REPORT ABOUT ENVISAT SCIAMACHY NRT OZONE PRODUCT (SCI_RV__2P) FOR JANUARY 2006

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1. Key points for January 2006

- SCIAMACHY SCI_RV__2P data quality stable

- Improvement on the agreement between SCIAMACHY and ECMWF ozone values

- SCIAMACHY data about 10 DU lower than ECMWF values in the global mean

- Large departures in the northern hemisphere extratropics

- Still few relatively large ozone values in the latitude band 62.5°-67.5°S

- 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 January 2006. Amount of received data and their quality are shown in Figures 1-6 for various latitude bands. Geographical distributions and zonal means timeseries of number of data, observation values, first-guess departures, and of observations and first-guess departures standard deviations are presented in Figures 7-11 and Figures 12-16, respectively. 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 show that SCIAMACHY data quality was stable in January. After the wrong handling of the season index 3 of the operational processor IPF 5.04, which lasted from 15 October to 31 December 2005, the agreement between SCIAMACHY total column ozone and its ECMWF counterpart improved in January. The global mean departures decreased from -20 DU after 15 December to -10 DU this month.

The standard deviations of the mean analysis and first-guess departures have also decreased. In the global mean, the standard deviations of the departures decreased from mean values above 35 DU in December to values about 15 DU in January.

Although there is overall improvement on the data quality, there are still issues to remark. For instance, the geographical distribution of the mean first-guess departures (Fig. 10) shows large negative biases in the northern hemisphere, roughly between 45°-70°N, in particular over northwest Pacific and Alaska. This figure also exhibits large positive departures at the northern end of the orbits (around 70°N).

The Hovmoeller diagram of the zonal mean first-guess departures (Fig. 15) further illustrates the large negative departures north of 45°N as well as the large positive departures at the northern end of the orbits. Moreover, it suggests that the above-mentioned large negatives departures occurred mainly at 00 UTC.

The scatter plot of SCIAMACHY ozone values against latitude (Fig. 18) still exihbits few relatively large ozone values in the latitude band 62.5°-67.5°S that were first seen after 15 December 2005. The large negative and positive first-guess departures north of 45°N can also be seen in the scatter plot of first-guess mean departures against latitudes (Fig. 19).

The data unavailabilty between 1 and 3 January was due to an unexpected problem in the ENVISAT PDS with the 2006 leap second.

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 SCI_RV_2P data against the ECMWF ozone field does not give an independent validation.
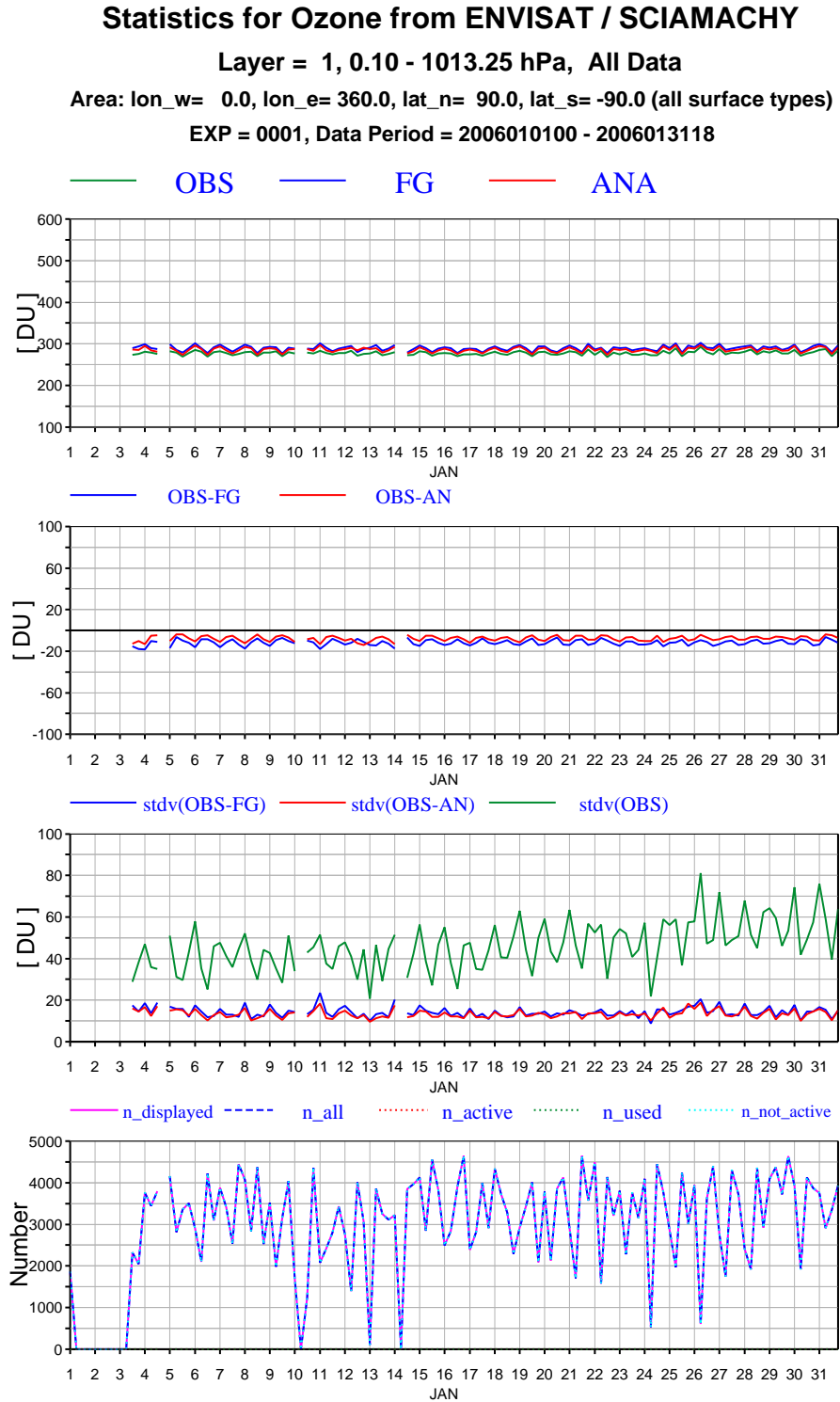
All ozone values are in Dobson Units (DU).

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= 90.0, lat_s= -90.0 (all surface types)

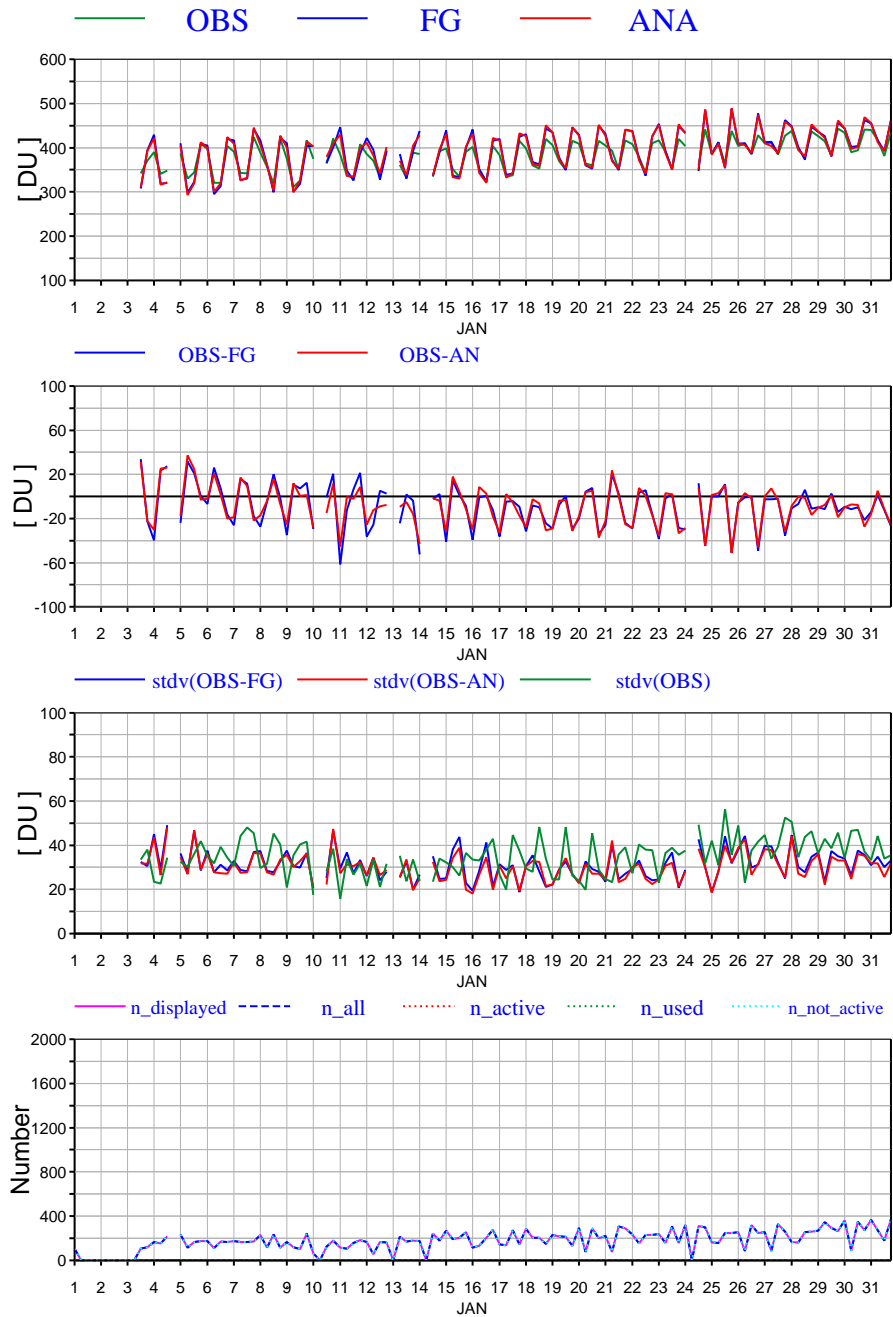**EXP = 0001, Data Period = 2006010100 - 2006013118**

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 January 2006 (Global means).

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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= 90.0, lat_s= 60.0 (all surface types)

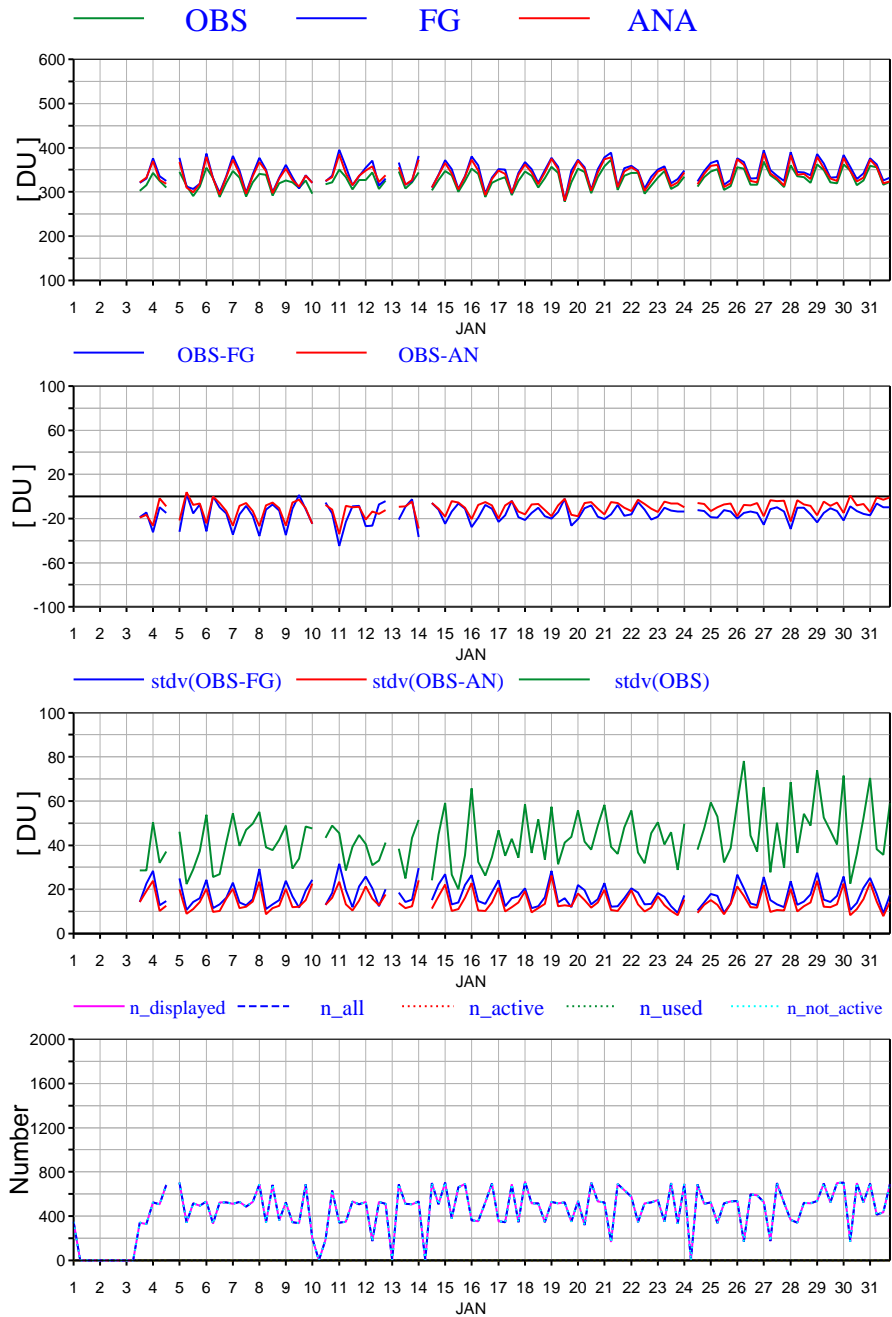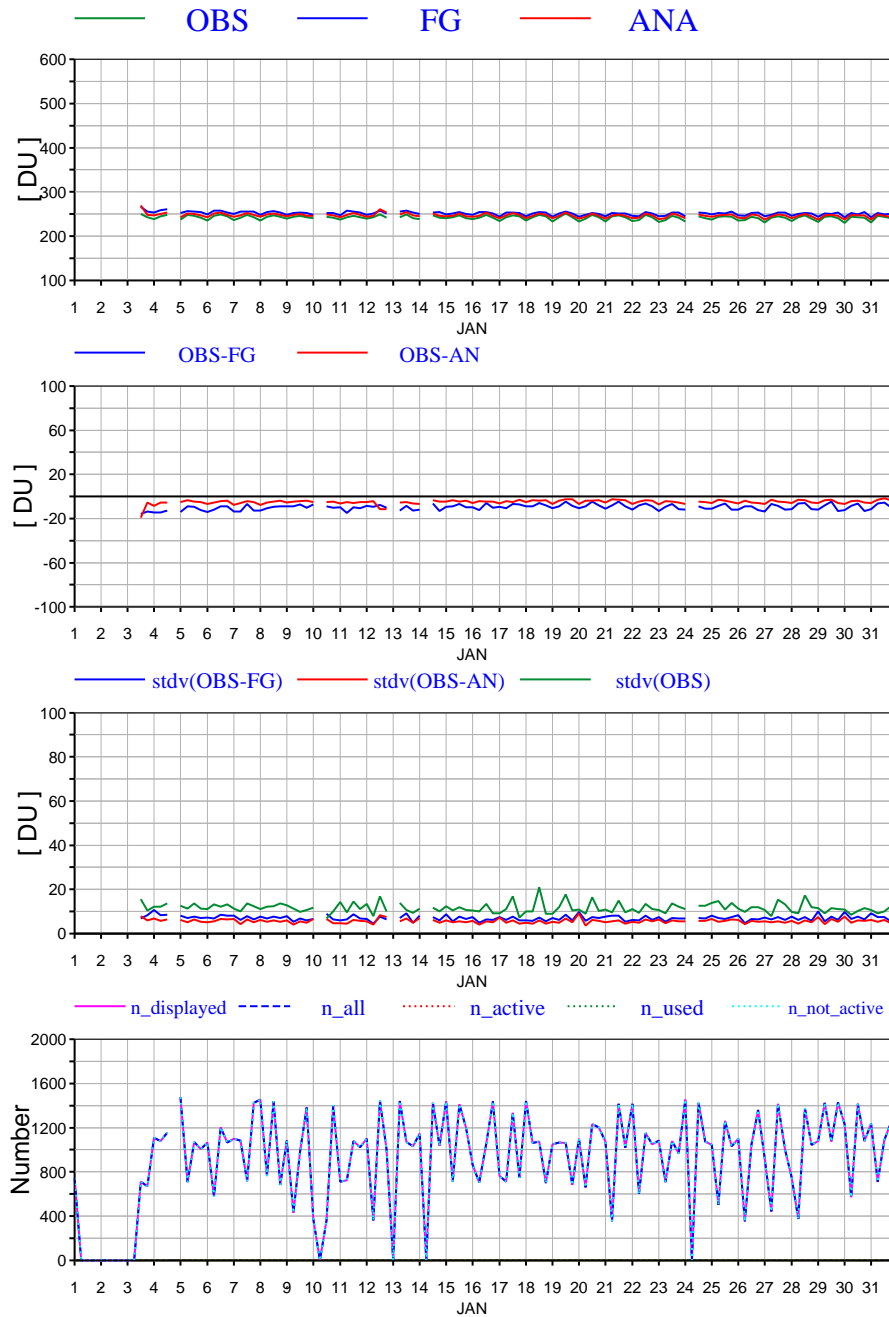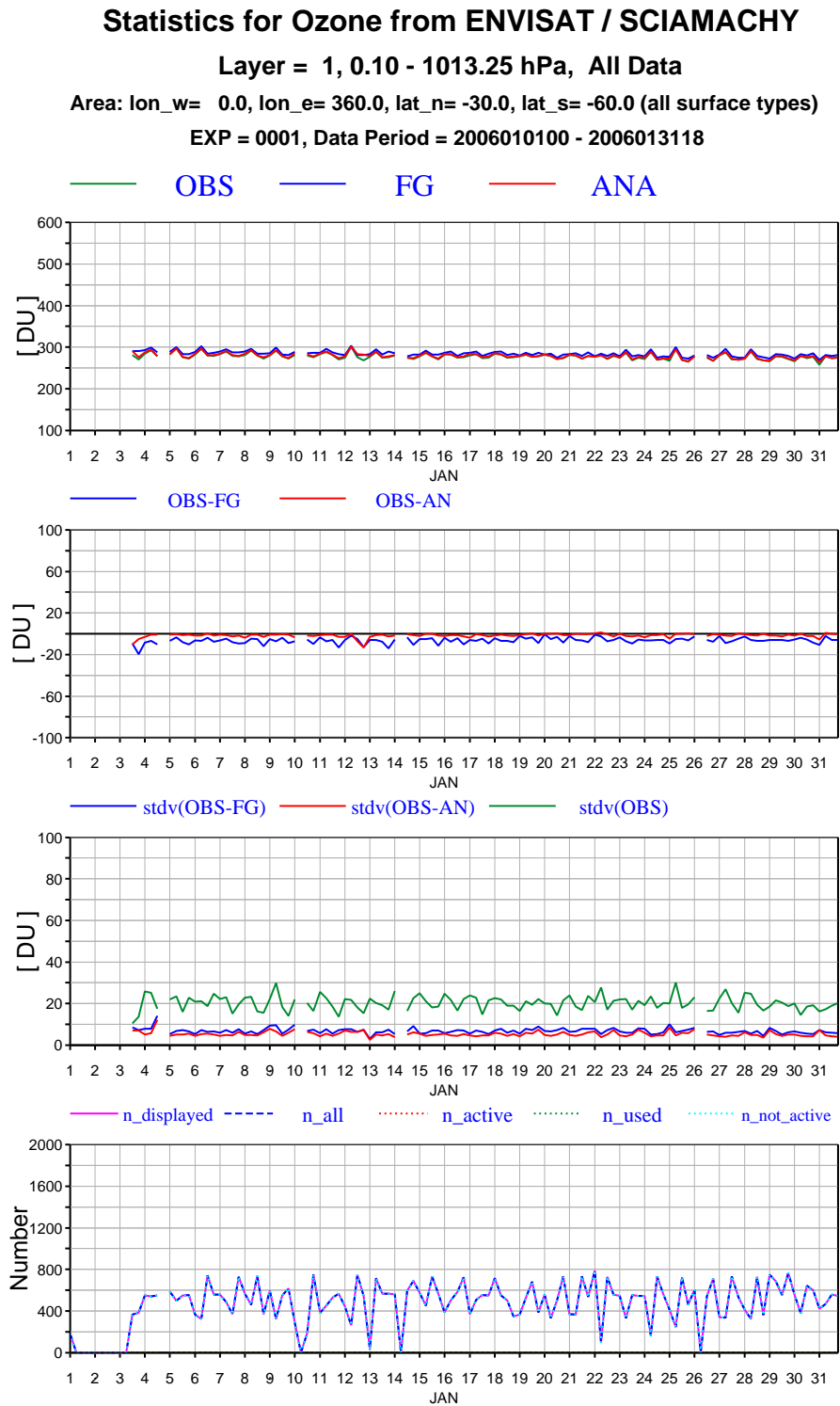EXP = 0001, Data Period = 2006010100 - 2006013118

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 = 2006010100 - 2006013118

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 = 2006010100 - 2006013118

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

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= -60.0 (all surface types)

EXP = 0001, Data Period = 2006010100 - 2006013118

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

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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= -90.0 (all surface types)

EXP = 0001, Data Period = 2006010100 - 2006013118
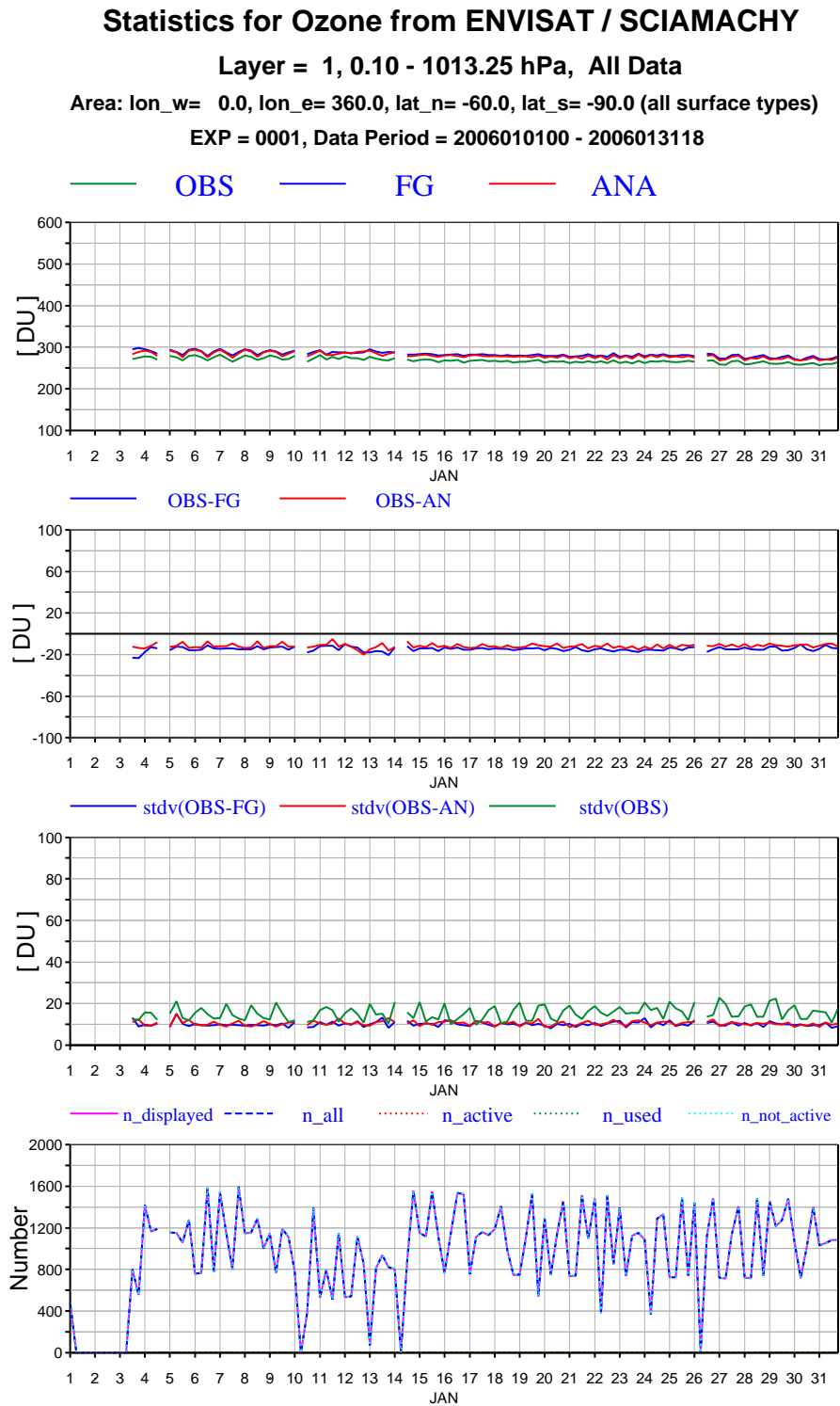
Fig. 6. As Fig. 1 but for 60-90S.
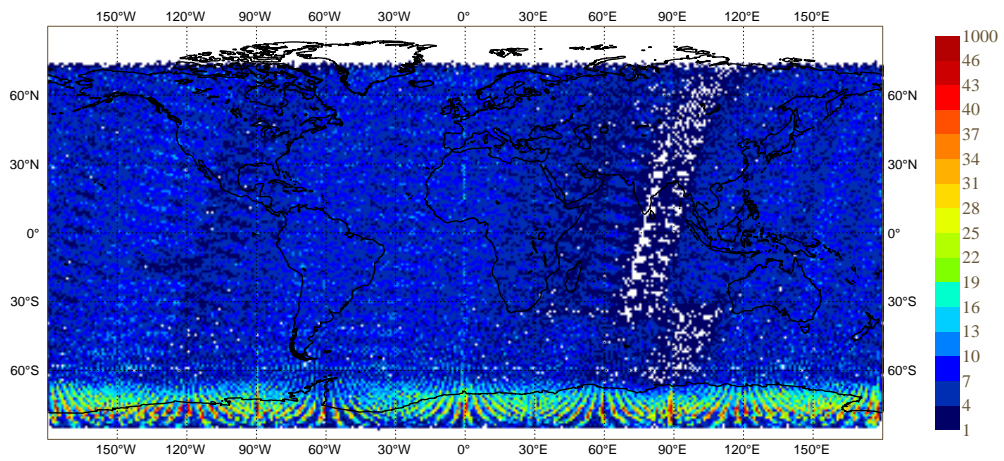
Fig. 7. Geographical distribution of mean number of data for ENVISAT SCIAMACHY NRT ozone data for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
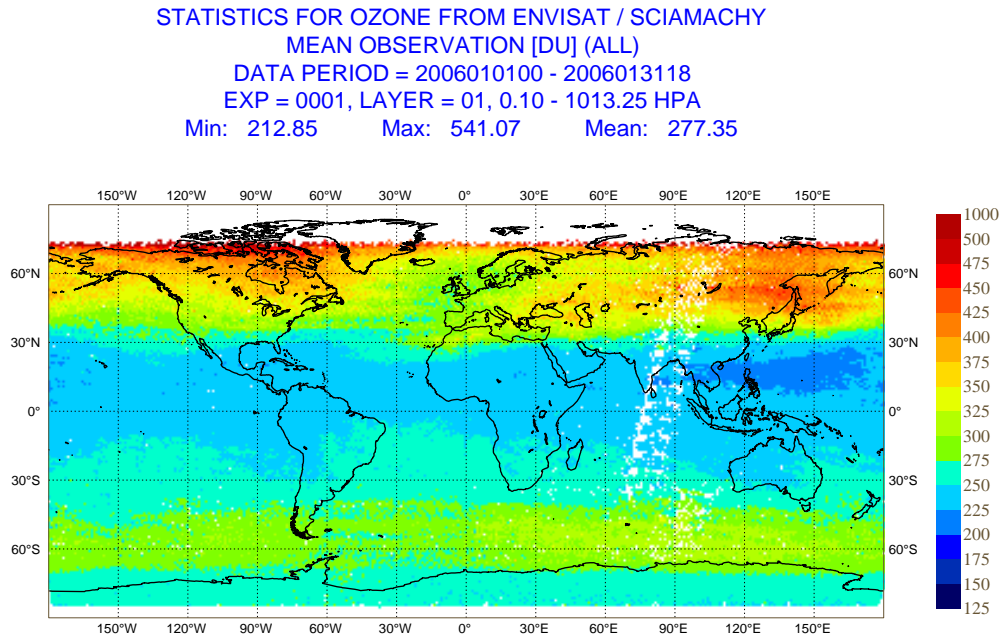MEAN OBSERVATION [DU] (ALL)
DATA PERIOD = 2006010100 - 2006013118
EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 212.85   Max: 541.07   Mean: 277.35

Fig. 8. Geographical distribution of mean observation values for ENVISAT SCIAMACHY NRT ozone data for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
STDV OF OBSERVATIONS [DU] (ALL)
DATA PERIOD = 2006010100 - 2006013118
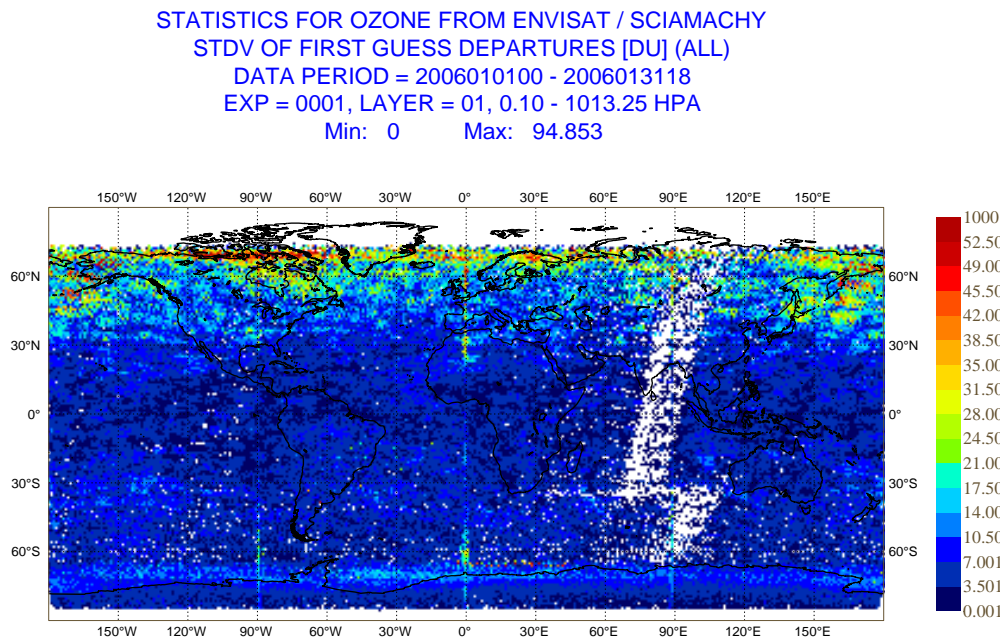EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 0   Max: 104.78
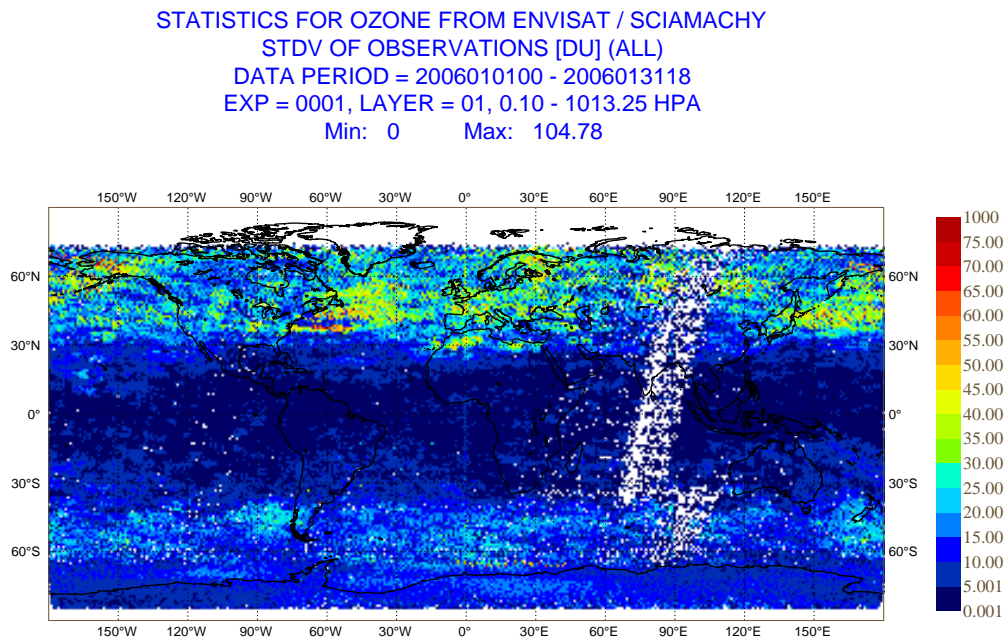
Fig. 9. Geographical distribution of the standard deviation of the mean observation values for ENVISAT SCIAMACHY NRT ozone data for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
MEAN FIRST GUESS DEPARTURE (OBS-FG) [DU] (ALL)
DATA PERIOD = 2006010100 - 2006013118
EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: -119.56   Max: 121.65   Mean: -11.841
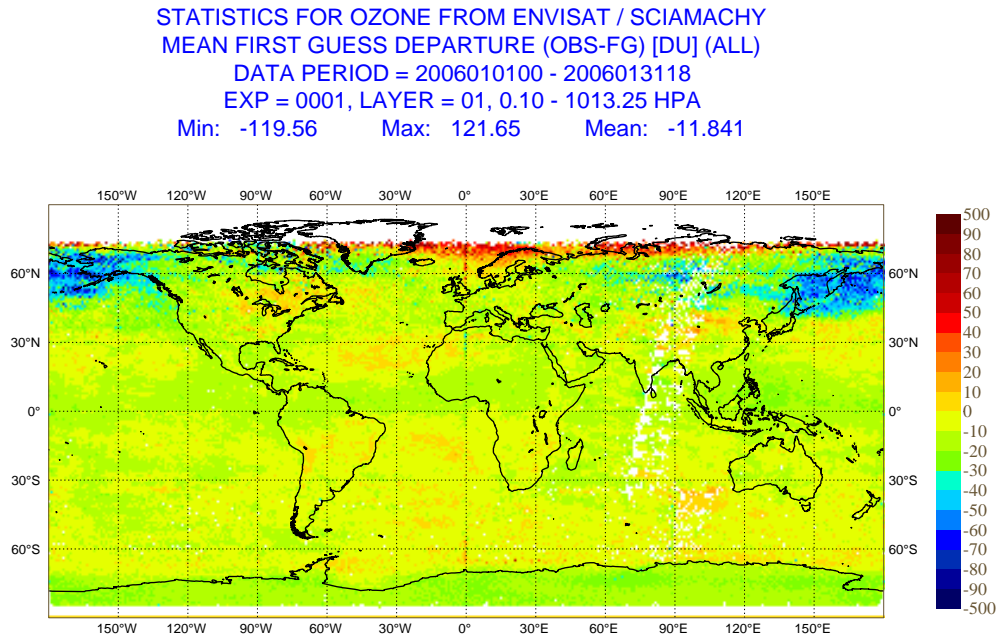
Fig. 10. Geographical distribution of mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
STDV OF FIRST GUESS DEPARTURES [DU] (ALL)
DATA PERIOD = 2006010100 - 2006013118
EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 0   Max: 94.853

Fig. 11. Geographical distribution of the standard deviation of the mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
NUMBER OF OBSERVATIONS IN AVERAGE
EXP = 0001, DATA PERIOD = 2006010100 - 2006013118
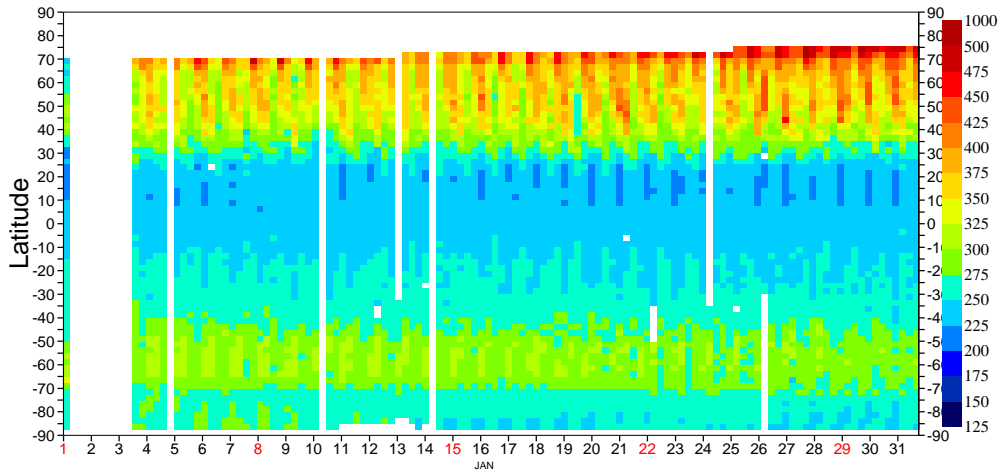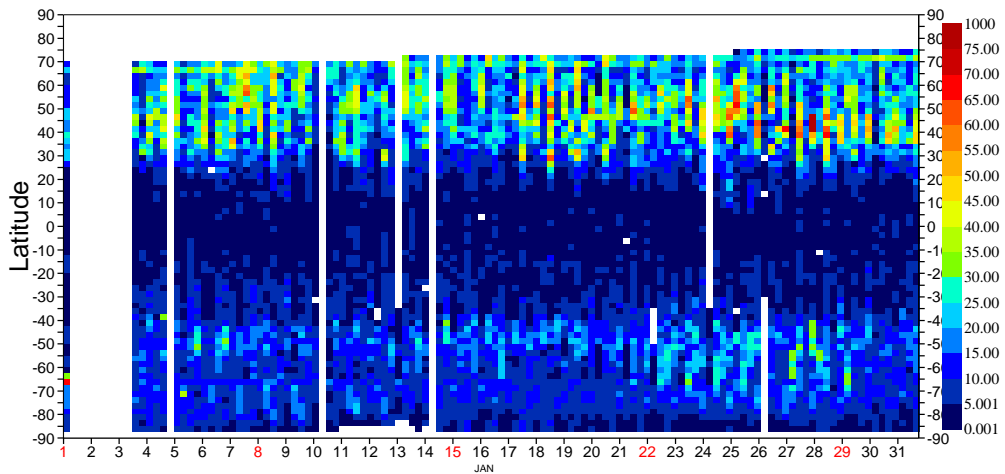Min: 0   Max: 254   Mean: 40.851
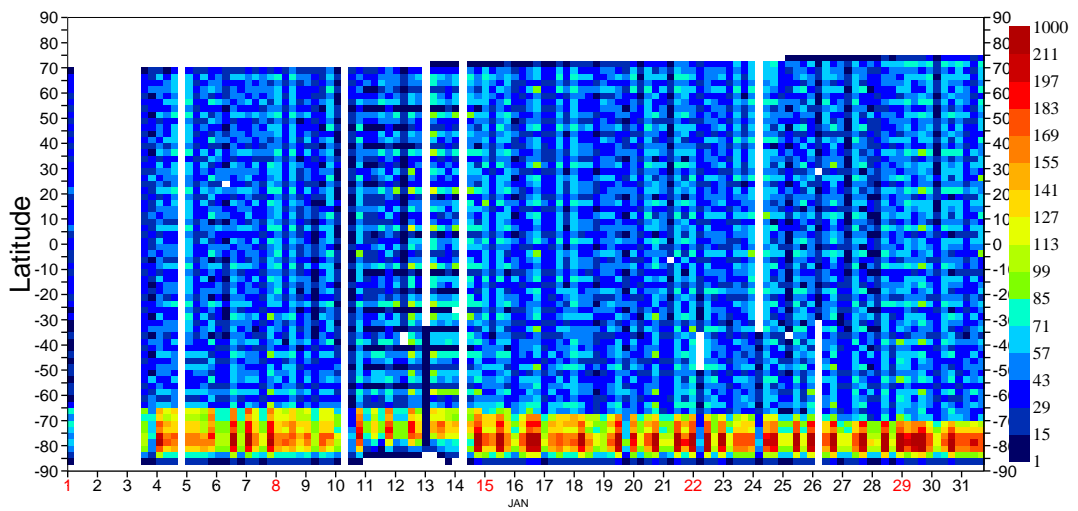
Fig. 12. Hovmoeller diagram of zonal mean number of data for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for January 2006.

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STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
ZONAL MEAN OBSERVATION [DU]
EXP = 0001, DATA PERIOD = 2006010100 - 2006013118
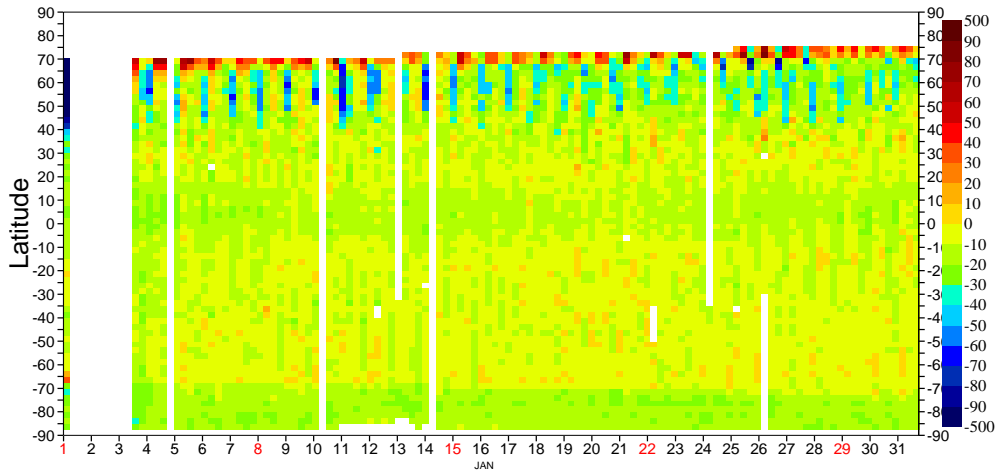Min: 213.3   Max: 507.66   Mean: 280.8

Fig. 13. Hovmoeller diagram of zonal mean observation values for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for January 2006.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA (ALL)
STDV OF OBSERVATION [DU]
EXP = 0001, DATA PERIOD = 2006010100 - 2006013118
Min: 0   Max: 95.941   Mean: 11.586

Fig. 14. Hovmoeller diagram of the zonal mean observation standard deviations for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for January 2006.

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Fig. 15. Hovmoeller diagram of zonal mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for January 2006.
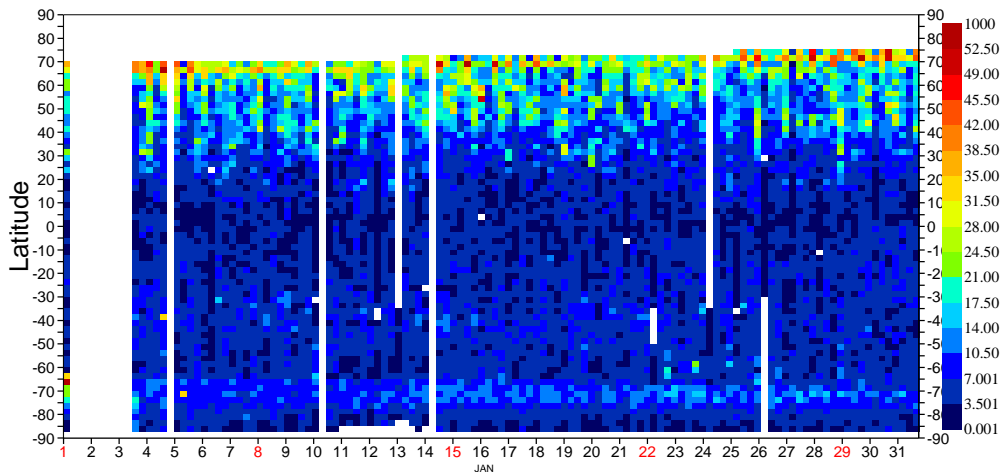

Fig. 16. Hovmoeller diagram of zonal mean first-guess departures standard deviations for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for January 2006.
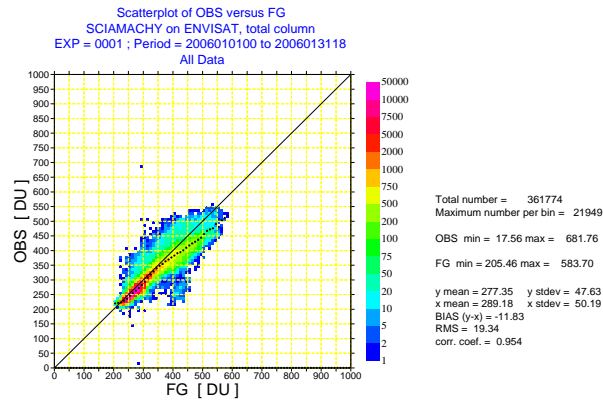
Fig. 17. Scatter plot of ENVISAT SCIAMACHY ozone values against first-guess for January 2006. The colours show the number per bin, the black dots the mean values per bin.
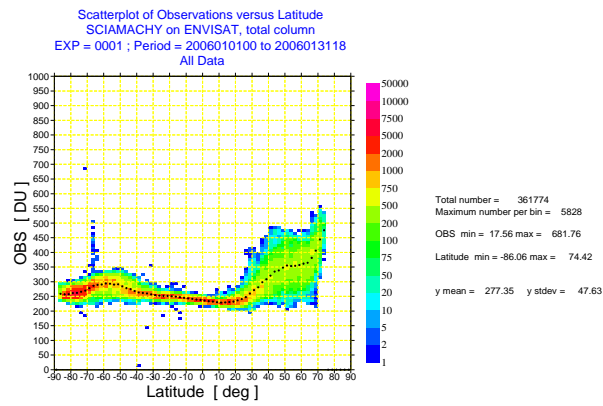

Fig. 18. Scatter plot of ENVISAT SCIAMACHY ozone values against latitude for January 2006. The colours show the number per bin, the black dots the mean values per bin.
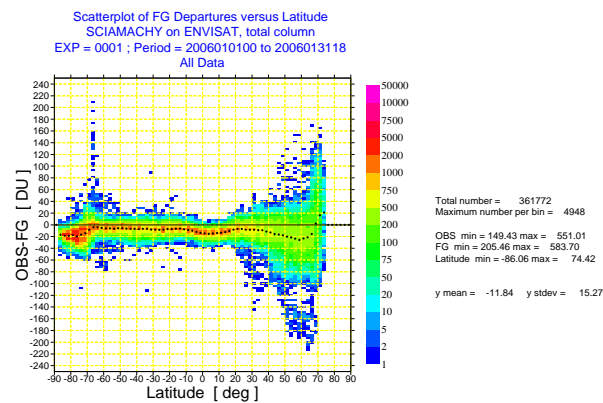

Fig. 19. Scatter plot of first-guess departures of ENVISAT SCIAMACHY ozone against latitude for January 2006. The colours show the number per bin, the black dots the mean values per bin.