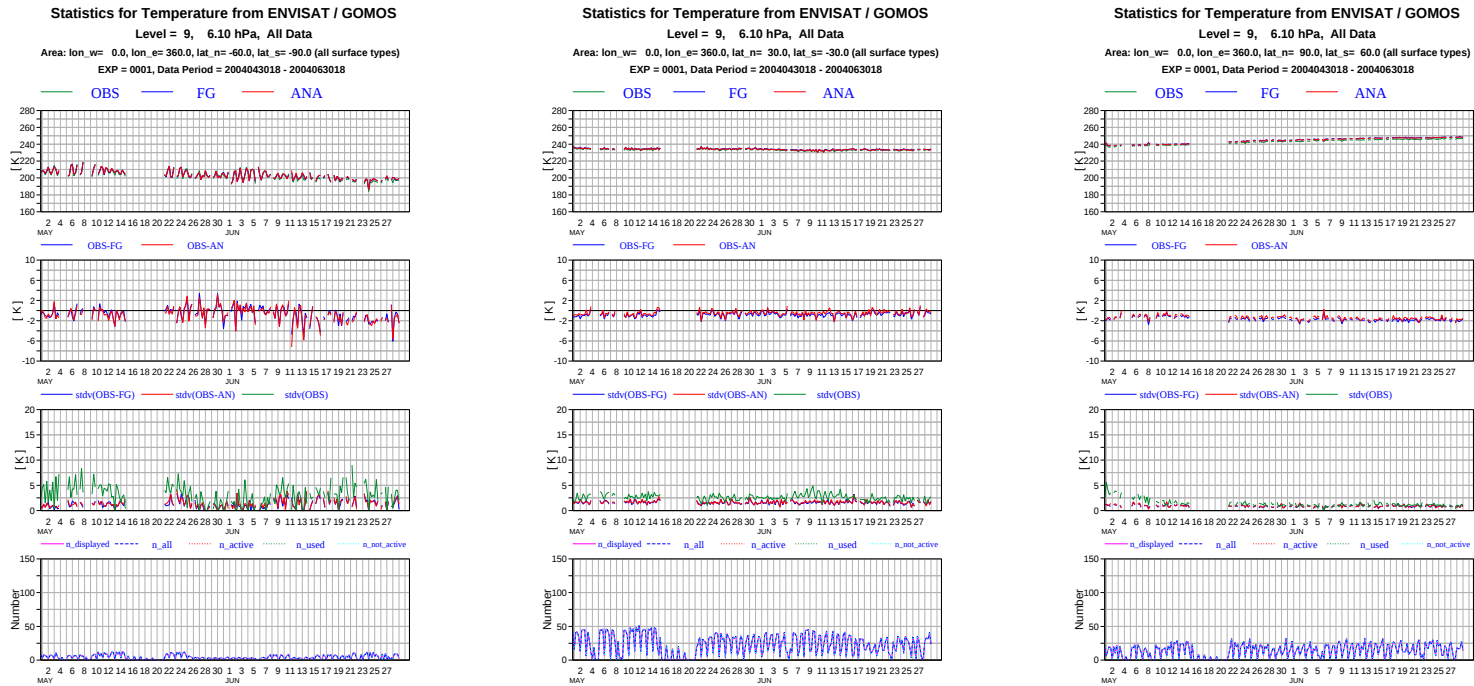


Fig. 23. As Figure 21, but for level 9 (6.1 hPa).

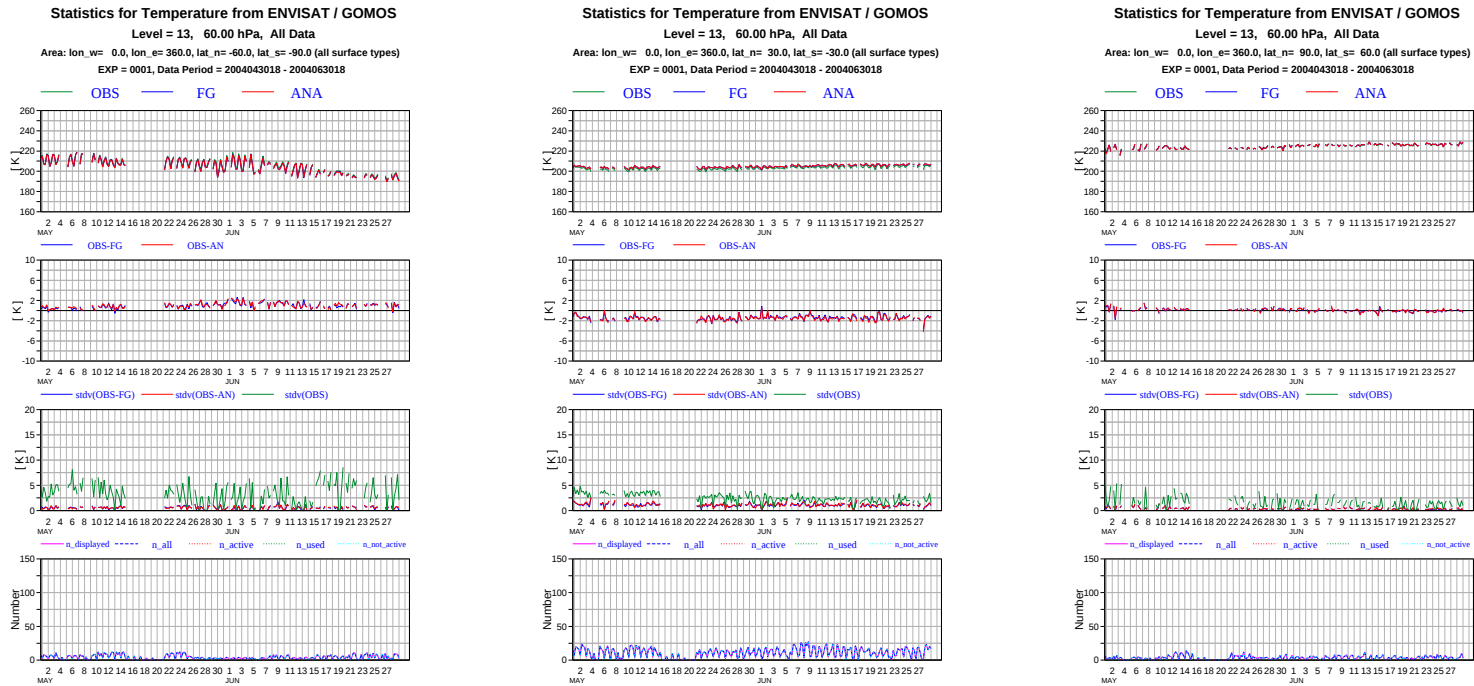


Fig. 24. As Figure 21, but for level 13 (60 hPa).

# REPORT ABOUT ENVISAT GOMOS NRT OZONE DATA (GOM\_RR\_2P) FOR JUNE 2004

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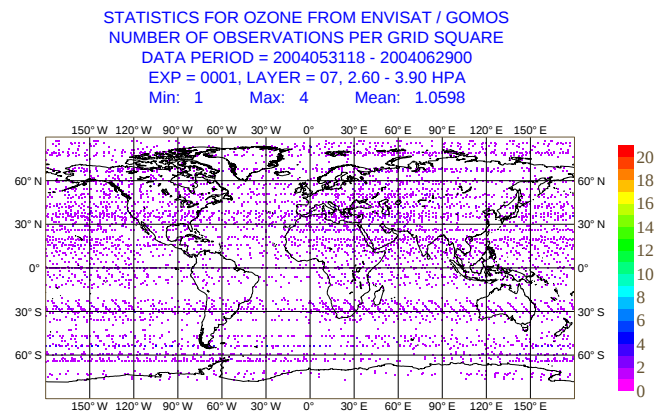


Fig. 1. Geographical distribution of mean number of ENVISAT GOMOS NRT ozone data for June 2004.

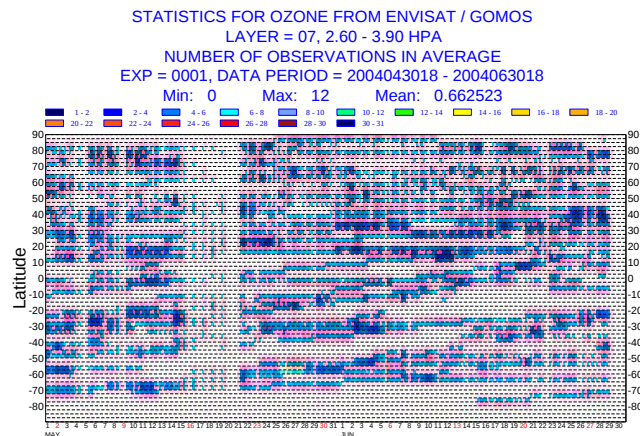


Fig. 2. Hovmoeller diagram of zonal mean number of data of ENVISAT GOMOS NRT ozone data per 6-hour cycle for May and June 2004.

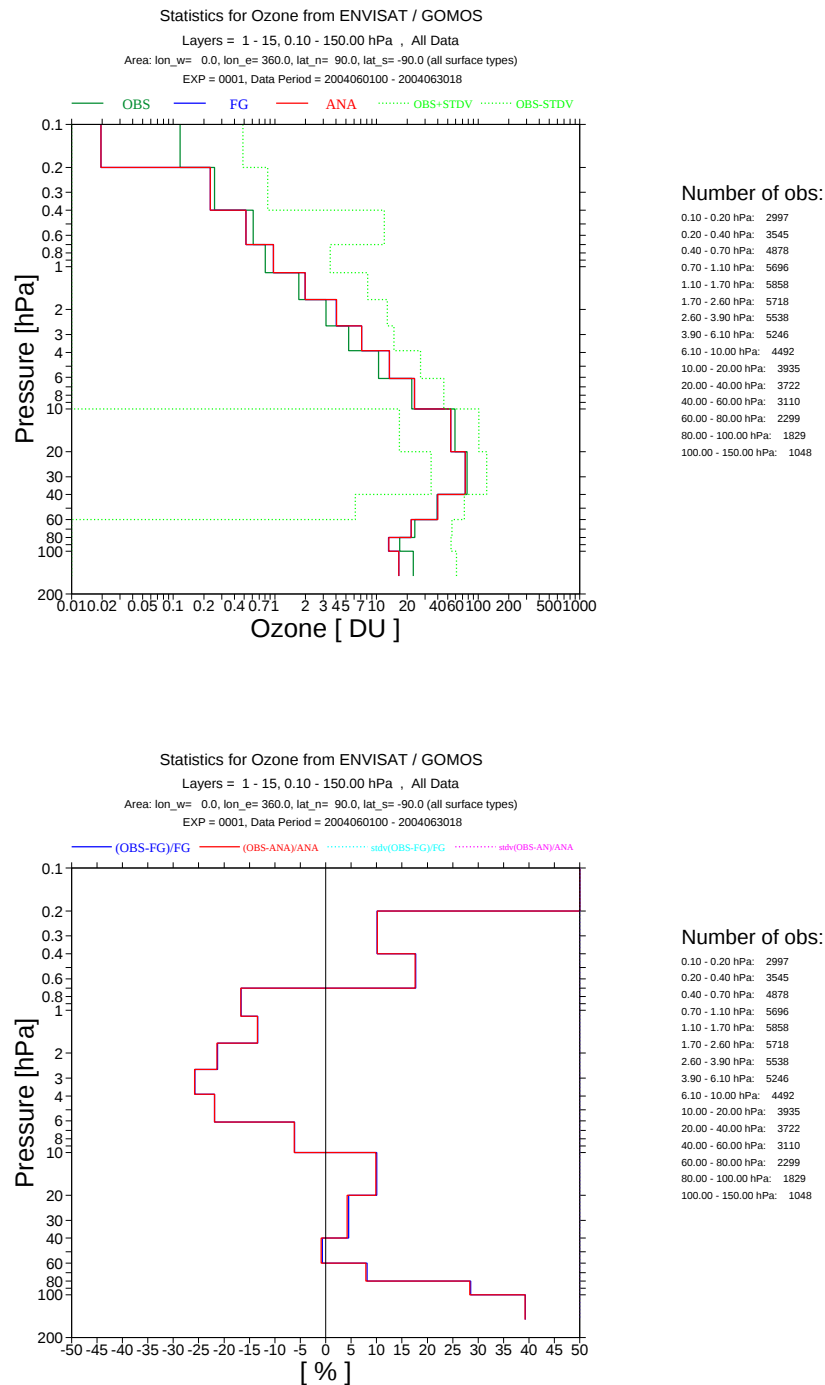


Fig. 3. Time mean vertical distribution of ENVISAT GOMOS NRT ozone data in DU for June 2004 (global mean). The top plot shows the mean analysis values (blue), the mean observation (red), and the mean observation  $\pm 1$  standard deviation (dotted lines). The bottom plot shows the departures and the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

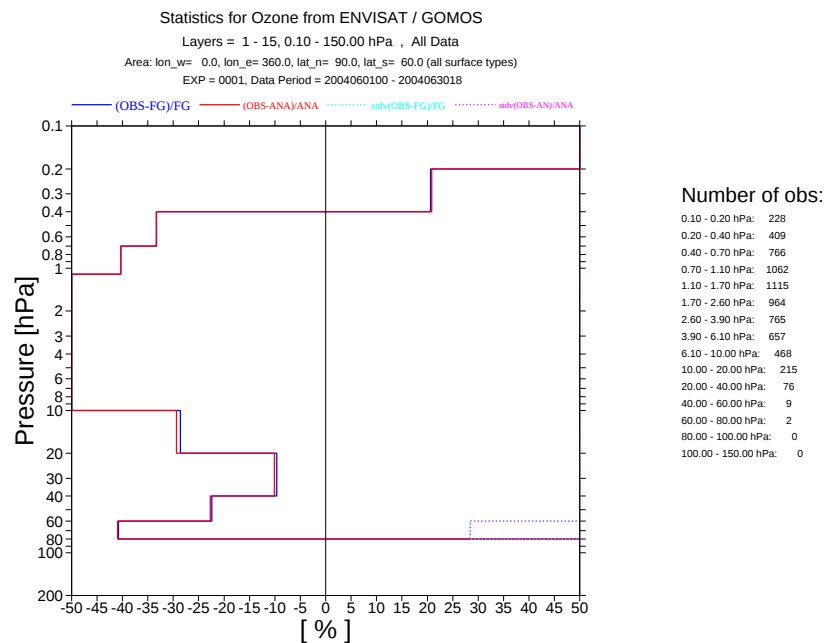
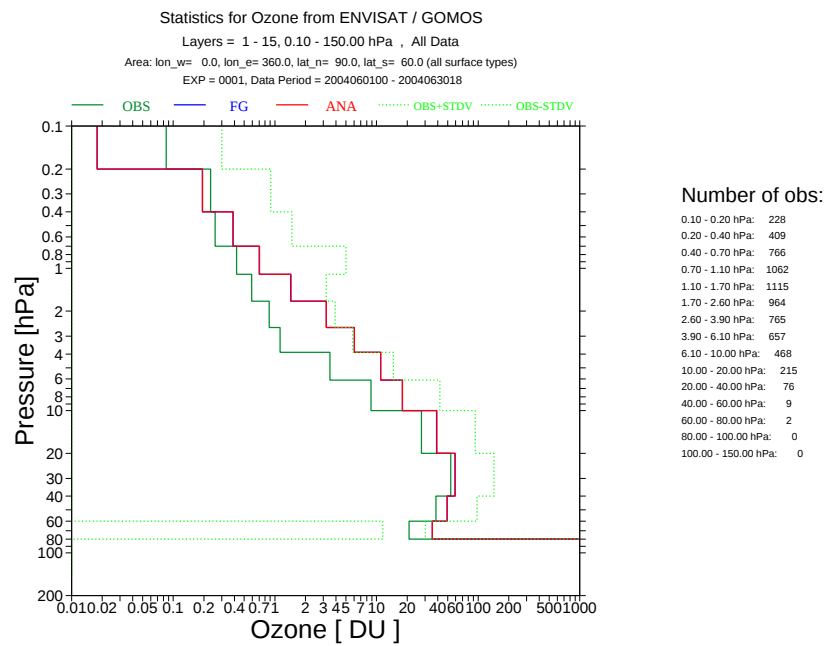


Fig. 4. As Fig. 3 but for 90N-60N.

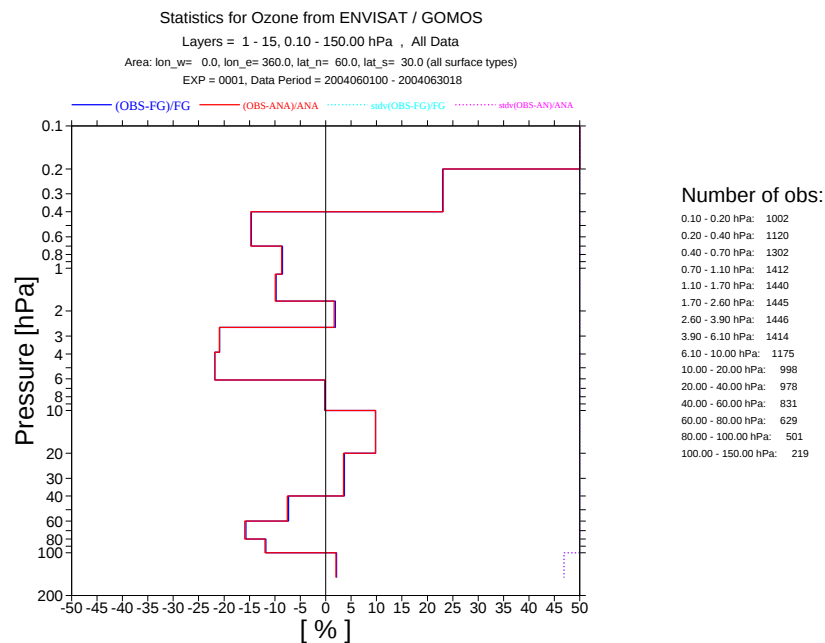
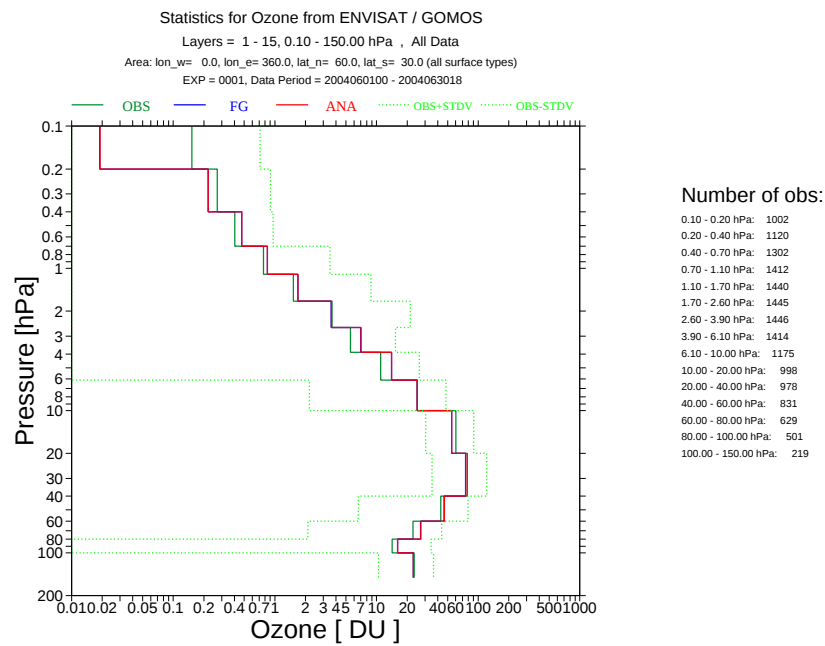


Fig. 5. As Fig. 3 but for 60-30N.

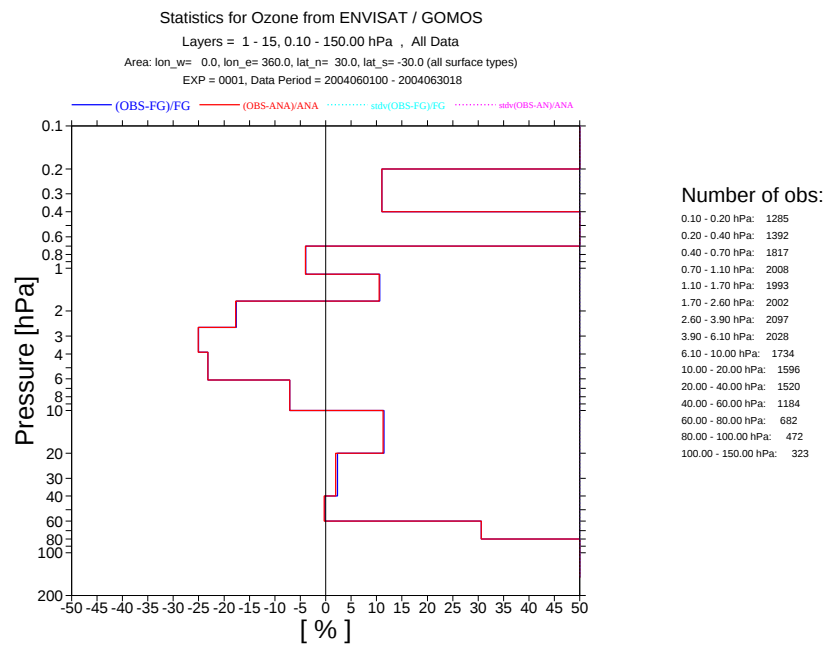
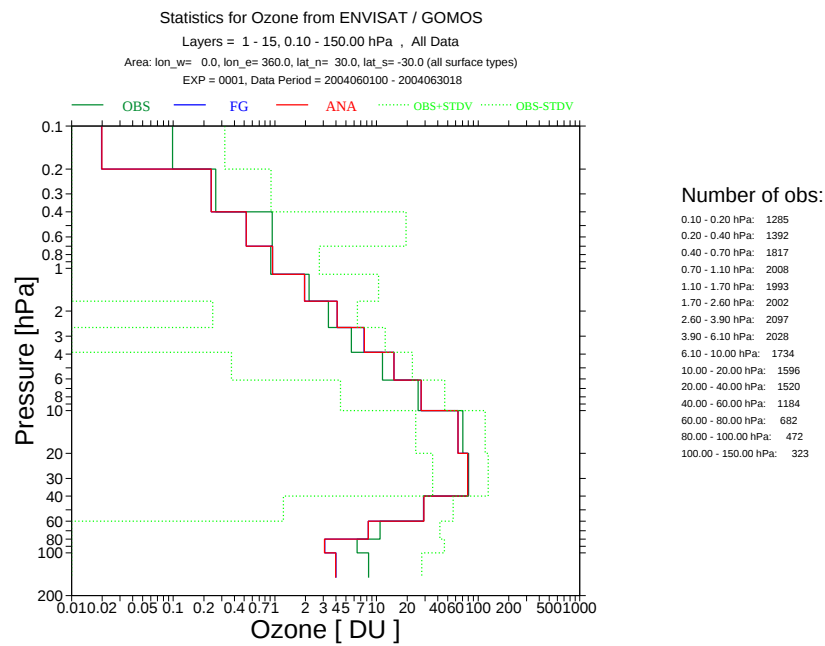


Fig. 6. As Fig. 3 but for 30N-30S.

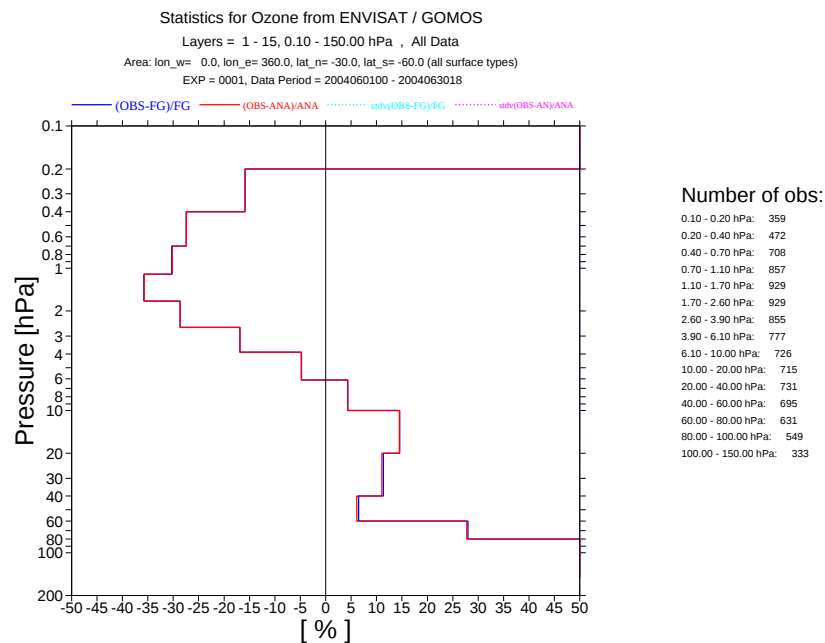
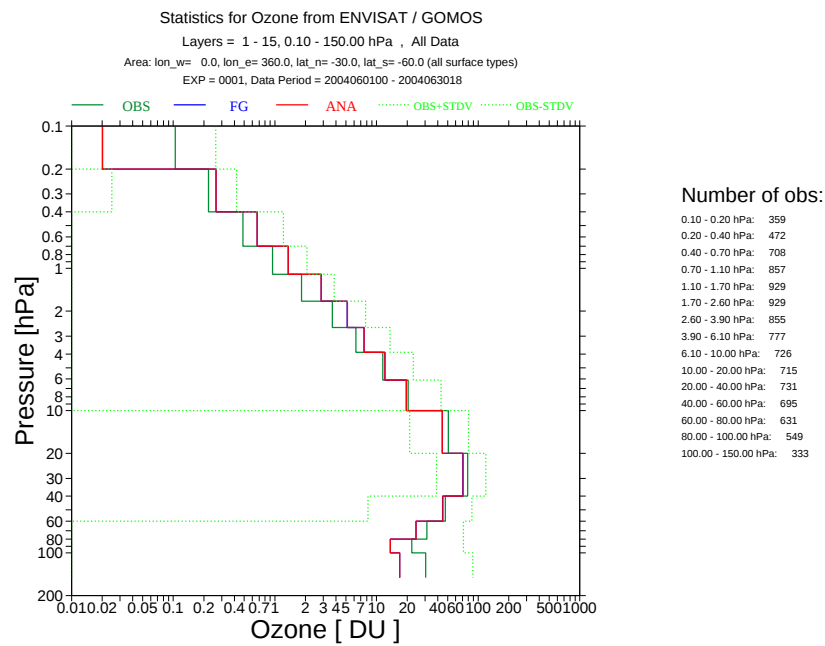


Fig. 7. As Fig. 3 but for 30S-60S.

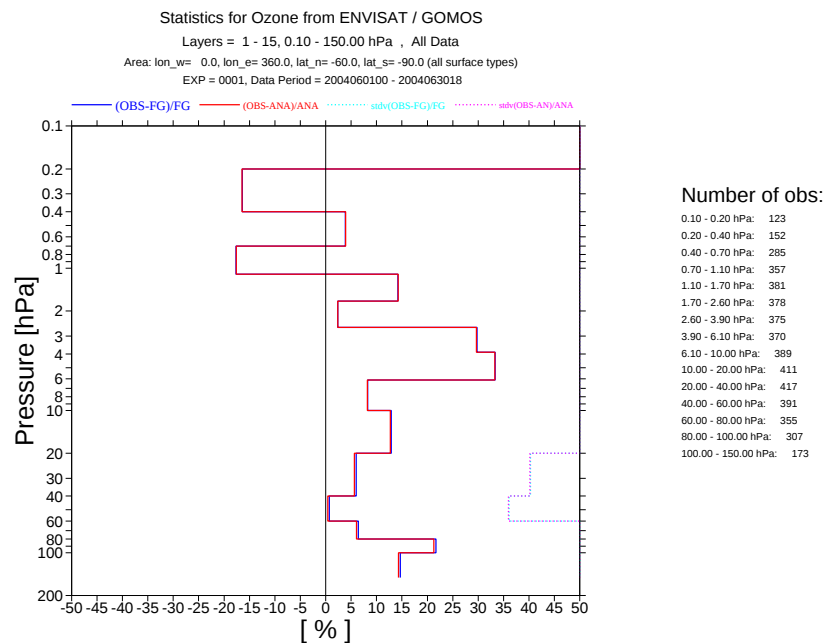
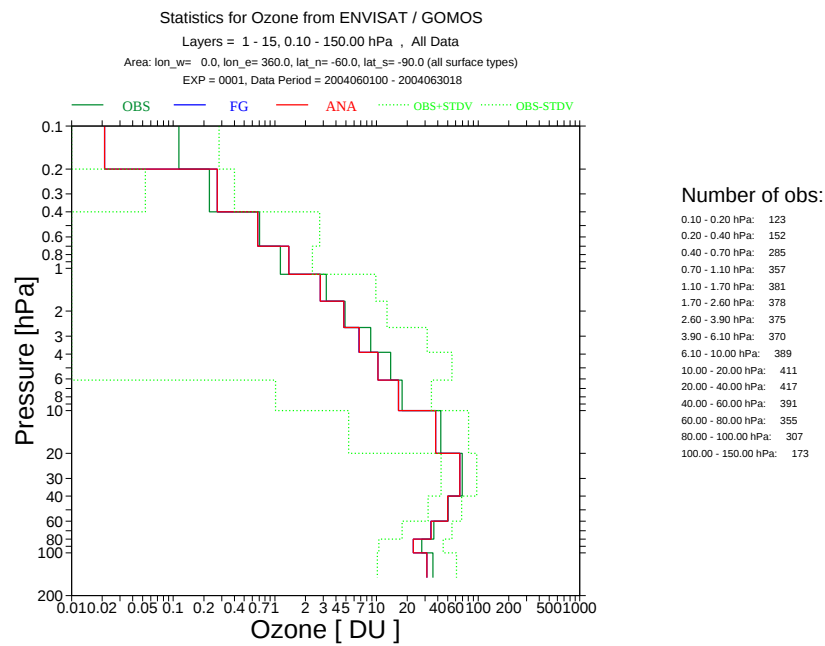


Fig. 8. As Fig. 3 but for 60-90S.

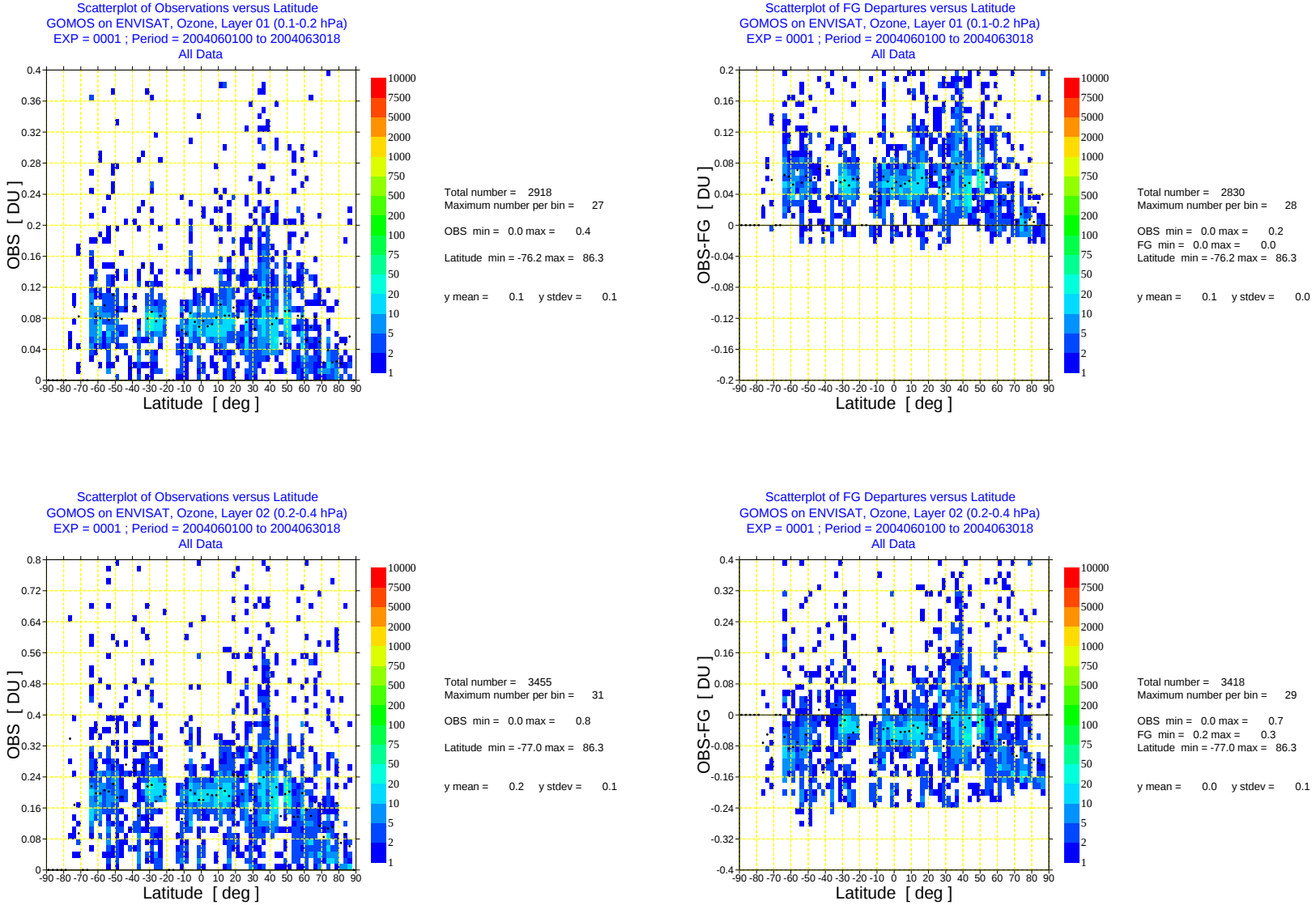


Fig. 9. Scatter plot of ENVISAT GOMOS NRT ozone data against latitude and scatter plot of first-guess departures of ENVISAT GOMOS NRT ozone data (right) against latitude for June 2004 for layer 1 (0.1-0.2 hPa) and layer 2 (0.2-0.4 hPa).

The colours show the number of data per bin, the black dots the mean value per bin.

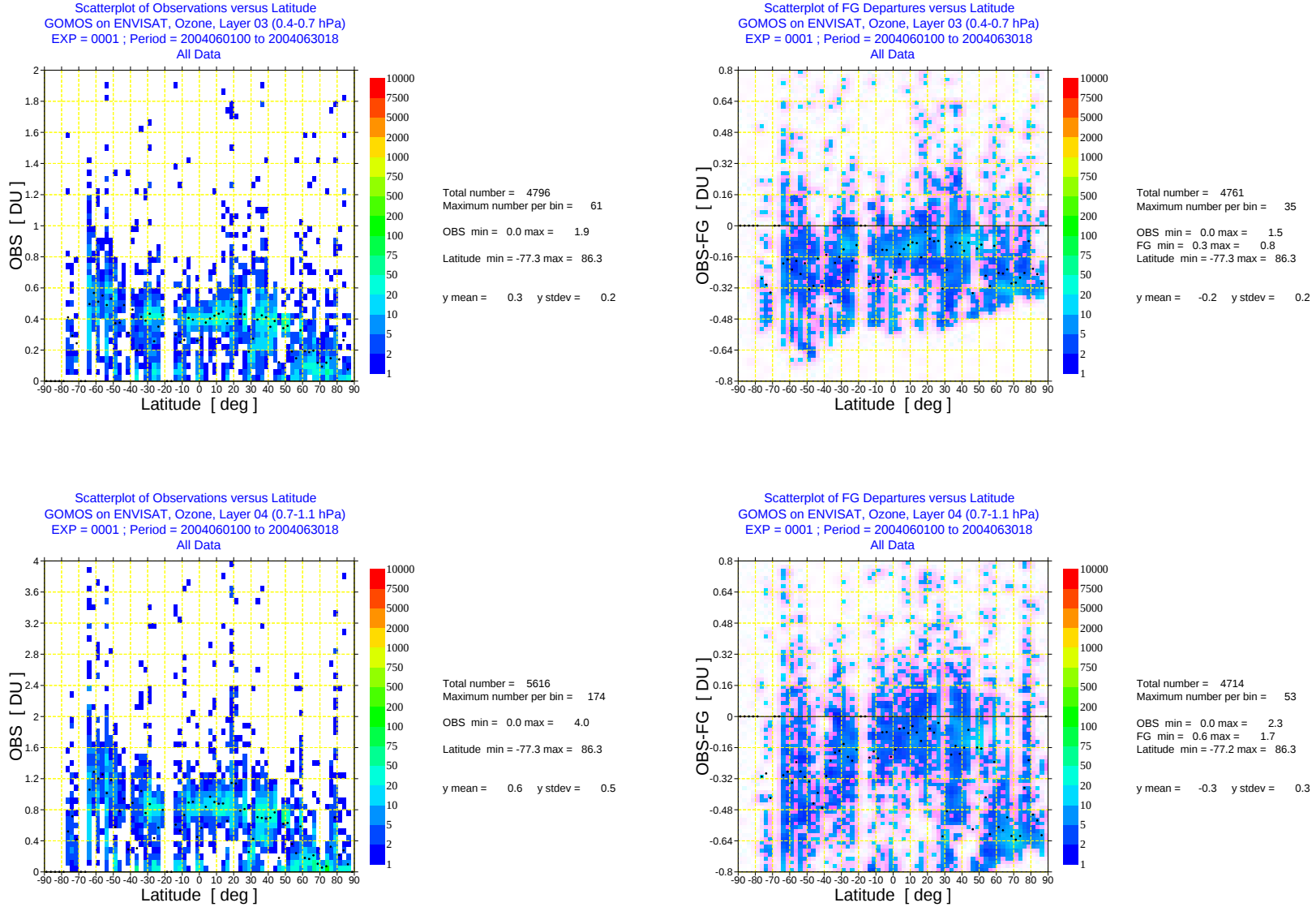


Fig. 10. As Fig. 9 but for layer 3 (0.4-0.7 hPa) and layer 4 (0.7-1.1 hPa).

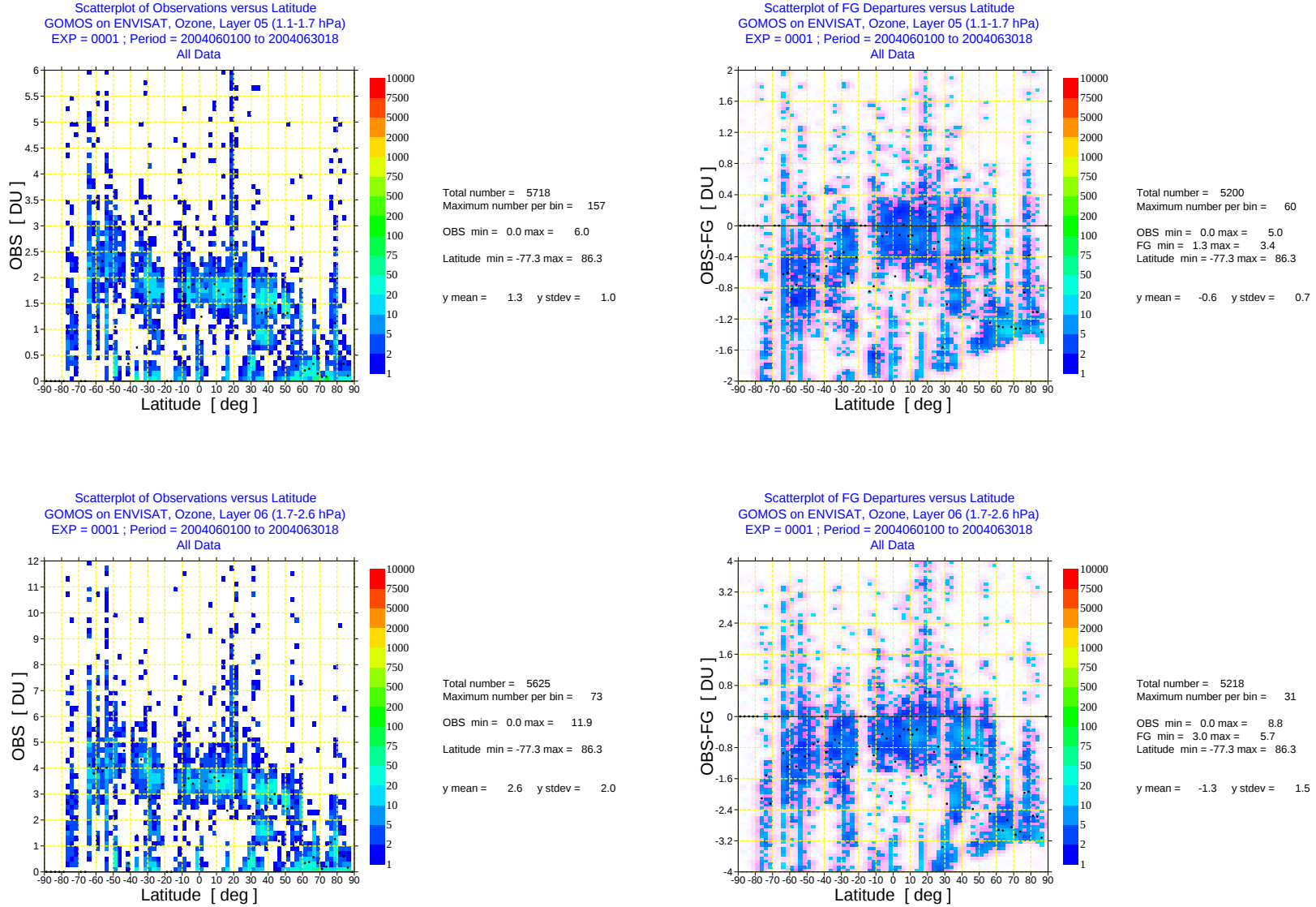


Fig. 11. As Fig. 9 but for layer 5 (1.1-1.7 hPa) and layer 6 (1.7-2.6 hPa).

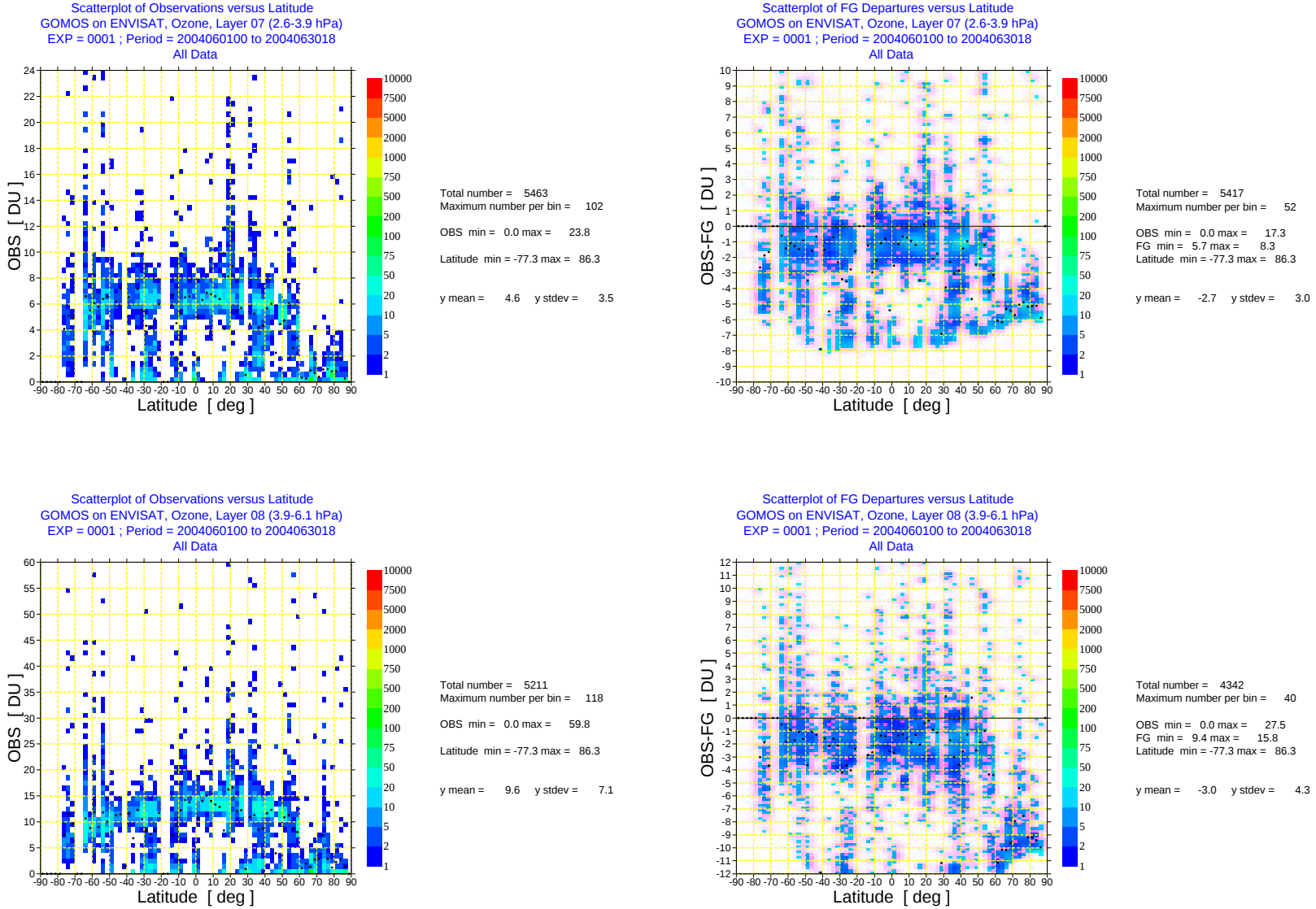


Fig. 12. As Fig. 9 but for layer 7 (2.6-3.9 hPa) and layer 8 (3.9-6.1 hPa).

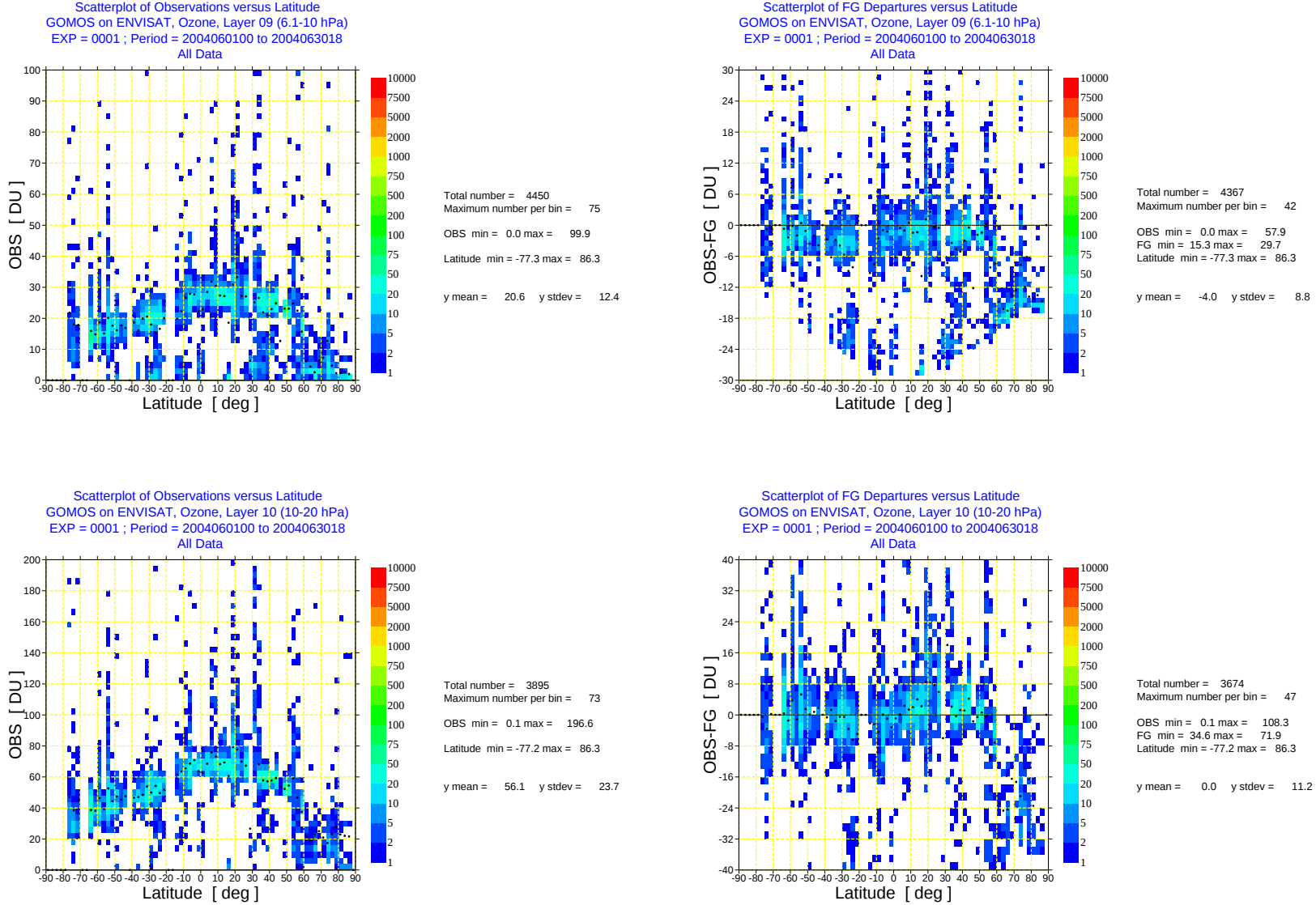


Fig. 13. As Fig. 9 but for layer 9 (6.1-10 hPa) and layer 10 (10-20 hPa).

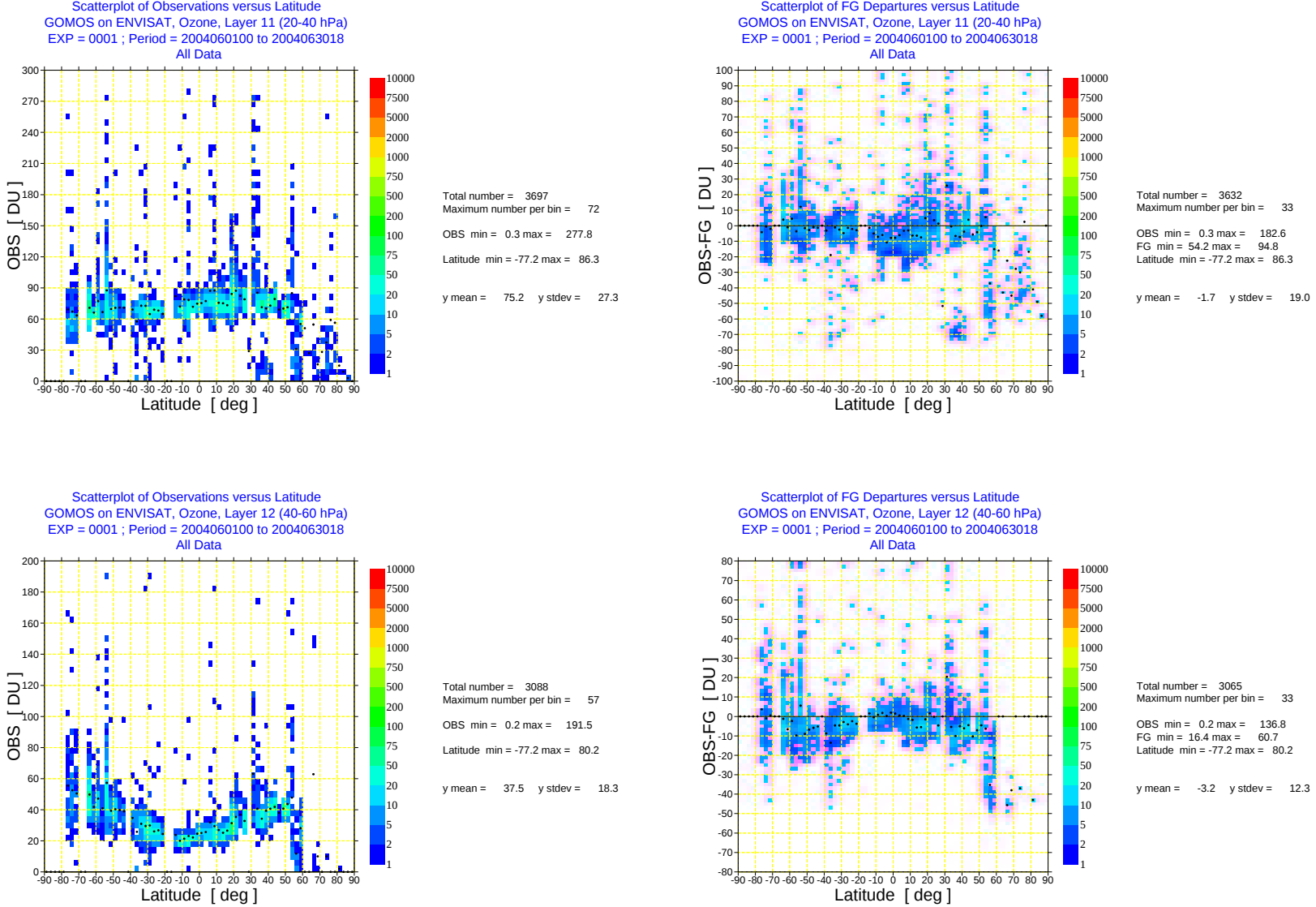


Fig. 14. As Fig. 9 but for layer 11 (20-40 hPa) and layer 12 (40-60 hPa).

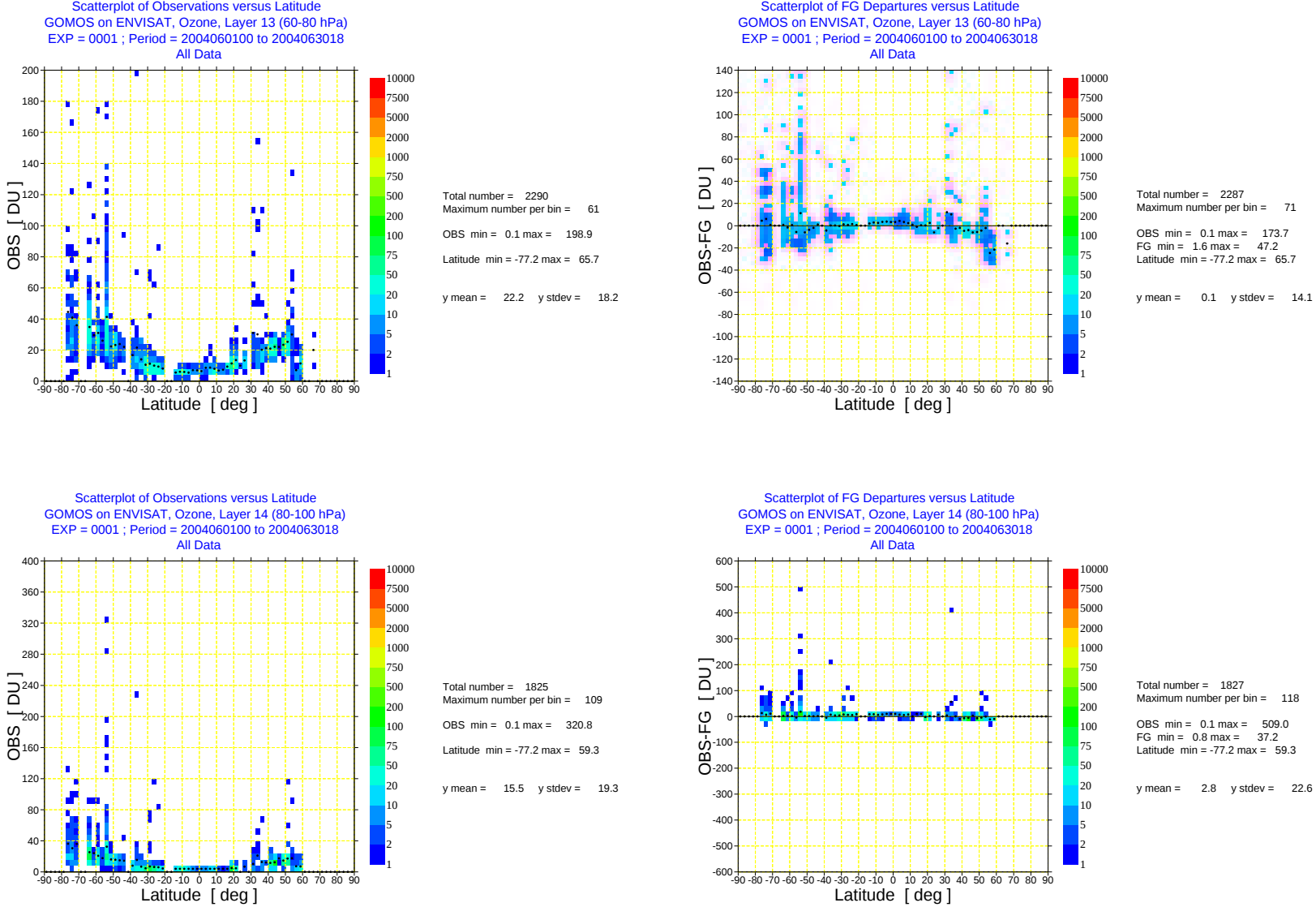


Fig. 15. As Fig. 9 but for layer 13 (60-80 hPa) and layer 14 (80-100 hPa).

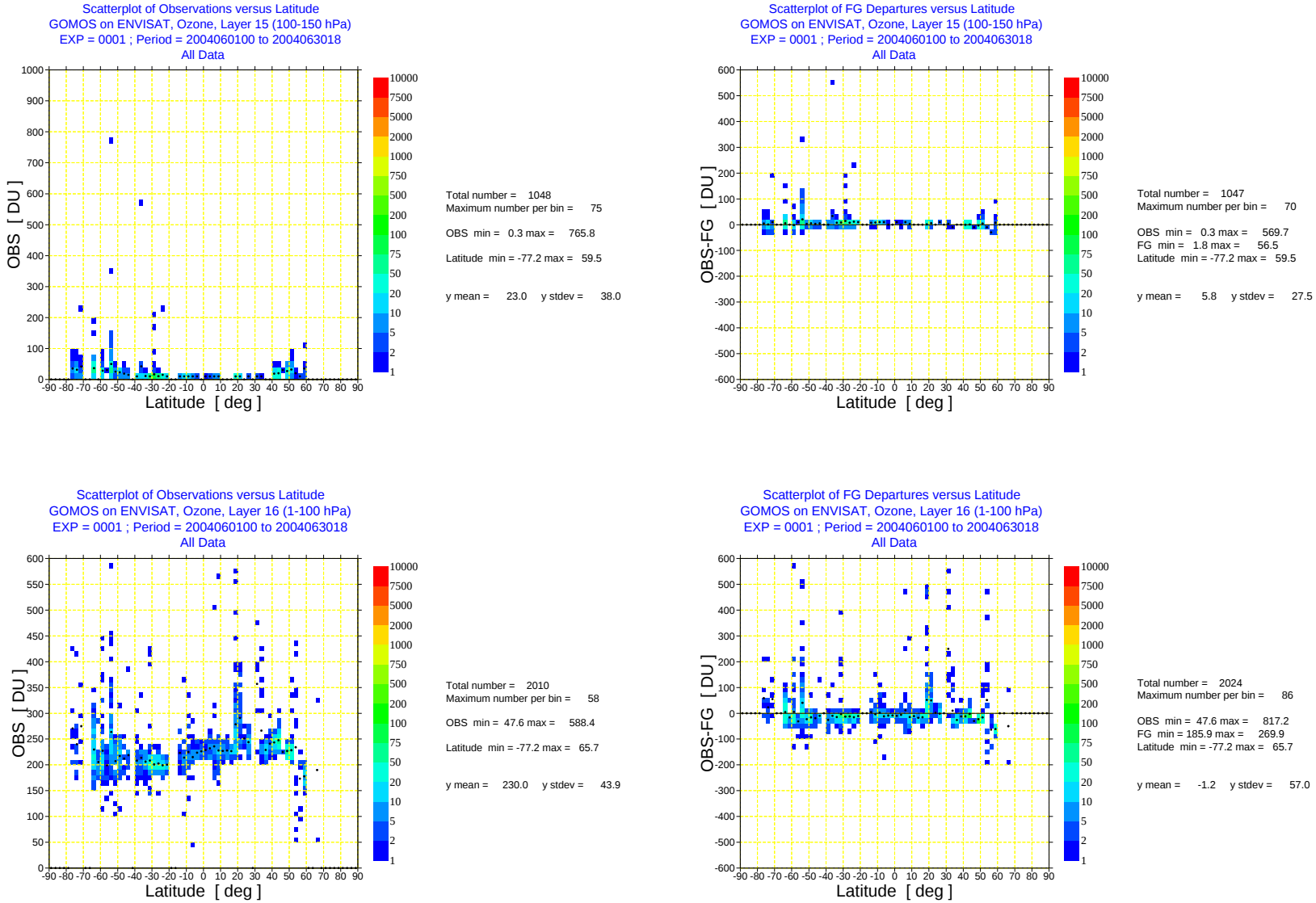


Fig. 16. As Fig. 9 but for layer 15 (100-150 hPa) and layer 16 (1-100 hPa).

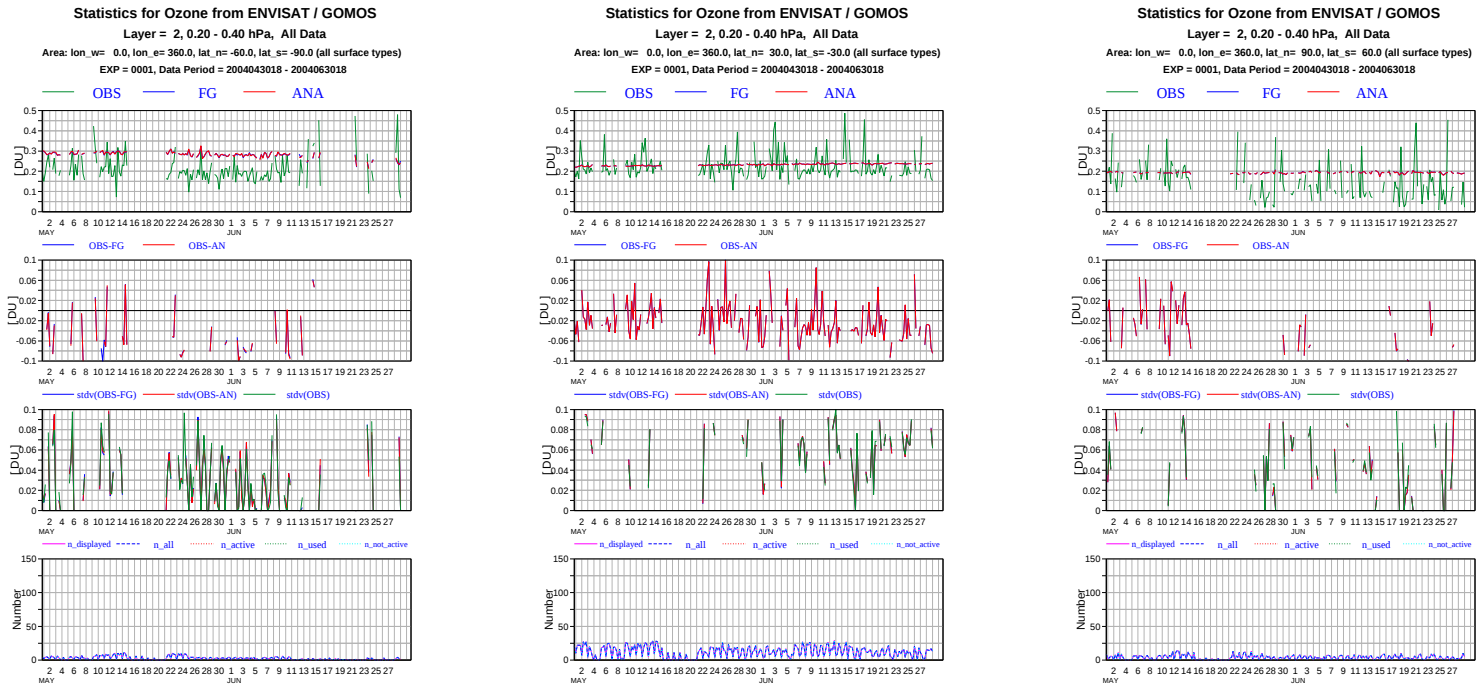


Fig. 17. Timeseries of mean ENVISAT GOMOS NRT ozone data, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for layer 2 (0.2-0.4 hPa) 90-60N, 30N-30S, 60-90S for May and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

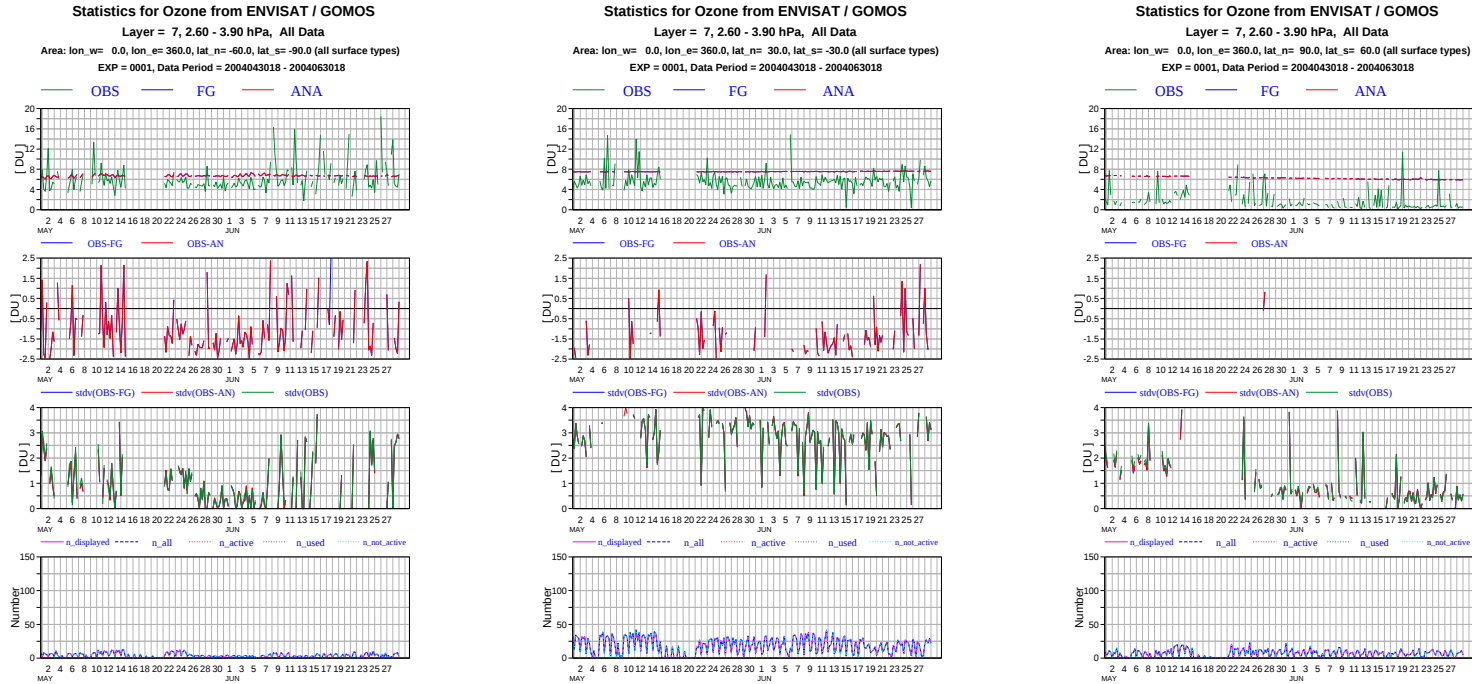


Fig. 18. As Figure 17, but for layer 7 (2.6-3.9 hPa).

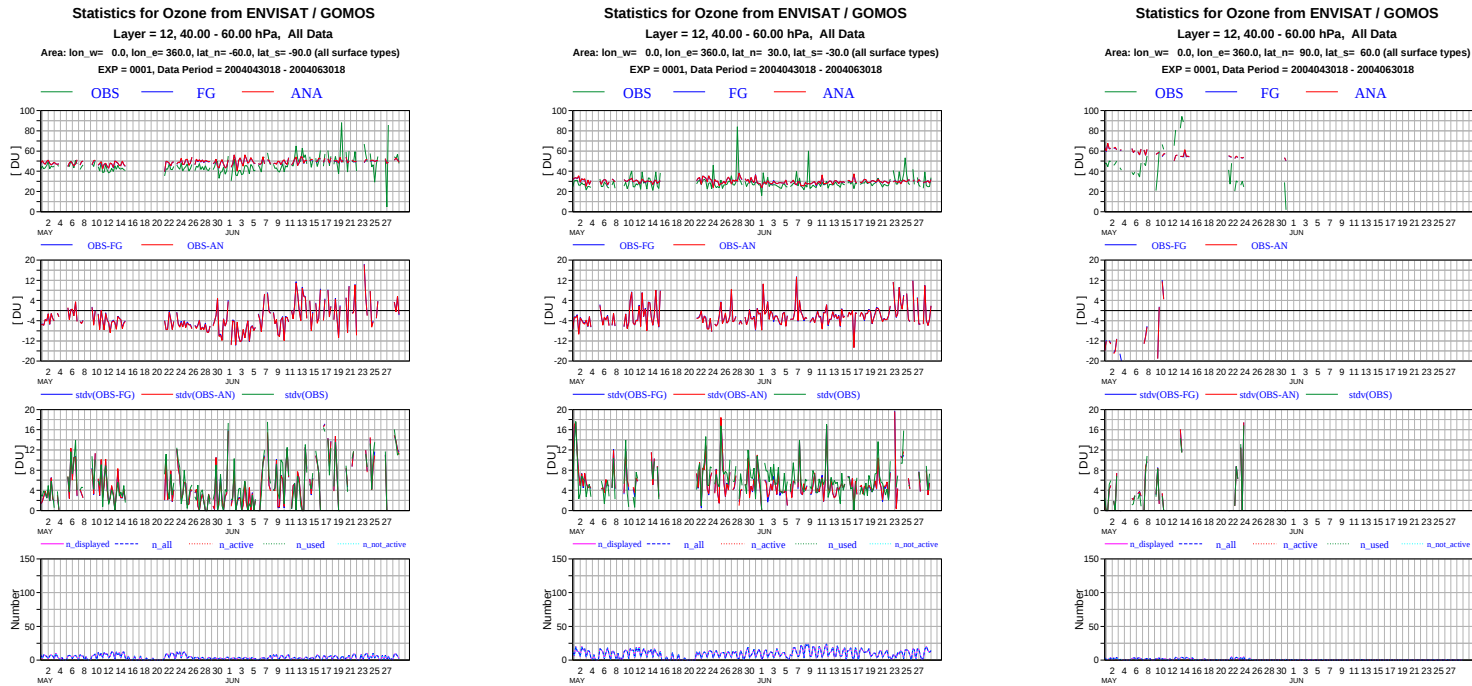


Fig. 19. As Figure 17, but for layer 12 (40-80 hPa).

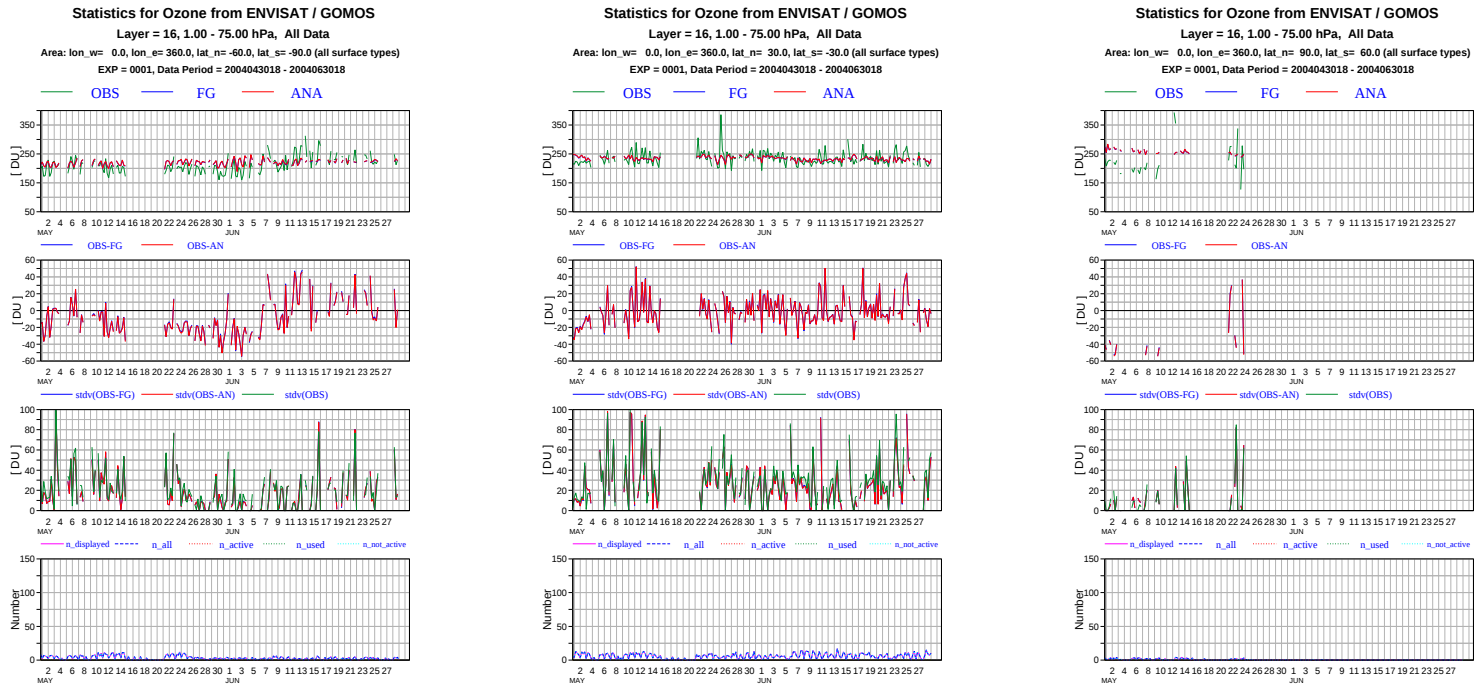


Fig. 20. As Figure 17, but for layer 16 (1-100 hPa).