REPORT ABOUT ENVISAT SCIAMACHY NRT OZONE PRODUCT (SCI_RV__2P) FOR MARCH 2005

Vanda da Costa Bechtold

ECMWF, Shinfield Park, Reading, RG2 9AX, United Kingdom,
Email: Vanda.Bechtold@ecmwf.int, Tel: 0044 118 9499369

April 5, 2005

1. Key points for March 2005

- SCIAMACHY data quality stable in March.

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

- No SCIAMACHY data from 5 March to 6 March.

- This monitoring report was produced with the operational ECMWF model, CY28R4.

2. Quality and amount of received data

This report covers SCIAMACHY NRT total column ozone data for March 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 mean first-guess departures are shown in Figures 7-9. Timeseries of zonal mean number of data, zonal mean observation values and zonal mean first-guess departures are shown in Figures 10-12. Figures 13-15 present the scatter plots of SCIAMACHY ozone values against first-guess ozone values and latitude 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 continue to be stable in March. Overall, the global mean departures (SCIAMACHY-ECMWF) have kept around -10 DU, the exception is observed between 12 and 18 March when KNMI SCIAMACHY ozone data was not assimilated in the ECMWF system. During this period there is a drift in the mean departures towards slightly higher negative values, which is particularly noticeable at the northern high latitudes. From 23 March onwards, negative mean departures up to -22 DU can be seen at high southern latitudes.

The standard deviations of the first-guess and analysis departures have also been stable in March. As in February, those values are roughly around 15 DU, in the global means. At the northern high latitudes the standard deviations of the mean departures have slightly decreased as compared to the previous month, and at the southern high latitudes those values have increased after 23 of March. The standard deviations of the SCIAMACHY data show a drift towards higher values (in the global mean).

No SCIAMACHY data were available between 5 March (00 UTC) and 6 March (06 UTC).

From the geo plots, the hovmoeller plots and the scatter plots (Figures 7-15) one can see that large positive departures at the northern high latitudes and between 40 and 70N are still present this month. In addition, large positive departures are also seen at the southern high latitudes after 23 of March. The scatter of relatively low and high ozone values between 0-30S that has been reported is still observed this month.

3. Remarks

As ozone layers from SBUV/2 on NOAA-16 and SCIAMACHY total column ozone data produced by KNMI are actively assimilated in the operational ECMWF model, 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)
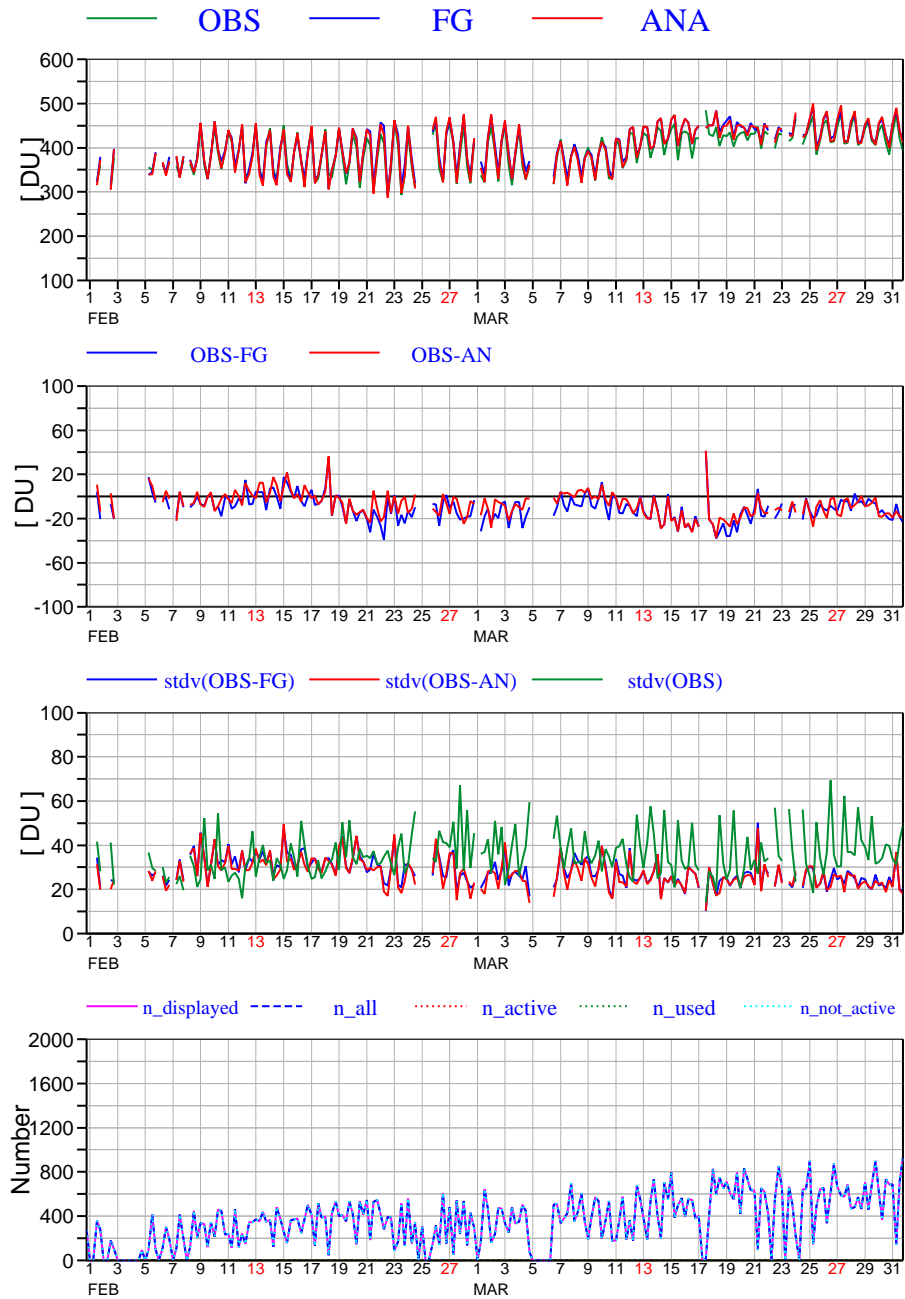
EXP = 0001, Data Period = 2005013118 - 2005033118
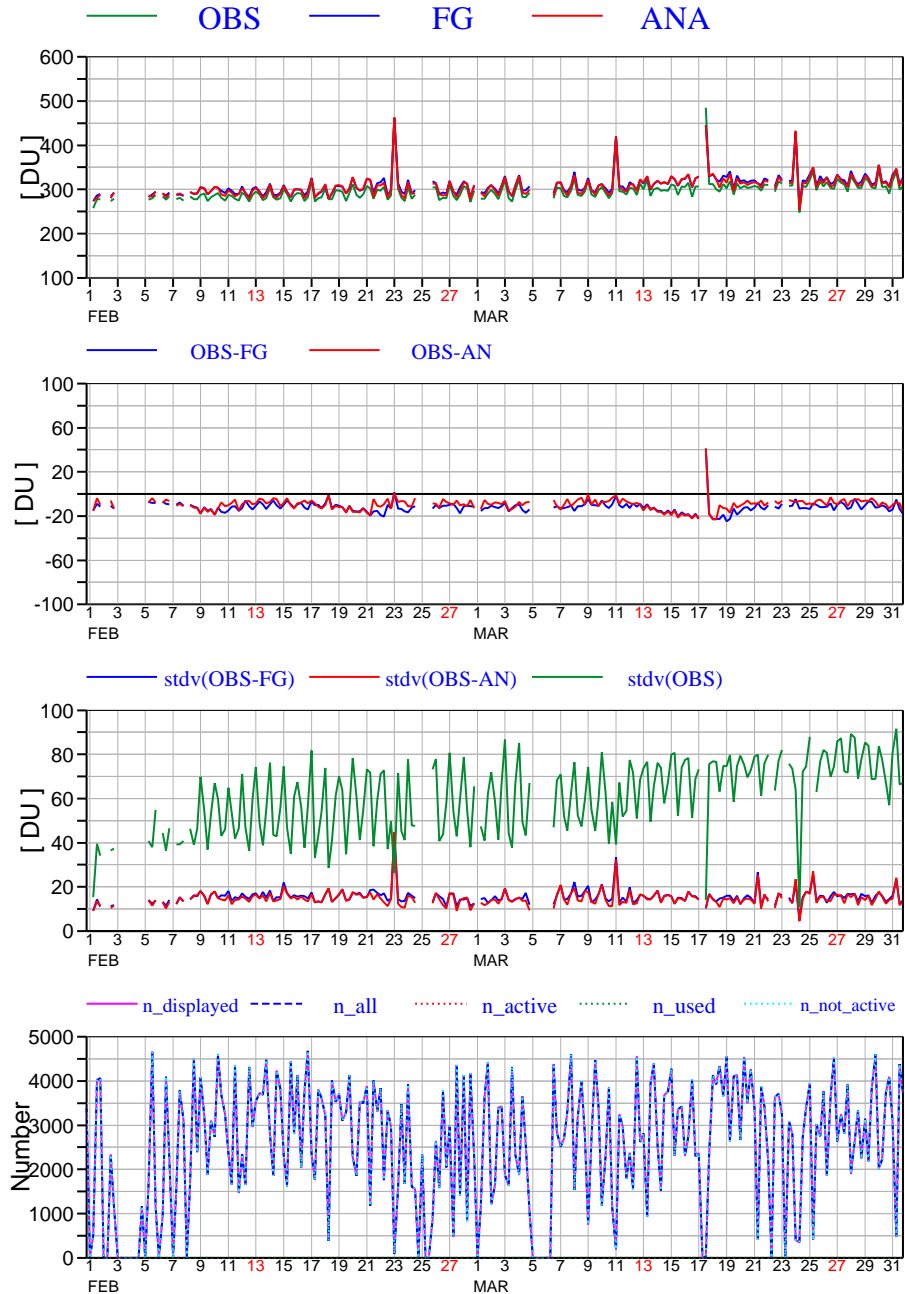
Fig. 1. Time series of mean observations, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for ENVISAT SCIAMACHY NRT ozone data for February and March 2005 (Global means).

3

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 = 2005013118 - 2005033118
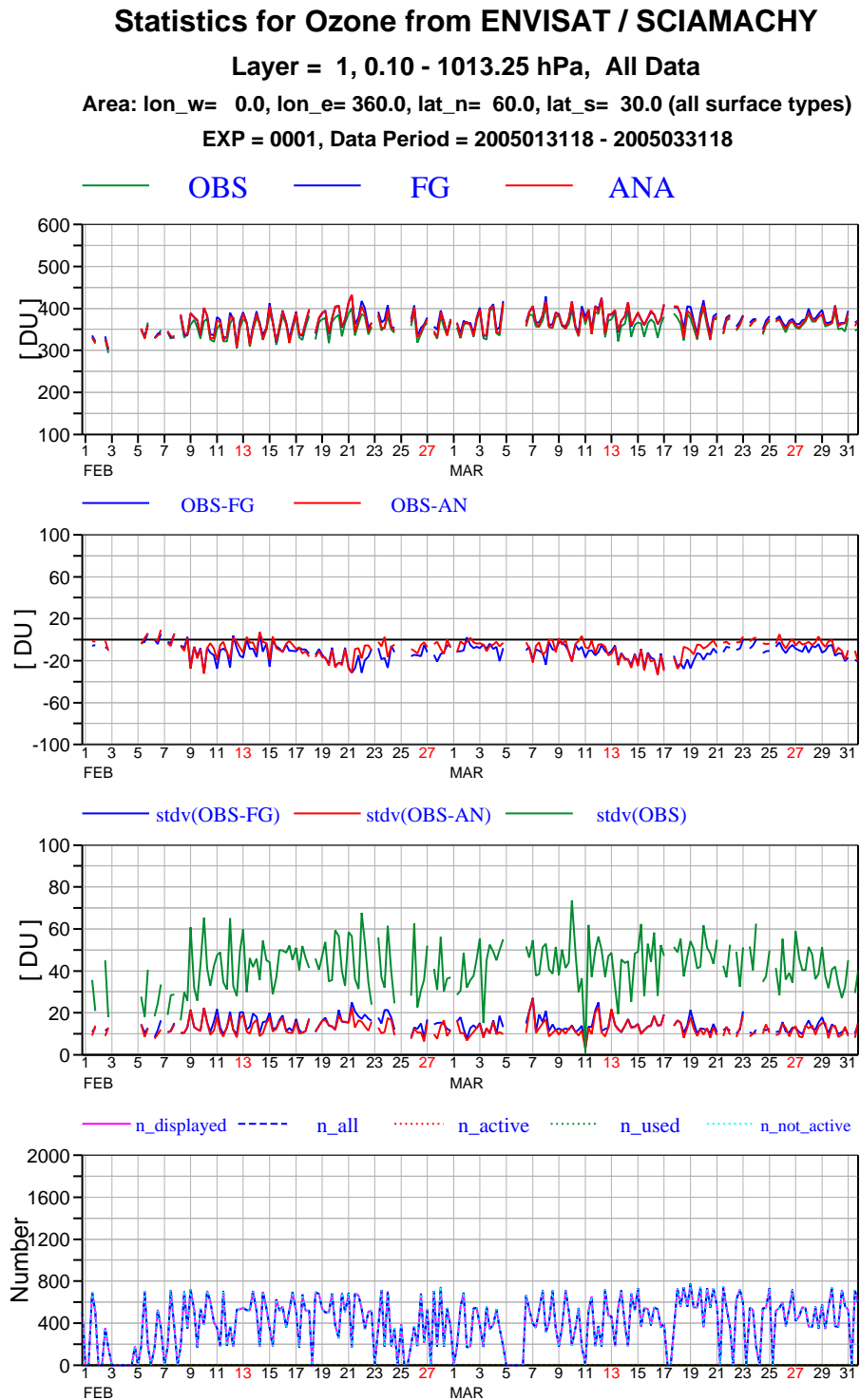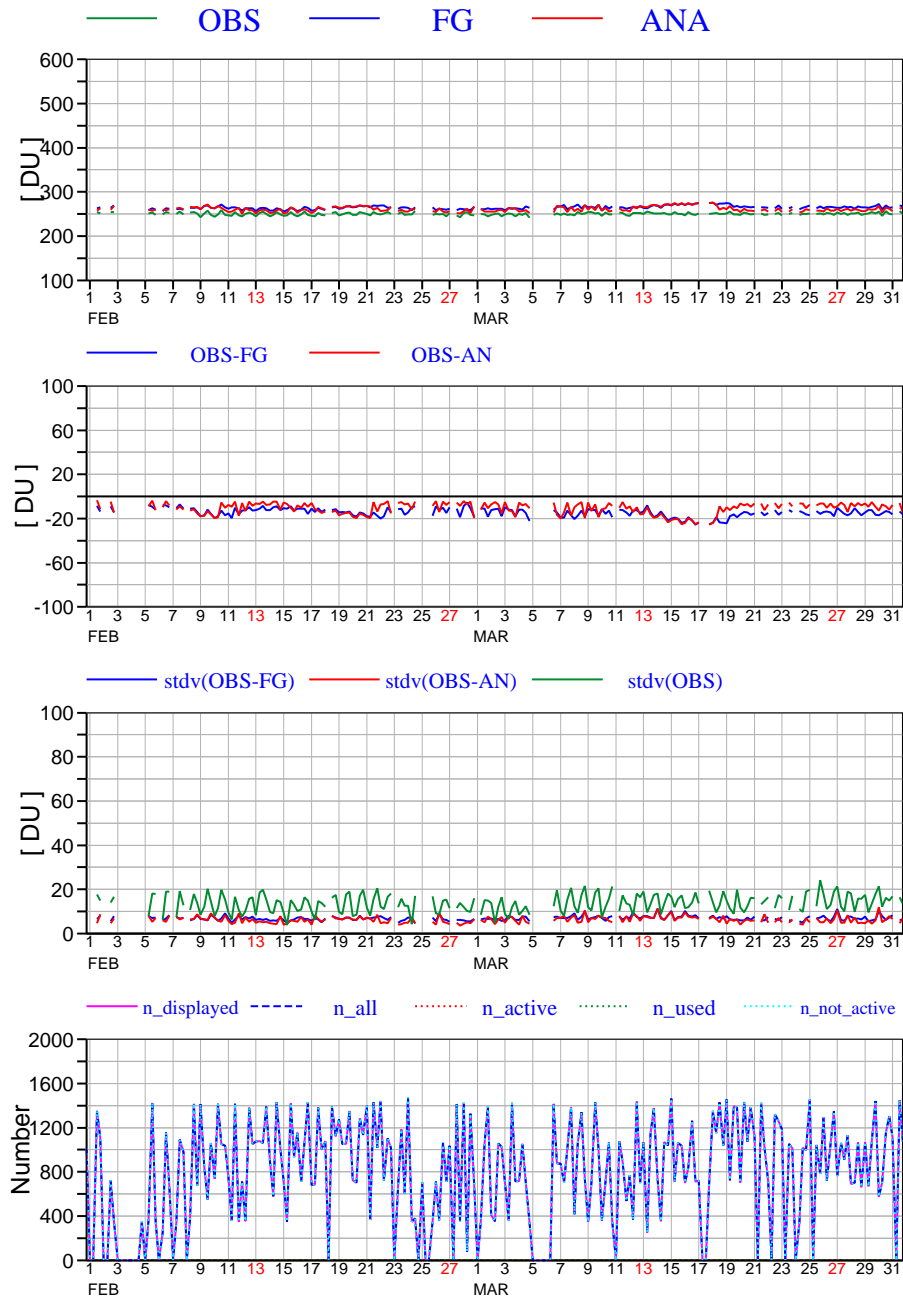
Fig. 2. As Fig.1 but for 90-60N.

4

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

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 = 2005013118 - 2005033118
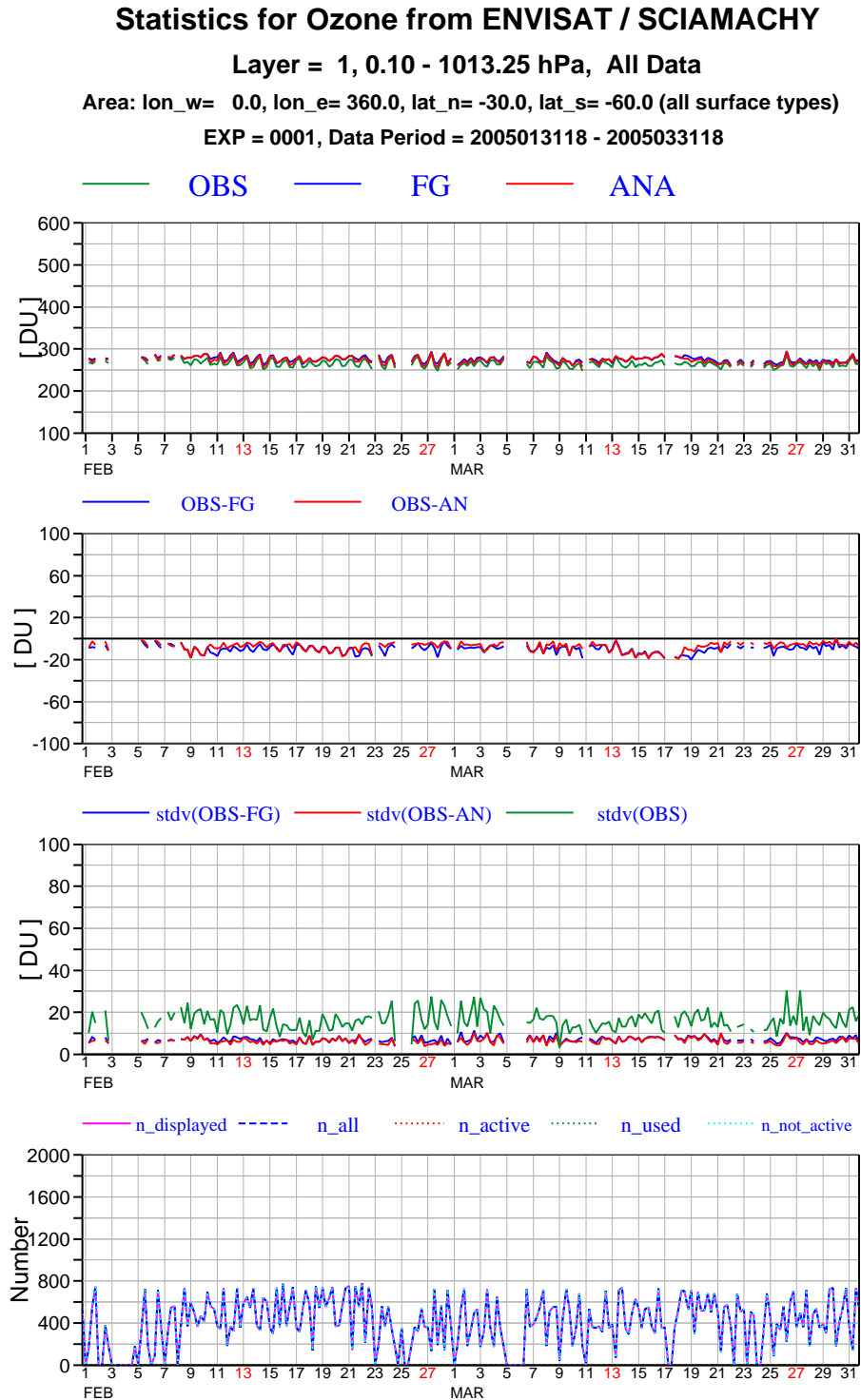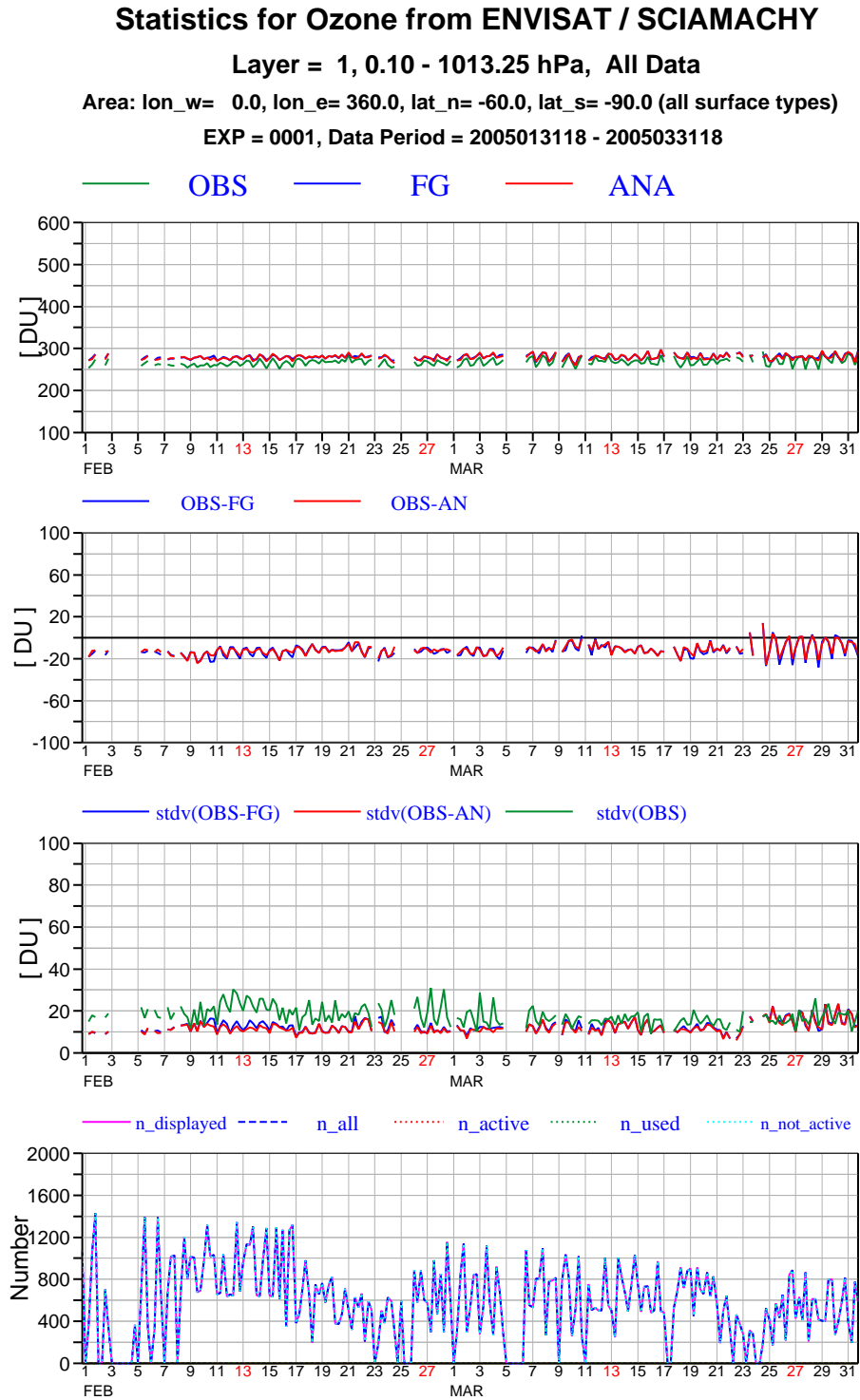

Fig. 5. As Fig. 1 but for 30-60S.

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 = 2005013118 - 2005033118

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

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
NUMBER OF OBSERVATIONS PER GRID SQUARE
DATA PERIOD = 2005030100 - 2005033118
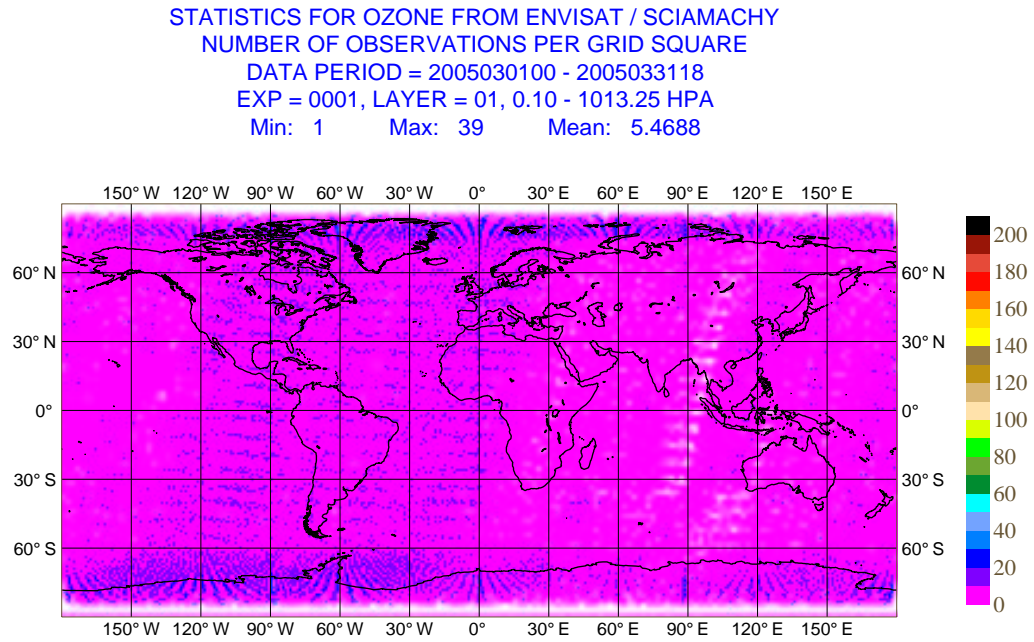EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 1   Max: 39   Mean: 5.4688

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

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
MEAN OBSERVATION [DU]
DATA PERIOD = 2005030100 - 2005033118
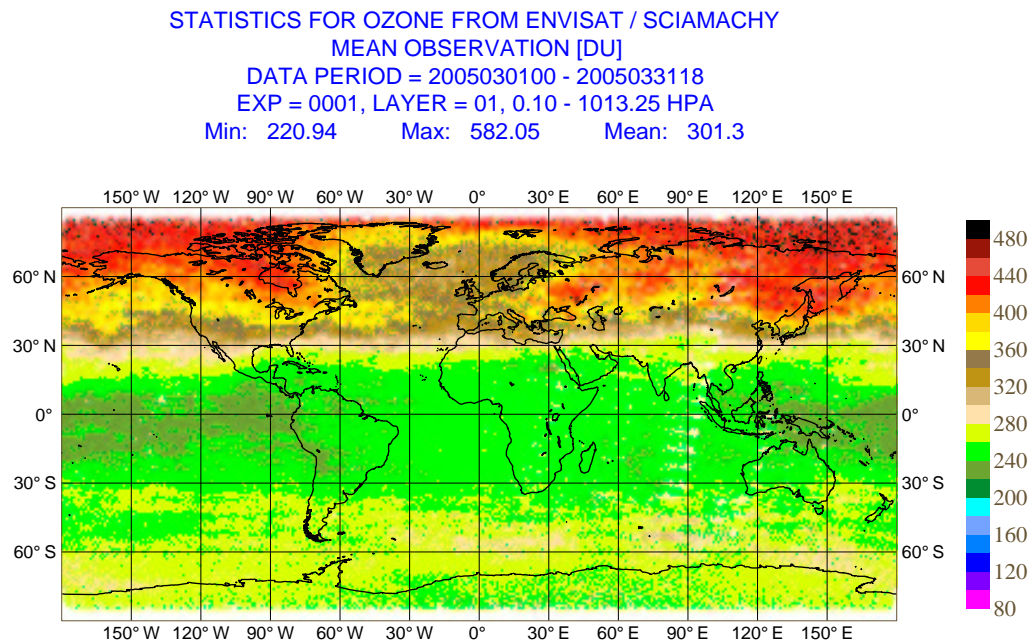EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA
Min: 220.94   Max: 582.05   Mean: 301.3

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

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
MEAN FIRST GUESS DEPARTURE (OBS-FG) [DU]
DATA PERIOD = 2005030100 - 2005033118
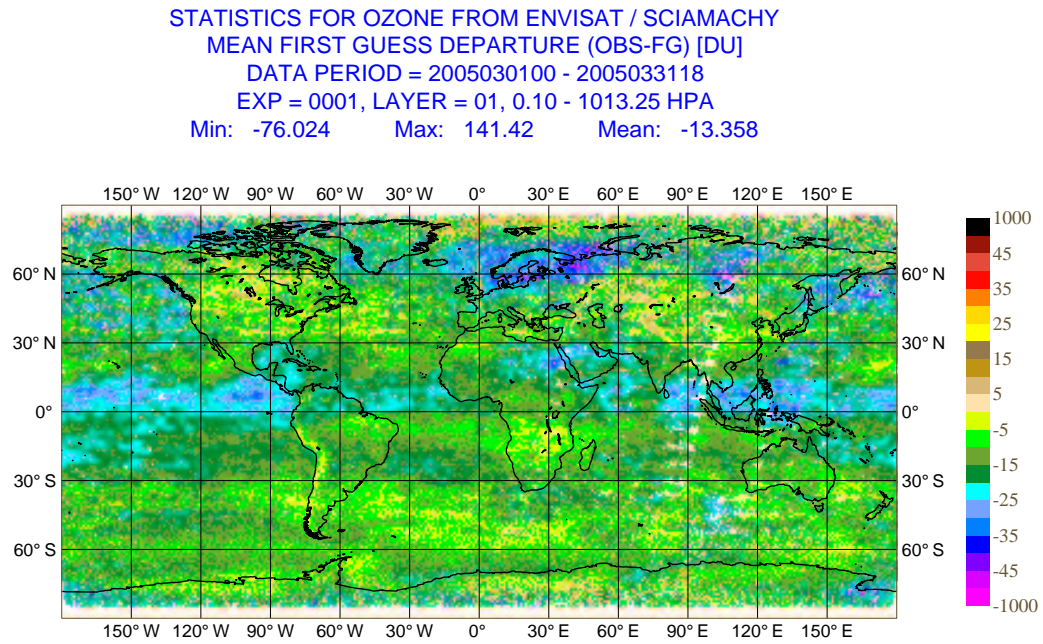**EXP = 0001, LAYER = 01, 0.10 - 1013.25 HPA**
Min: -76.024   Max: 141.42   Mean: -13.358

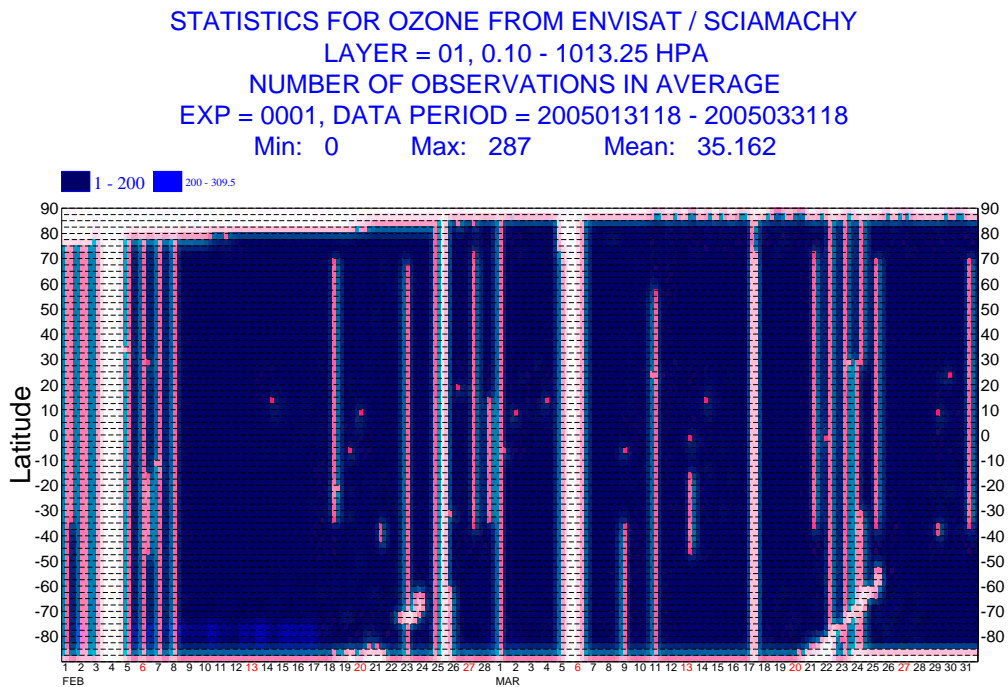Fig. 9. Geographical distribution of mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for March 2005.

STATISTICS FOR OZONE FROM ENVISAT / SCIAMACHY
LAYER = 01, 0.10 - 1013.25 HPA
NUMBER OF OBSERVATIONS IN AVERAGE
EXP = 0001, DATA PERIOD = 2005013118 - 2005033118
Min: 0   Max: 287   Mean: 35.162

Fig. 10. Hovmoeller diagram of zonal mean number of data for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for February and March 2005.
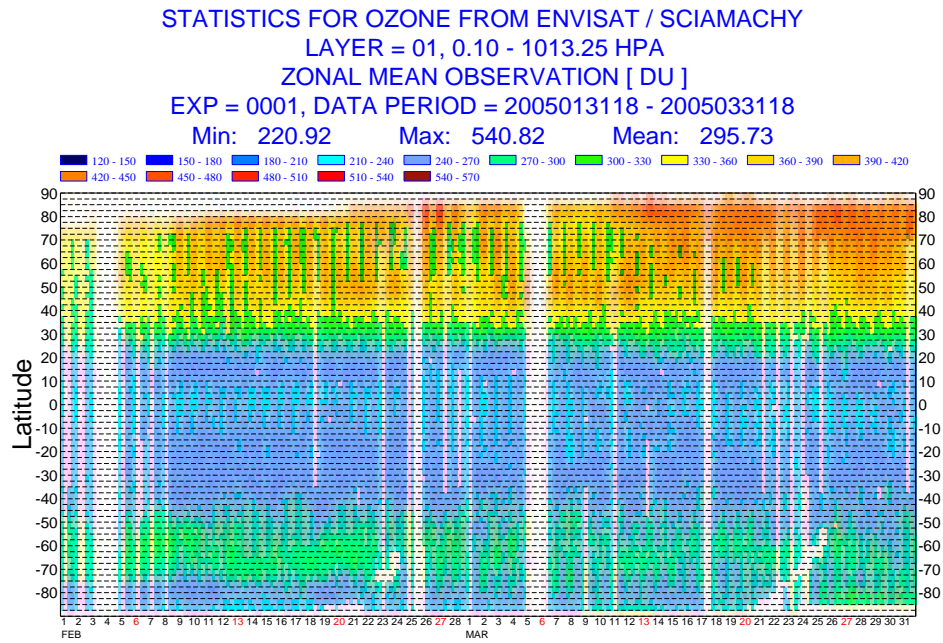
Fig. 11. Hovmoeller diagram of zonal mean observation values for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for February and March 2005.
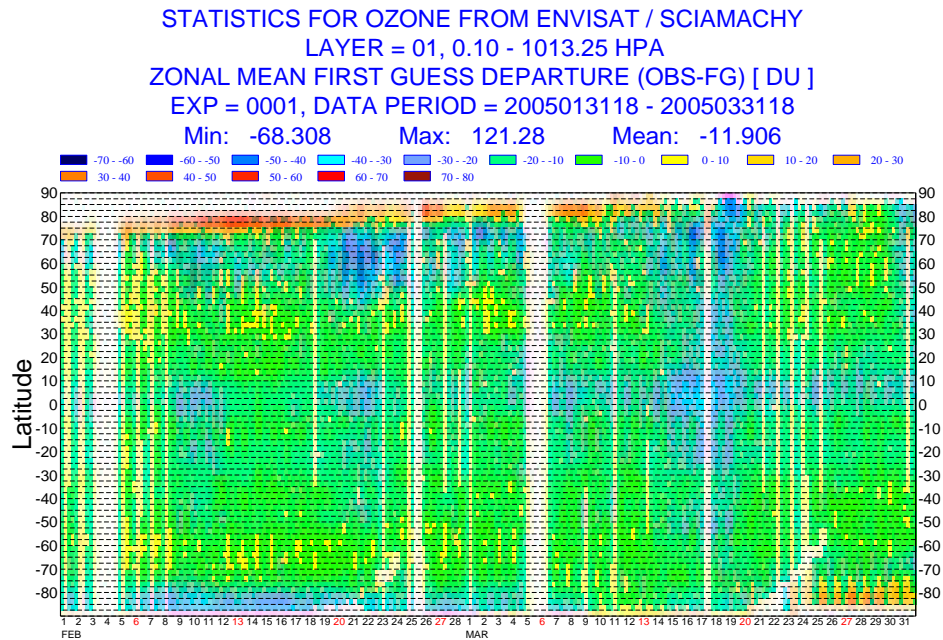

Fig. 12. Hovmoeller diagram of zonal mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for February and March 2005.
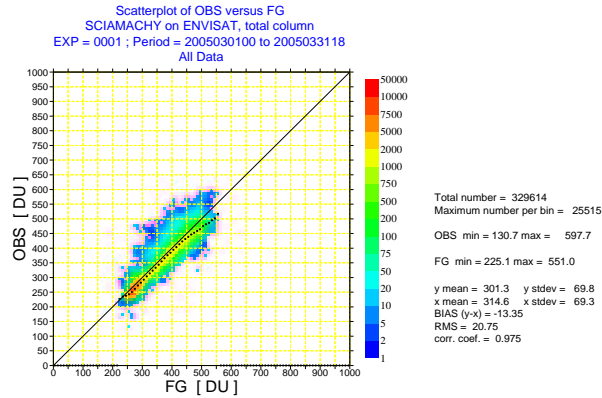
Fig. 13. Scatter plot of ENVISAT SCIAMACHY ozone values against latitude for March 2005. The colours show the number per bin, the black dots the mean values per bin.
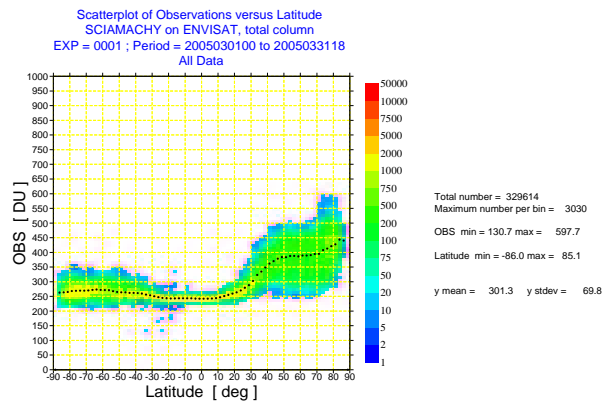

Fig. 14. Scatter plot of ENVISAT SCIAMACHY ozone values against latitude for March 2005. The colours show the number per bin, the black dots the mean values per bin.
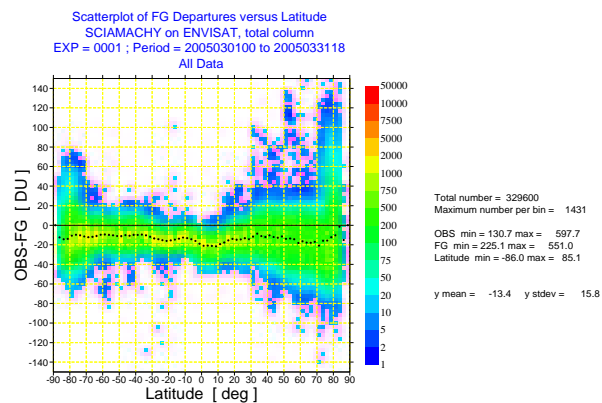

Fig. 15. Scatter plot of first-guess departures of ENVISAT SCIAMACHY ozone against latitude for March 2005. The colours show the number per bin, the black dots the mean values per bin.