

REPORT ABOUT ENVISAT SCIAMACHY NRT OZONE PRODUCT (SCI_RV_2P) FOR OCTOBER 2005

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1. Key points for October 2005

- SCIAMACHY data quality not stable
- Change in SCIAMACHY SCI_RV_2P data on 15 October
- SCIAMACHY data about 16 DU higher in the global mean than ECMWF ozone values after 15 October
- Unrealistically large ozone values south of 75S
- Still relatively large biases south of 50S along about 90W, 0 and 90E meridians
- This monitoring report was produced with the operational ECMWF model, CY29R2

2. Quality and amount of received data

This report covers SCIAMACHY NRT total column ozone data for October 2005. Amount of received data and their quality are shown in Figures 1-6 for various latitude bands. Geographical distributions of mean number of data, mean observation values and its standard deviations, and mean first-guess departures as well as its standard deviations are shown in Figures 7-11. Timeseries of zonal mean number of data, zonal mean observation values and its standard deviations and zonal mean first-guess departures as well as its standard deviations are shown in Figures 12-16. Figures 17-19 present the scatter plots of SCIAMACHY ozone values against first-guess and latitude values, as well as the scatter plot of first-guess departures of SCIAMACHY ozone values against latitude.

The timeseries plots (Figures 1-6) show that SCIAMACHY data quality is not stable in October. A sudden change to higher SCIAMACHY ozone columns occurs on 15 October. This change can be clearly seen in the area averaged timeseries (Figures 1-6) and in the zonal mean timeseries plots (Hovmoeller plots, Figures 12-16). After this change, the global mean analysis departures are about +16 DU and the global mean first-guess departures about +13 DU, compared to -1.5 DU and -5 DU respectively, in September.

The standard deviations of the mean analysis and first-guess departures and of SCIAMACHY data are also not stable this month and have also increased after 15 October.

This change in the SCIAMACHY SCI_RV_2P data, which was already observed on the same date last year, is caused by a wrong handling of the season index 3 for the operational processor IPF version 5.04, as stated in the level 2 disclaimer (<http://envisat.esa.int/dataproducts/availability/disclaimers>). According to

ESA Earth Observation Helpdesk (to which the change was reported on 17 October), this problem shall be solved in the next processor IPF version 6, which should become operational either in November or December 2005.

The geo plots (Figures 7-11) show that the largest model biases and the largest standard deviations of SCIAMACHY data (and of the departures as well) are located at the high latitudes. The geographical distribution of mean first-guess departures (Fig. 10) still exhibit relatively large biases south of 50S along about 90W, 0 and 90E meridians as seen in September. The geographical distribution of the mean observation values (Fig. 8) show that in those locations the mean ozone values are relatively larger than the neighbouring mean values.

The Hovmoeller plots (Figures 13-16) show again the SCIAMACHY data quality degradation after 15 October and the scatter plots show unrealistically large ozone values and large positive departures south of 75S and large positive and negative departures north of 70N. These departures are larger than those seen in the previous months.

There are no data on the 16 October (18 UTC) and 24 October (all UTC).

3. Remarks

This monitoring report was produced with the operational ECMWF model (CY29R2). In cycle CY29R2 ozone layers from SBUV/2 on NOAA-16 and SCIAMACHY total column ozone data produced by KNMI are actively assimilated. The comparison of SCLRV__2P data against the ECMWF ozone field does not give an independent validation.

All ozone values are in Dobson Units (DU).

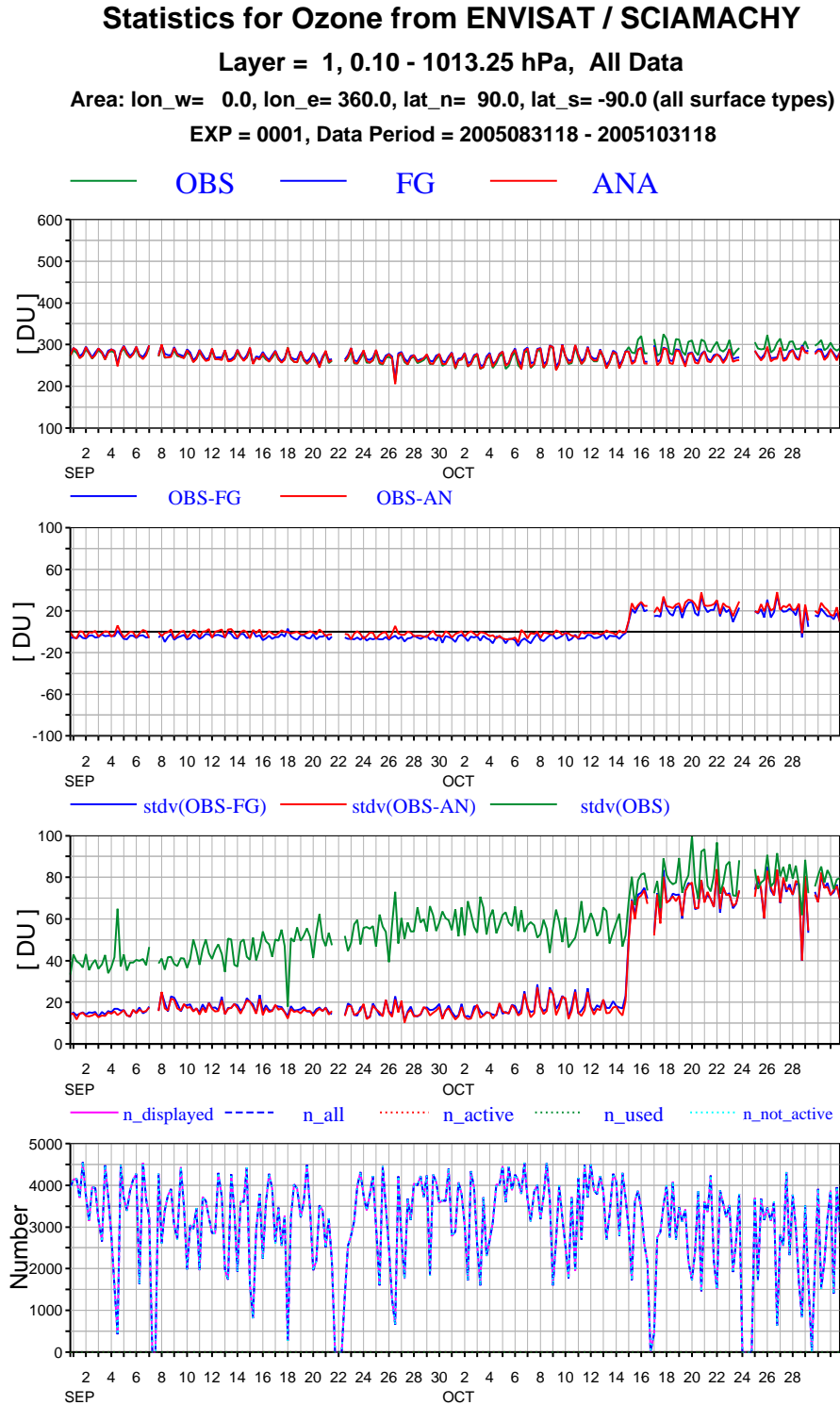


Fig. 1. Time series of mean observations, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for ENVISAT SCIAMACHY NRT ozone data for September and October 2005 (Global means).

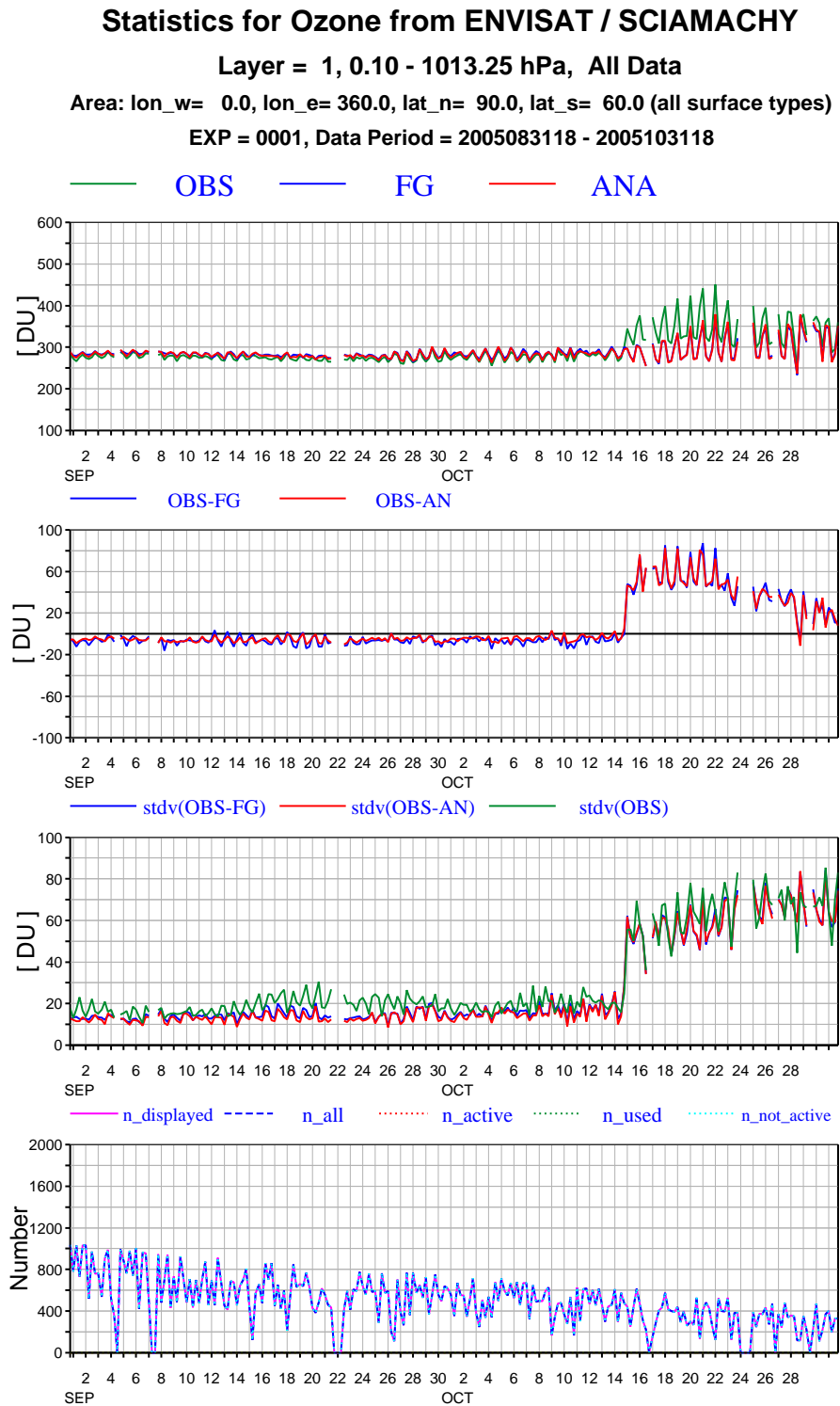


Fig. 2. As Fig.1 but for 90-60N.

Statistics for Ozone from ENVISAT / SCIAMACHY

Layer = 1, 0.10 - 1013.25 hPa, All Data

Area: lon_w= 0.0, lon_e= 360.0, lat_n= 60.0, lat_s= 30.0 (all surface types)

EXP = 0001, Data Period = 2005083118 - 2005103118

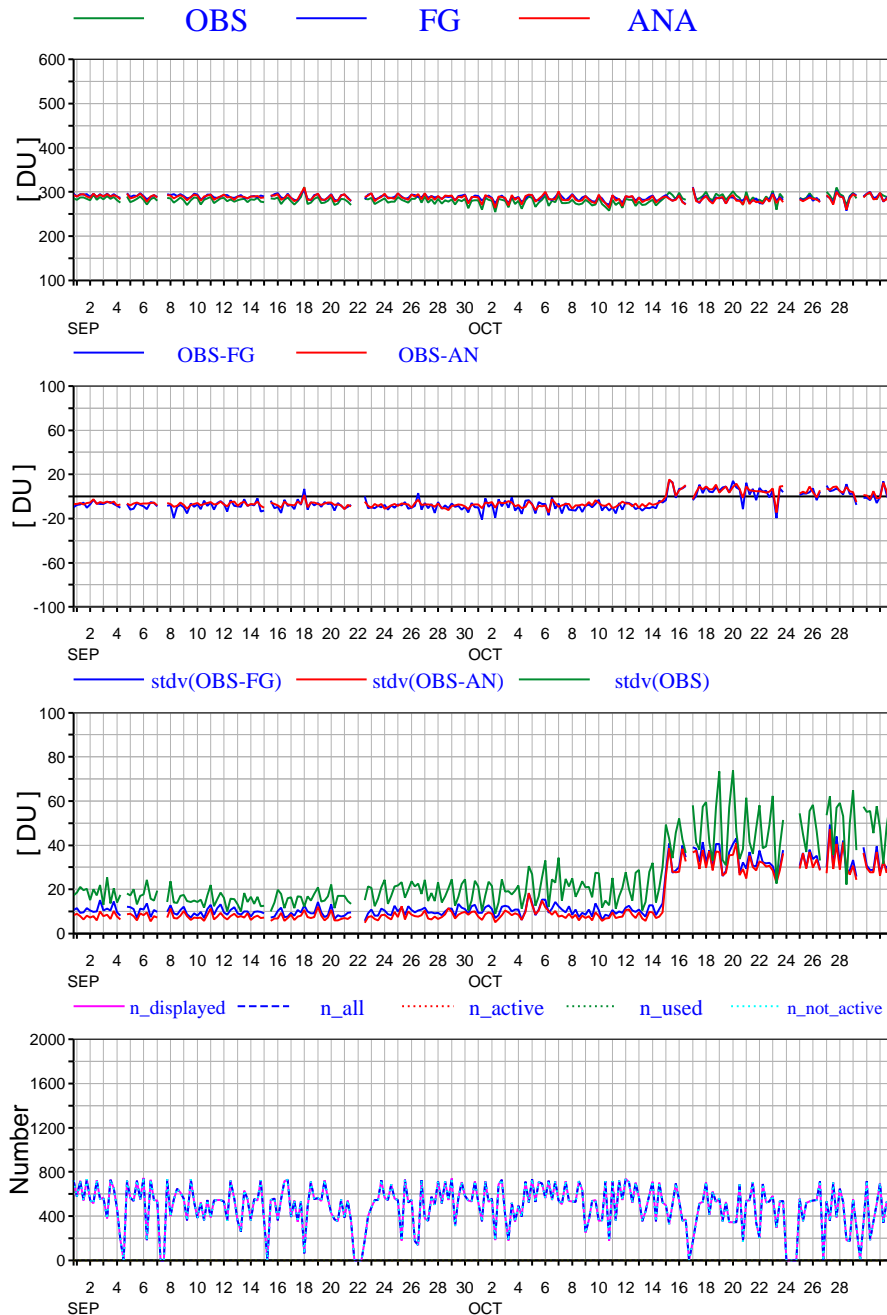


Fig. 3. As Fig. 1 but for 60-30N.

Statistics for Ozone from ENVISAT / SCIAMACHY

Layer = 1, 0.10 - 1013.25 hPa, All Data

Area: lon_w= 0.0, lon_e= 360.0, lat_n= 30.0, lat_s= -30.0 (all surface types)

EXP = 0001, Data Period = 2005083118 - 2005103118

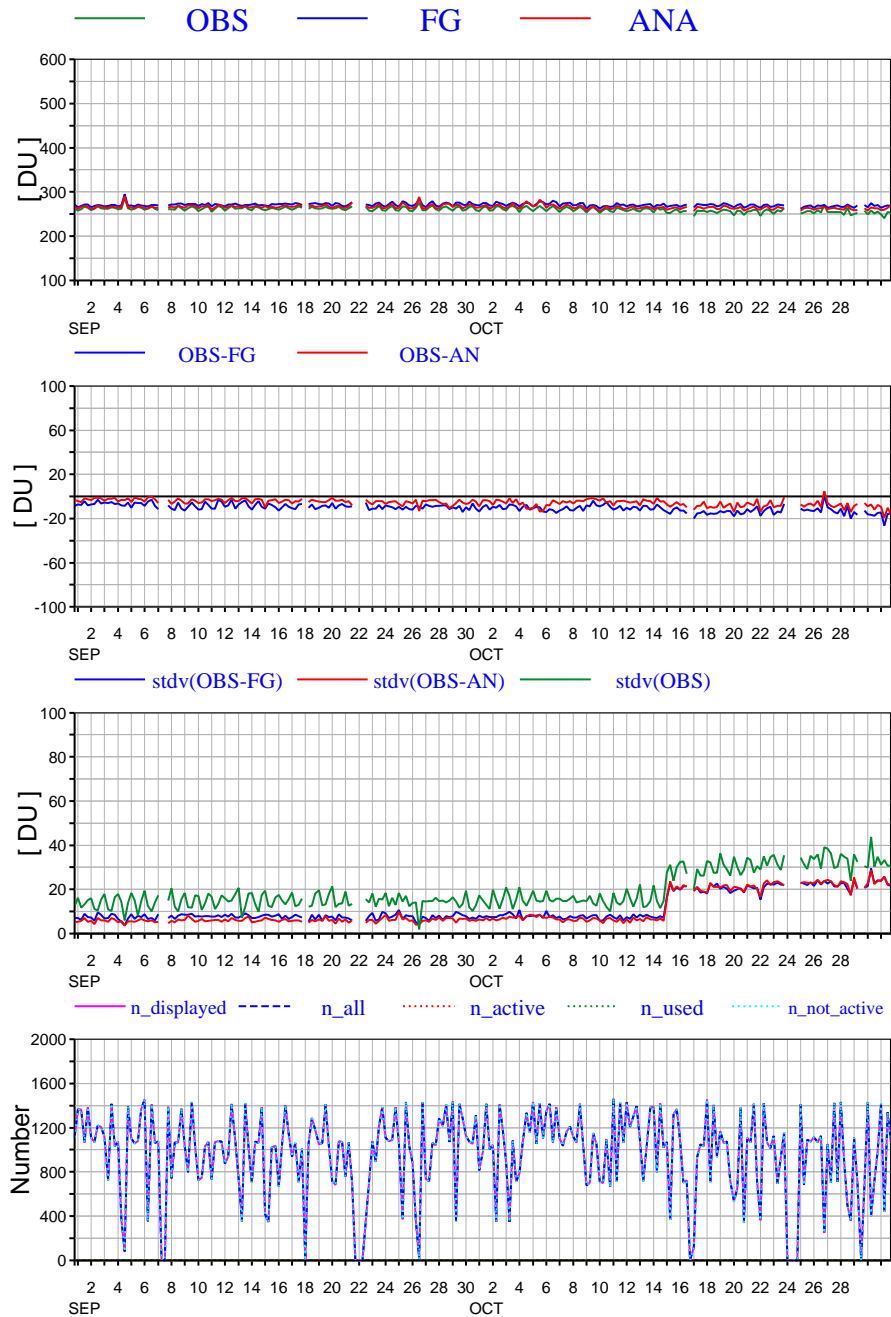


Fig. 4. As Fig. 1 but for 30N-30S.

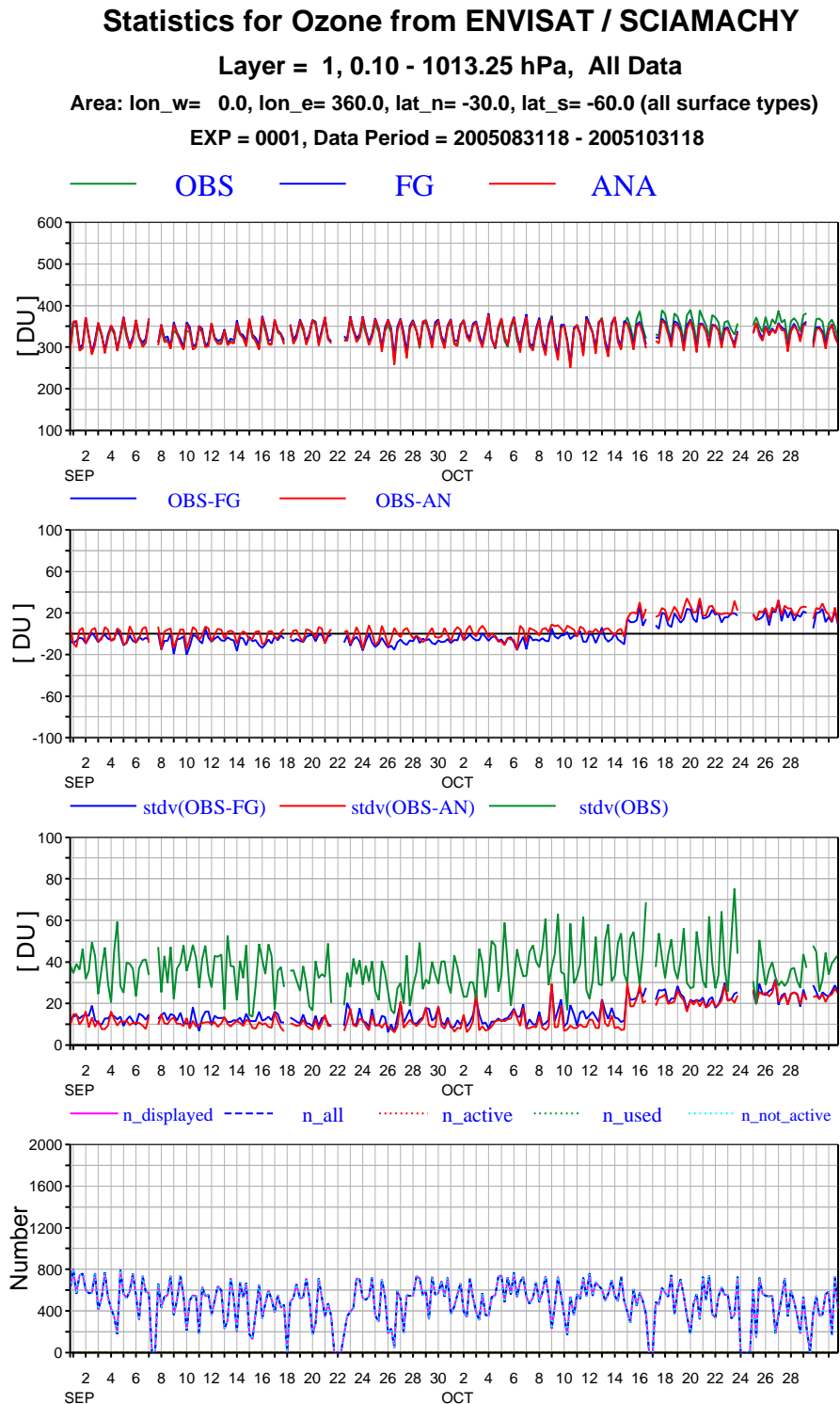


Fig. 5. As Fig. 1 but for 30-60S.

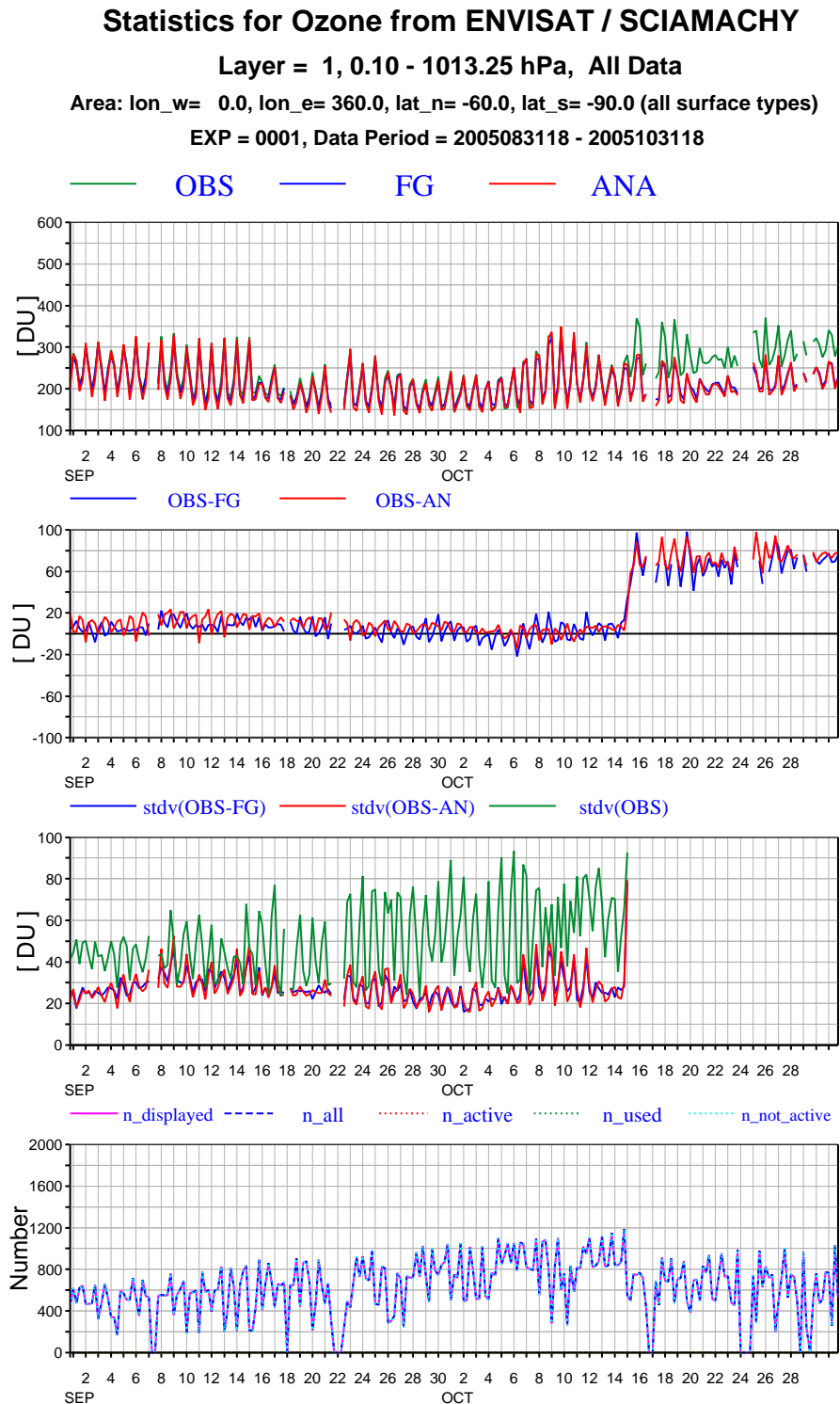


Fig. 6. As Fig. 1 but for 60-90S.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
NUMBER OF OBSERVATIONS PER GRID SQUARE (ALL)
DATA PERIOD = 2005100100 - 2005103118
EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 1 Max: 60 Mean: 6.1708

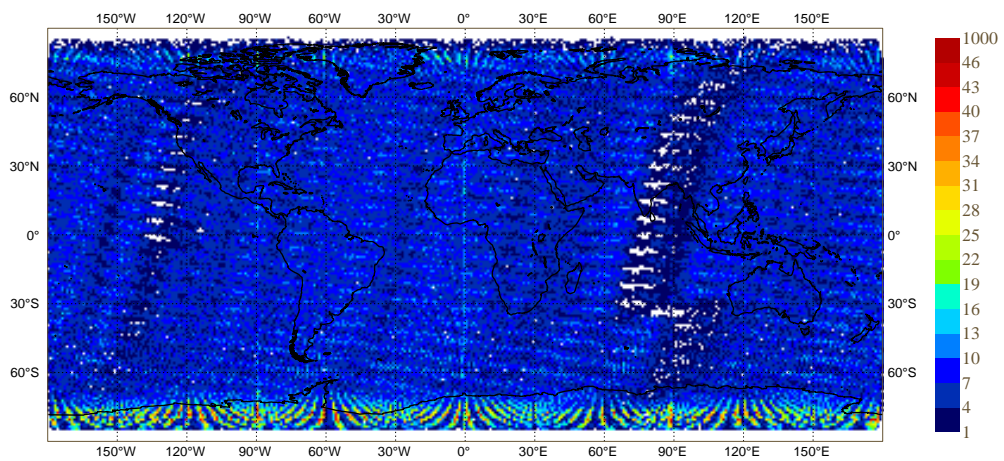


Fig. 7. Geographical distribution of mean number of data for ENVISAT SCIAMACHY NRT ozone data for October 2005.

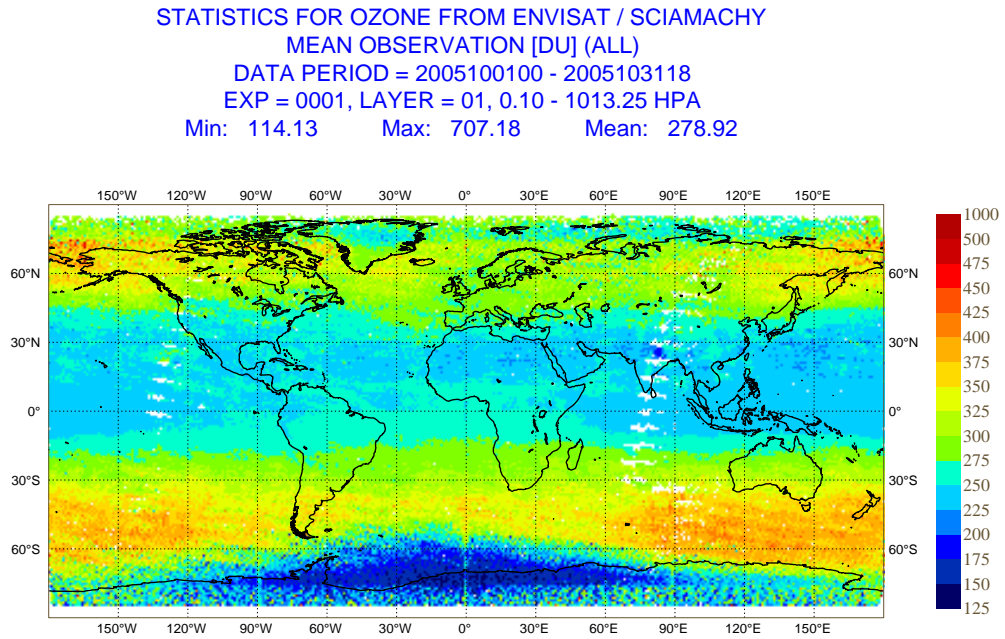


Fig. 8. Geographical distribution of mean observation values for ENVISAT SCIAMACHY NRT ozone data for October 2005.

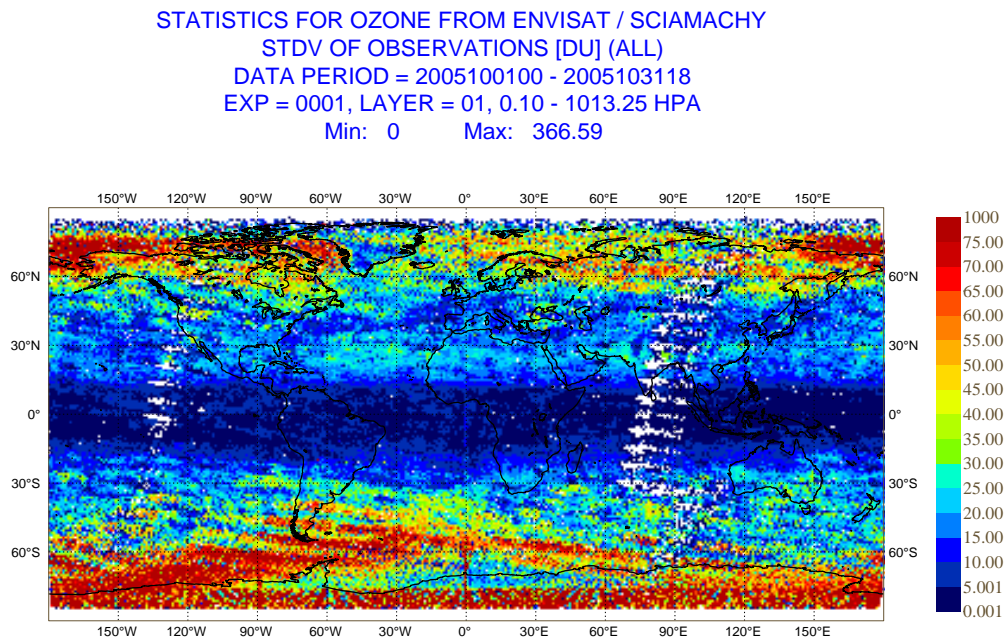


Fig. 9. Geographical distribution of the standard deviation of the mean observation values for ENVISAT SCIAMACHY NRT ozone data for October 2005.

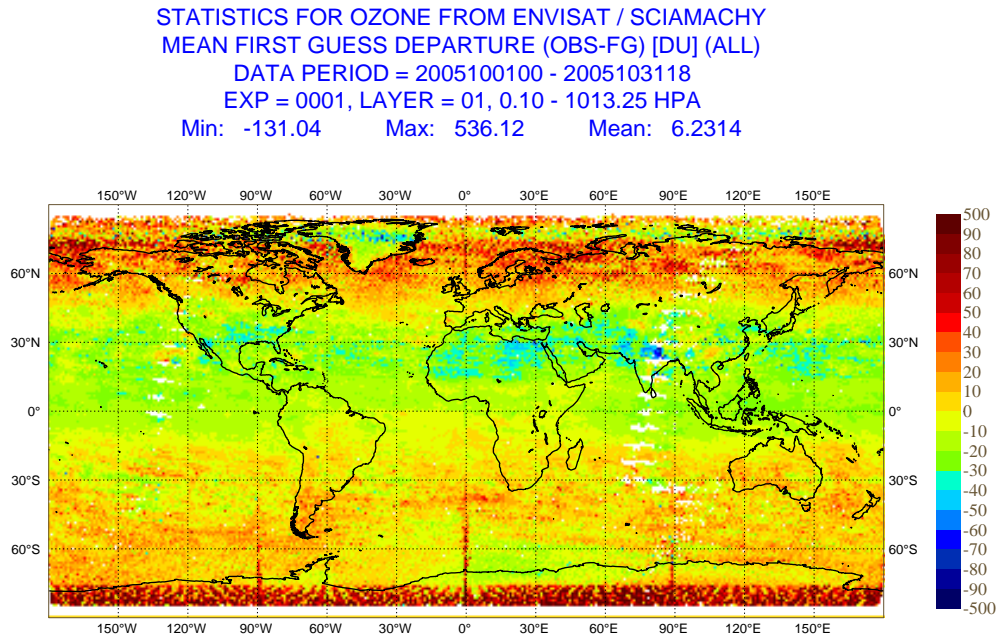


Fig. 10. Geographical distribution of mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for October 2005.

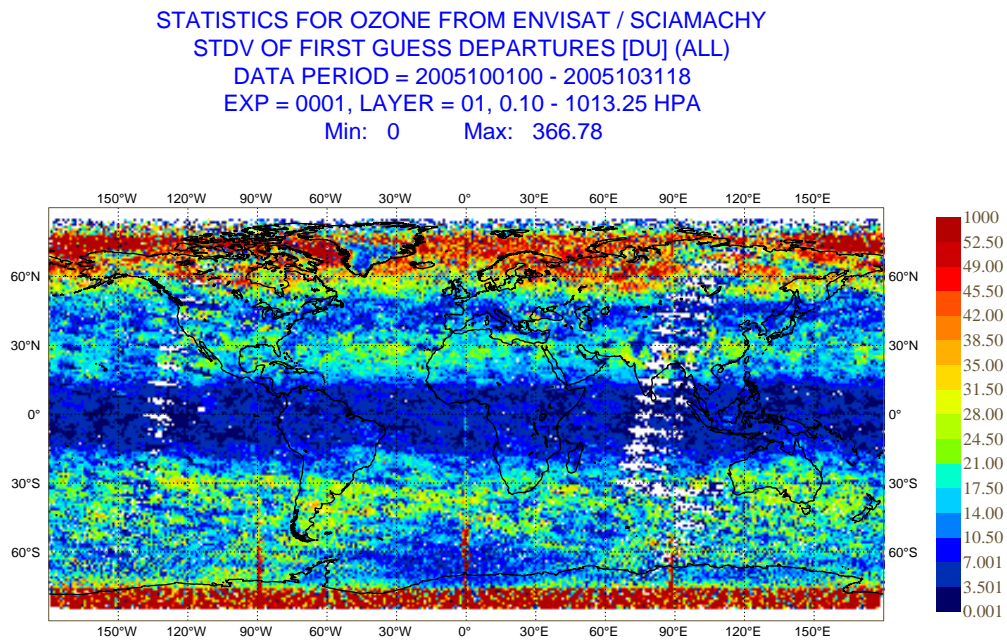


Fig. 11. Geographical distribution of the standard deviation of the mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for October 2005.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
NUMBER OF OBSERVATIONS IN AVERAGE
EXP = 0001, DATA PERIOD = 2005083118 - 2005103118
Min: 0 Max: 229 Mean: 42.510

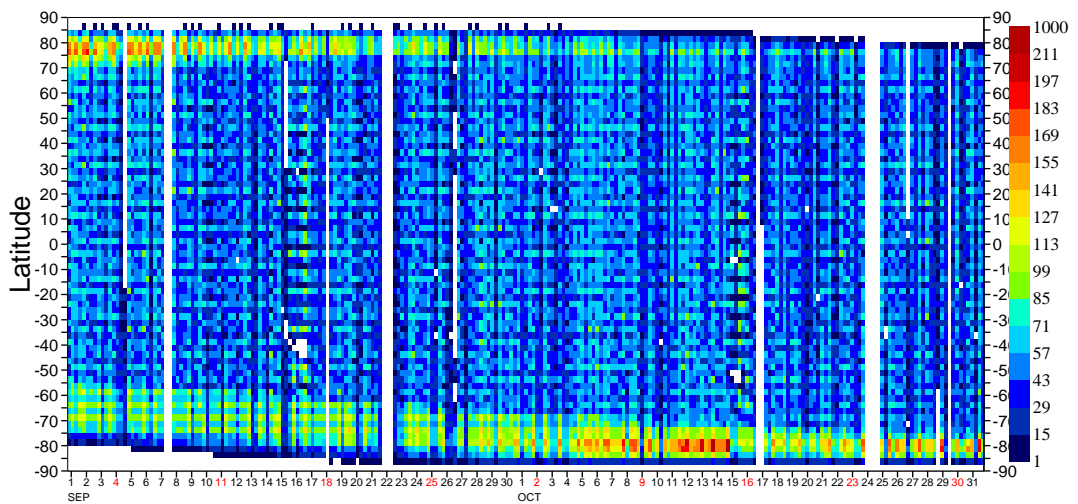


Fig. 12. Hovmoeller diagram of zonal mean number of data for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for September and October 2005.

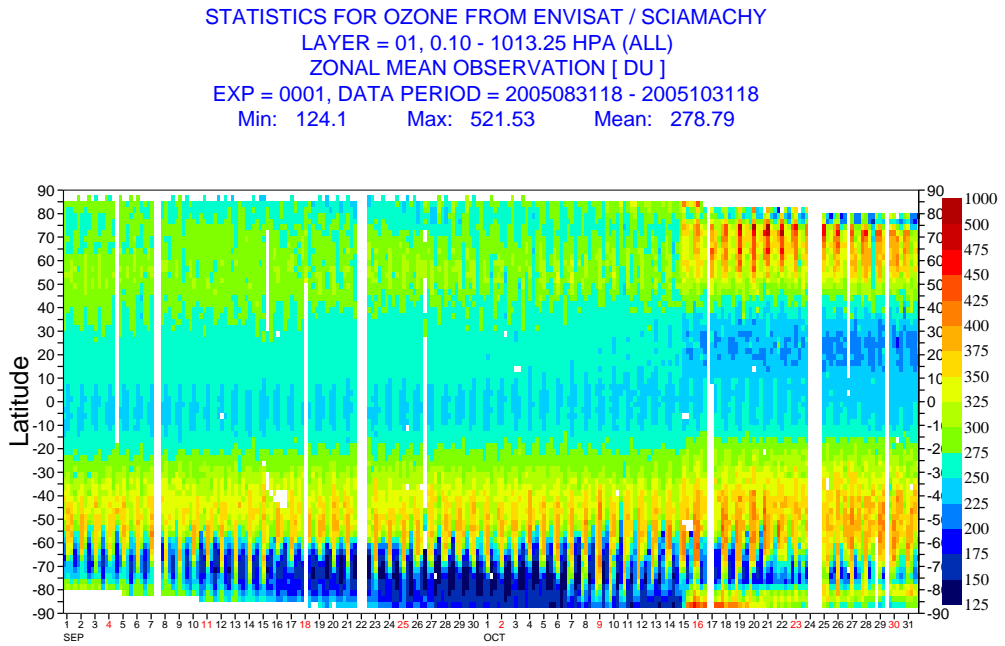


Fig. 13. Hovmoeller diagram of zonal mean observation values for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for September and October 2005.

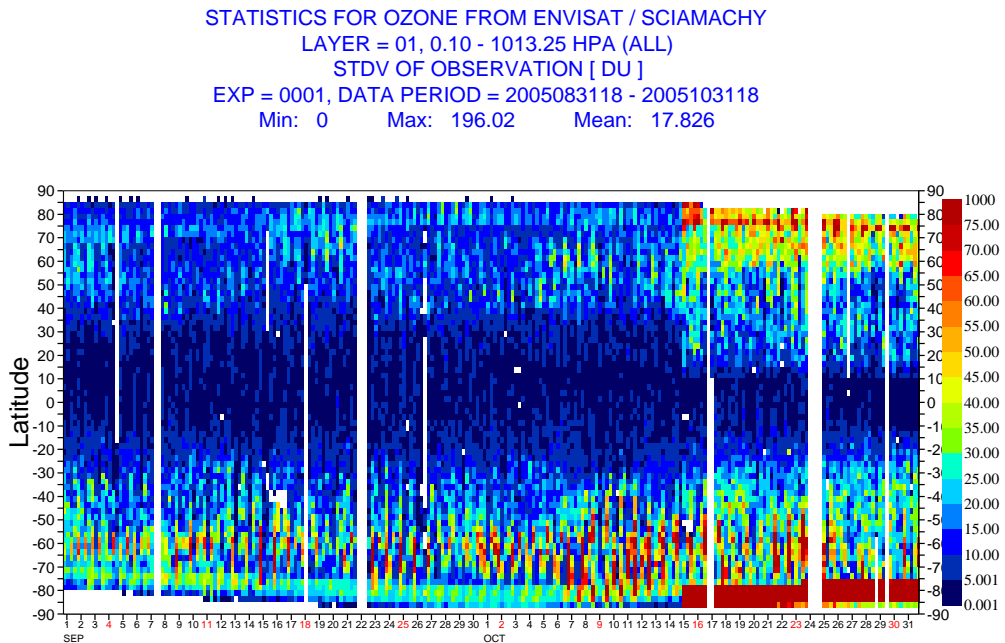


Fig. 14. Hovmoeller diagram of the zonal mean observation standard deviations for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for September and October 2005.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
ZONAL MEAN FIRST GUESS DEPARTURE (OBS-FG) [DU]
EXP = 0001, DATA PERIOD = 2005083118 - 2005103118
Min: -126.43 Max: 271.83 Mean: -0.352609

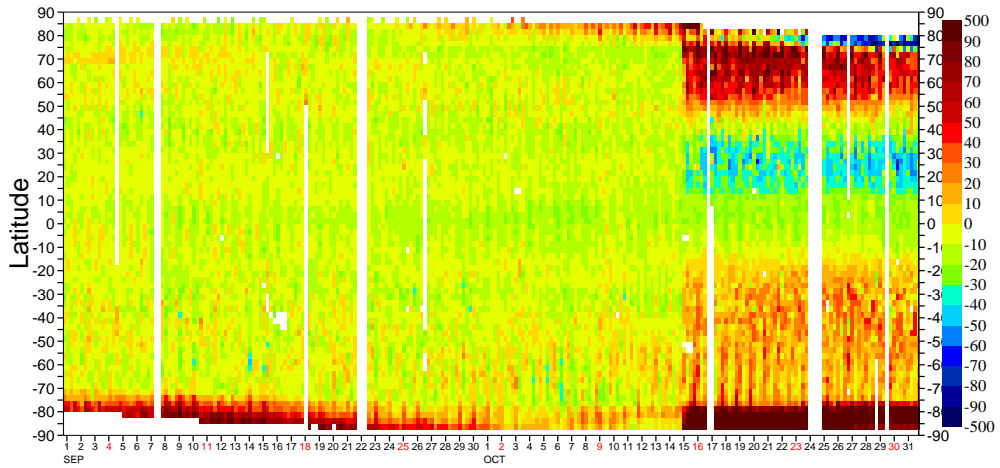


Fig. 15. Hovmoeller diagram of zonal mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for September and October 2005.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
STDV OF FIRST GUESS DEPARTURES (OBS-FG) [DU]
EXP = 0001, DATA PERIOD = 2005083118 - 2005103118
Min: 0 Max: 193.77 Mean: 13.559

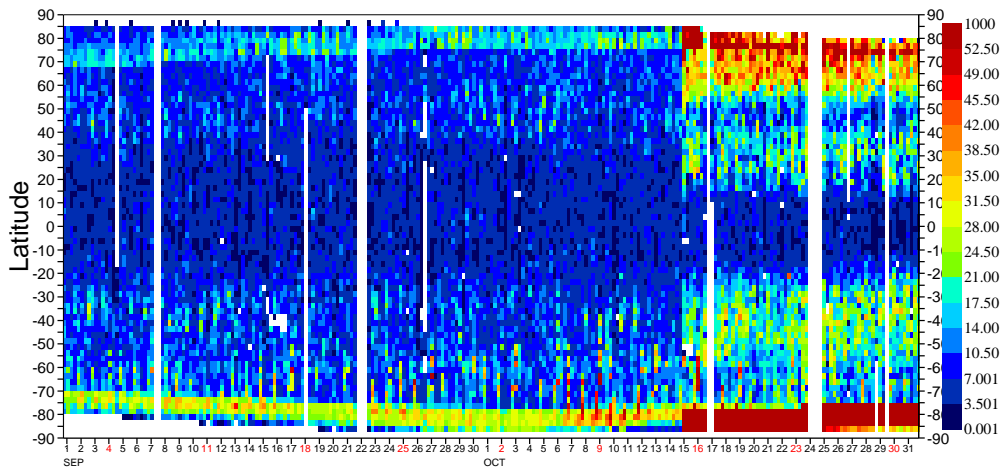


Fig. 16. Hovmoeller diagram of zonal mean first-guess departures standard deviations for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for September and October 2005.

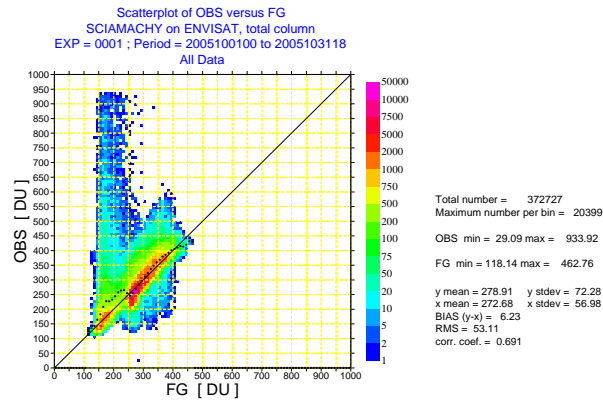


Fig. 17. Scatter plot of ENVISAT SCIAMACHY ozone values against latitude for October 2005. The colours show the number per bin, the black dots the mean values per bin.

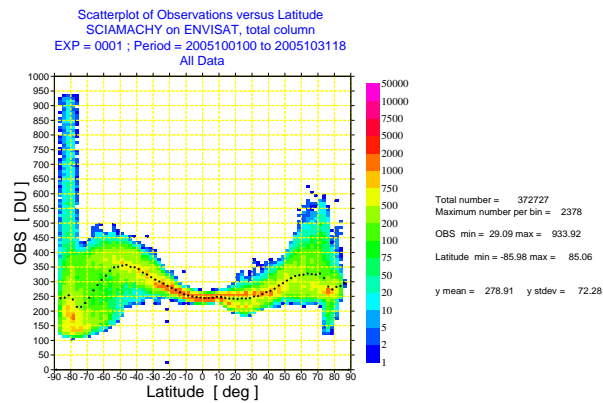


Fig. 18. Scatter plot of ENVISAT SCIAMACHY ozone values against latitude for October 2005. The colours show the number per bin, the black dots the mean values per bin.

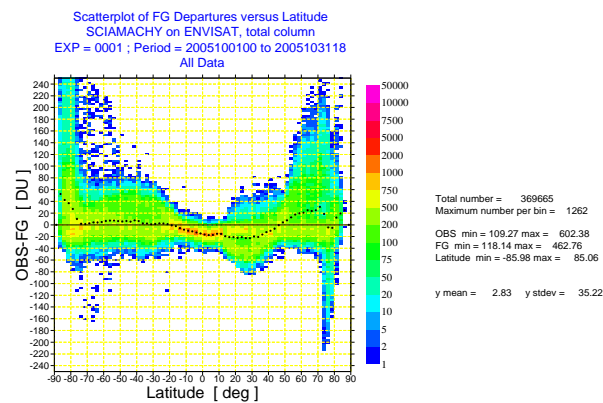


Fig. 19. Scatter plot of first-guess departures of ENVISAT SCIAMACHY ozone against latitude for October 2005. The colours show the number per bin, the black dots the mean values per bin.