REPORT ABOUT ENVISAT SCIAMACHY NRT OZONE PRODUCT (SCI_RV__2P) FOR DECEMBER 2004

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1. Key points for December 2004

- SCIAMACHY data quality not stable in December.
- Change in SCIAMACHY SCI_RV__2P data on 15 December.
- SCIAMACHY data about 25 DU lower in the global mean than ECMWF ozone values after 15 December.
- Standard deviation of SCIAMACHY data and of mean departures decreased in the global means after 15 December.
- This monitoring report was produced with the operational ECMWF model, CY28R3.

2. Quality and amount of received data

This report covers SCIAMACHY NRT total column ozone data for December 2004. 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.

SCIAMACHY data quality is not stable this month. A sudden change to lower SCIAMACHY ozone columns in the global mean occured on 15 December. This off-set can be clearly seen in the global and in the zonal means timeseries (Figures 1 and 11-12, respectively). After this change the global mean departures (SCIAMACHY-ECMWF) are around -25 DU. The standard deviation of SCIAMACHY data and of first-guess and analysis departures has decreased in the global means from values above 80 DU to values between 30 and 40 DU (Figure 1).

The drift in the mean departures seen in November for the Northern Hemisphere seems to have stabilized after the referred change (Figures 2-3). However, large negative mean departures (from 50 DU to more than 100 DU) can still be observed in the northern hemisphere in particular at high latitudes. Note however the small sample size to compute the mean values over the northern high latitudes (no data north of 70N , Figure 7).

The change on 15 December has removed most of the unrealistic ozones values and large departures over the mid- and high latitudes in particular over the southern high latitudes (Figures 11 and 12). However, there are still some unrealistic ozones values and large departures north of 40N and between 62.5S and 67.5S.

The scatter plots of Figures 13 and 14 (middle and bottom panels) show that the unrealistic large ozone values (up to 933.4 DU) south of 70S seen in same figures (top panels) were observed before 15 December.

3. Remarks

This monitoring report was produced with the operational ECMWF model (CY28R3). In CY28R3 ozone layers from SBUV/2 on NOAA-16 and SCIAMACHY total column ozone data produced by KNMI are actively assimilated. Hence, the comparison of SCI_RV__2P data against the ECMWF ozone field does not give an independent validation any more. However, it is worth pointing out that in absolute terms, SCIAMACHY total column ozone data produced by KNMI do not exhibit these unrealistically large values over the Southern Hemisphere.

All ozone values are in Dobson Units (DU).

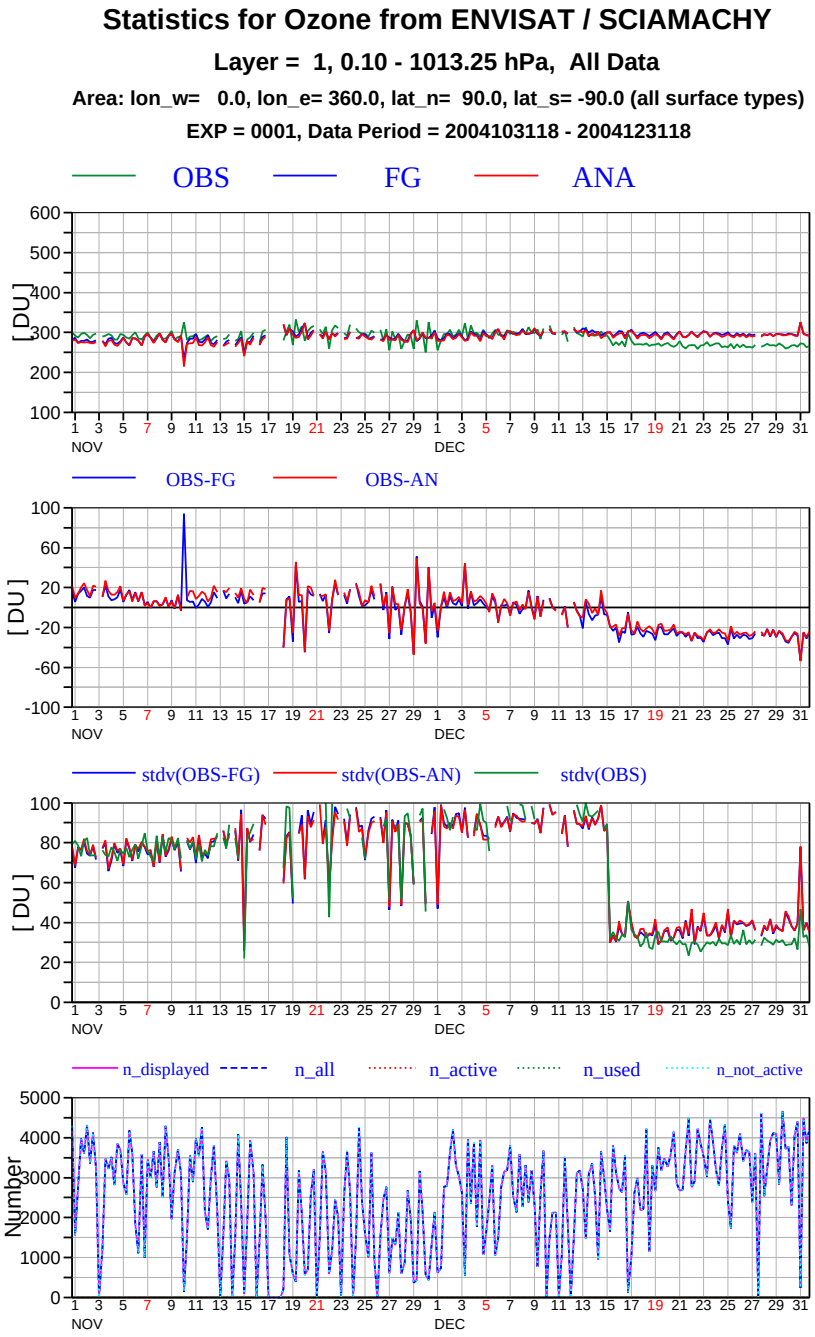

Fig. 1. Time series of mean observations, first guess and analysis values (top panel), first-guess and analysis departures (second panel), standard deviations (third panel) and number of data (bottom panel) per 6-hour cycle for ENVISAT SCIAMACHY NRT ozone data for November and December 2004 (Global means).

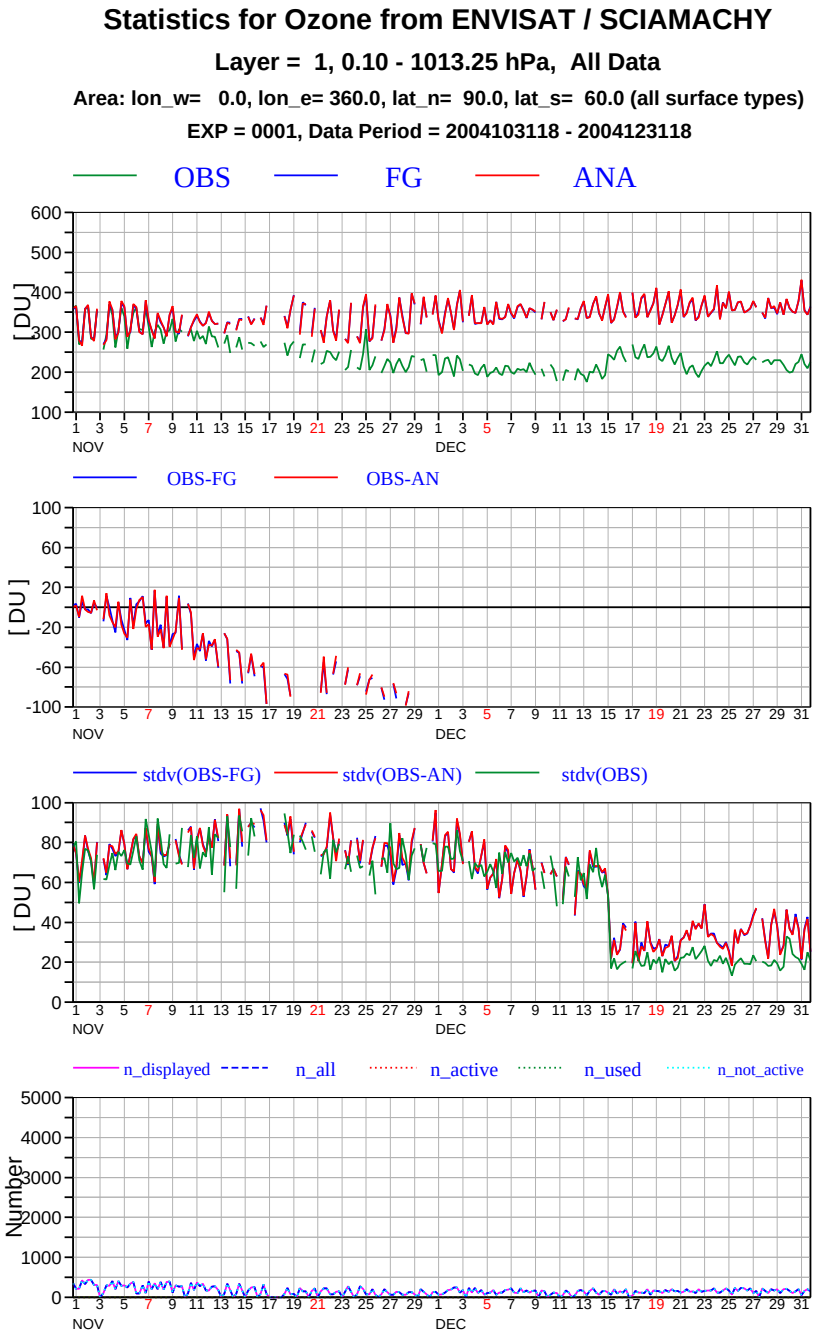

Fig. 2. As Fig.1 but for 90-60N.

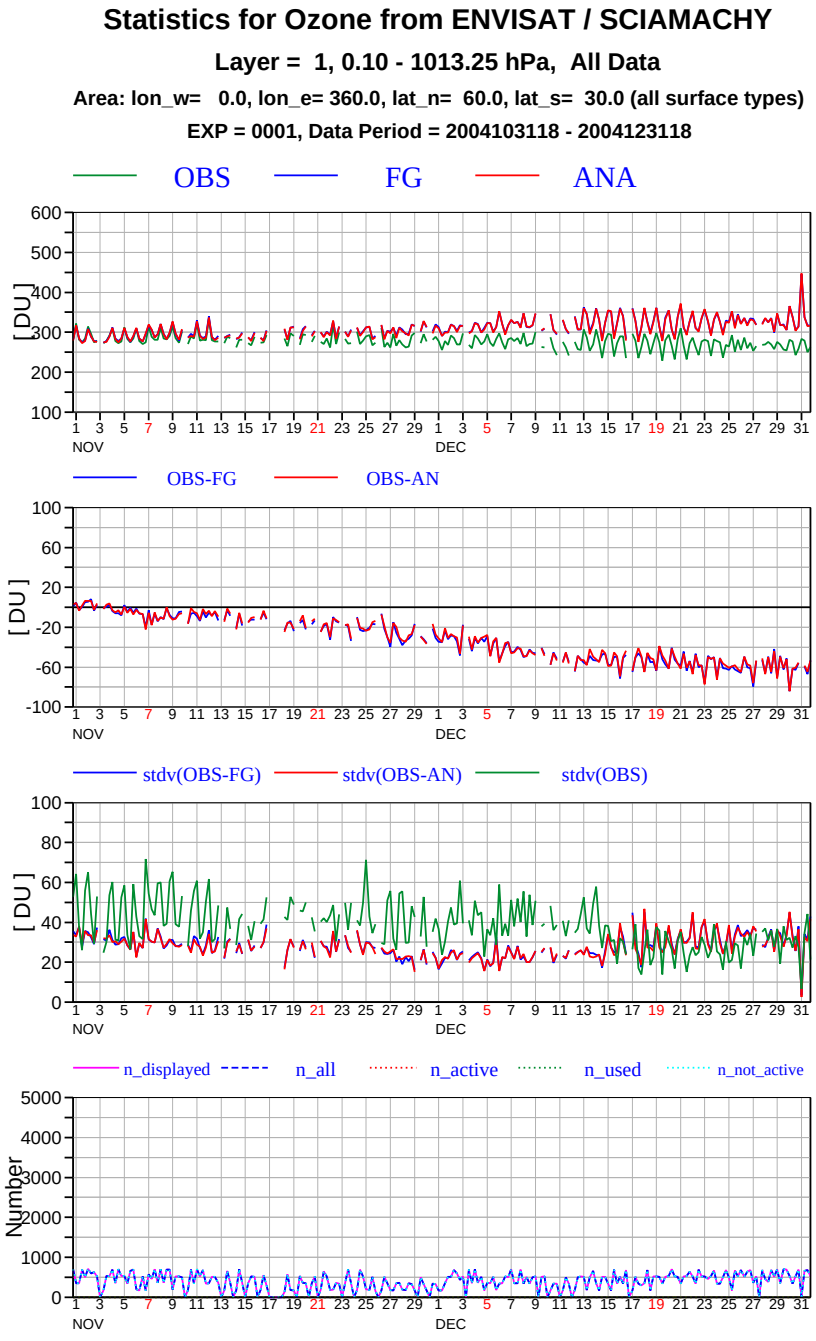

Fig. 3. As Fig. 1 but for 60-30N.

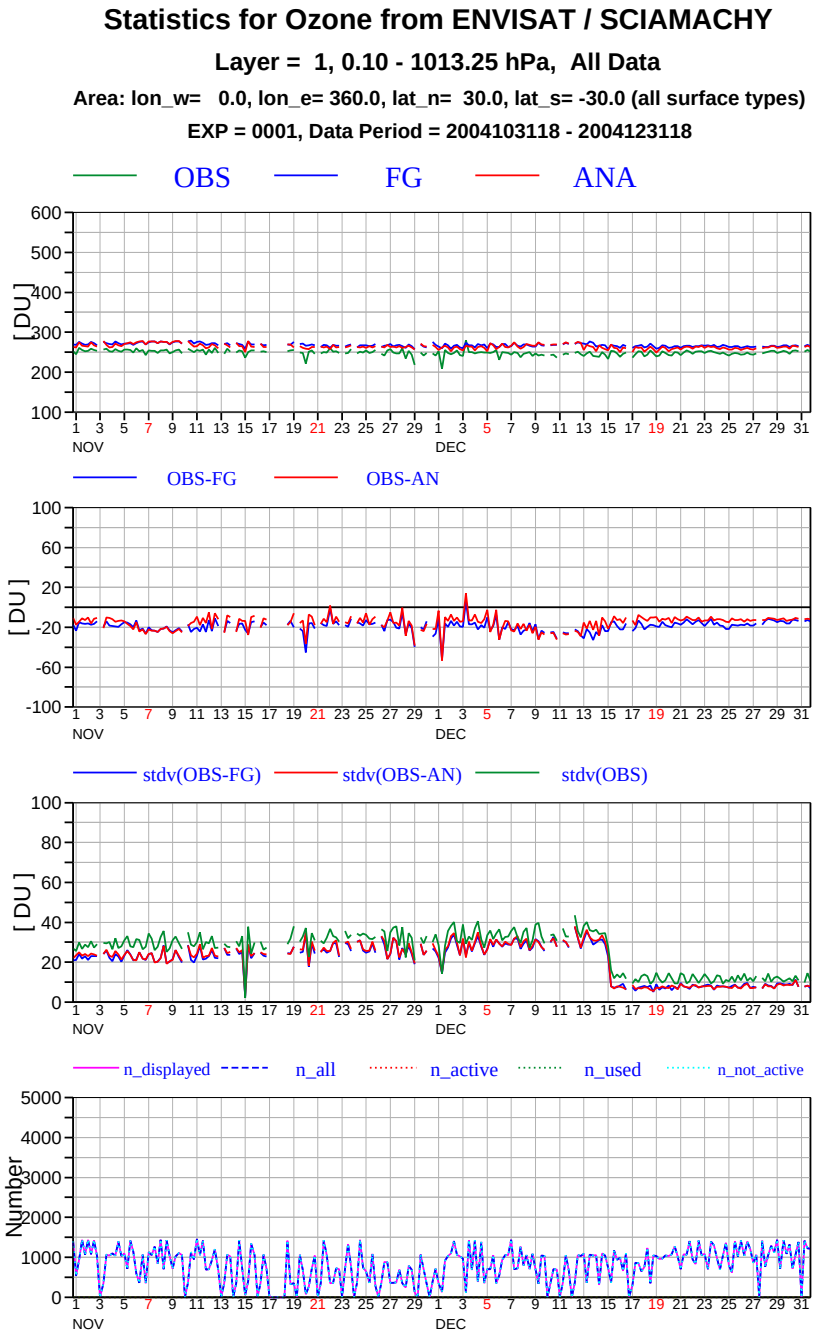

Fig. 4. As Fig. 1 but for 30N-30S.

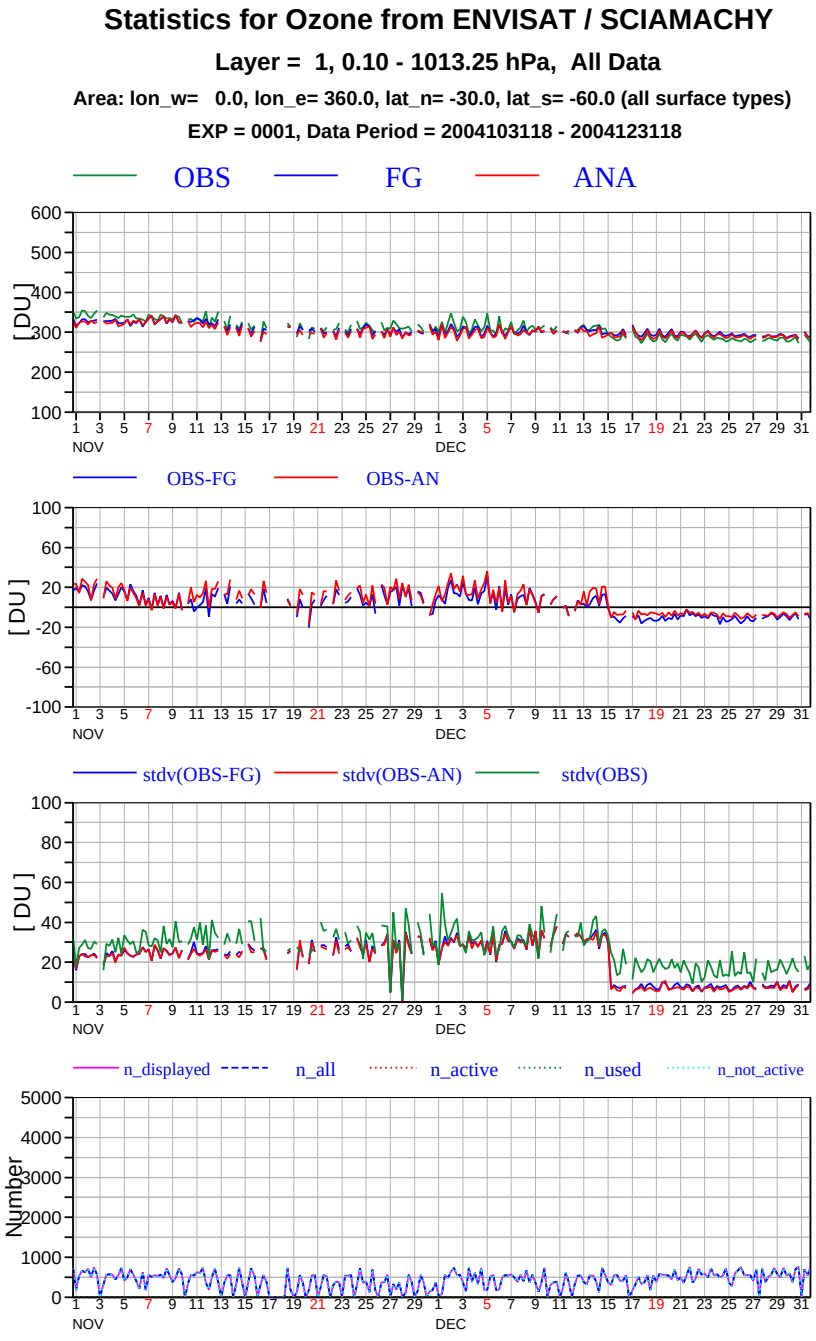

Fig. 5. As Fig. 1 but for 30-60S.

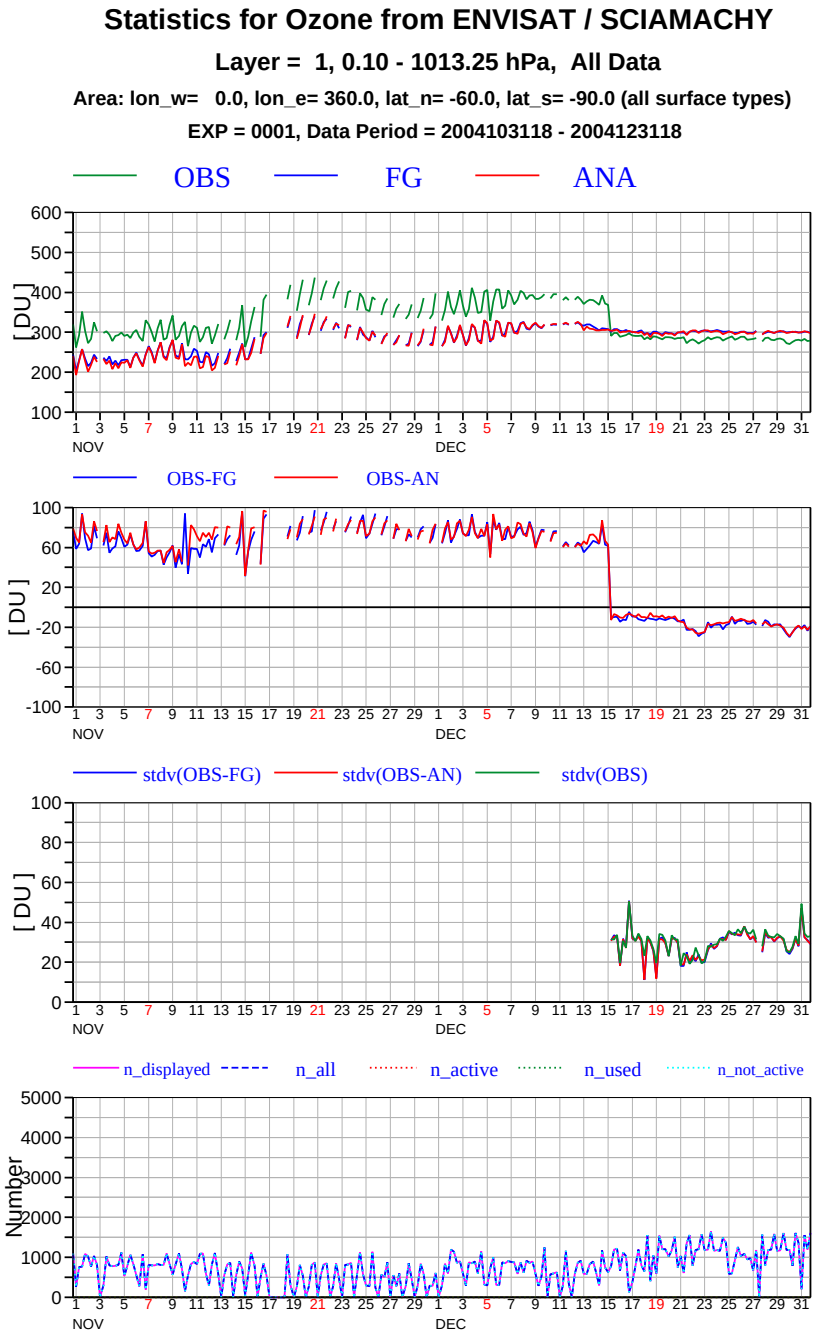

Fig. 6. As Fig. 1 but for 60-90S.

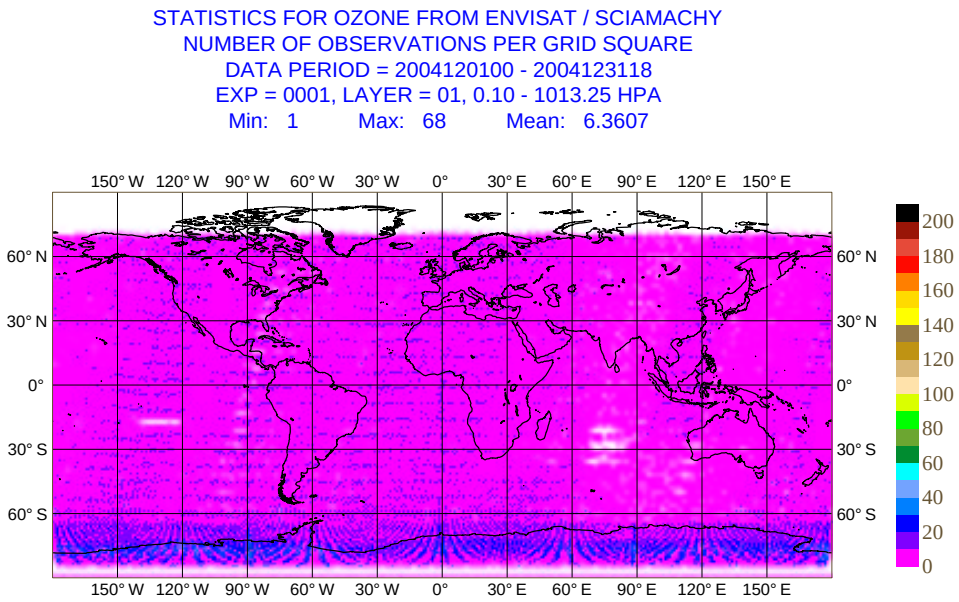

Fig. 7. Geographical distribution of mean number of data for ENVISAT SCIAMACHY NRT ozone data for December.

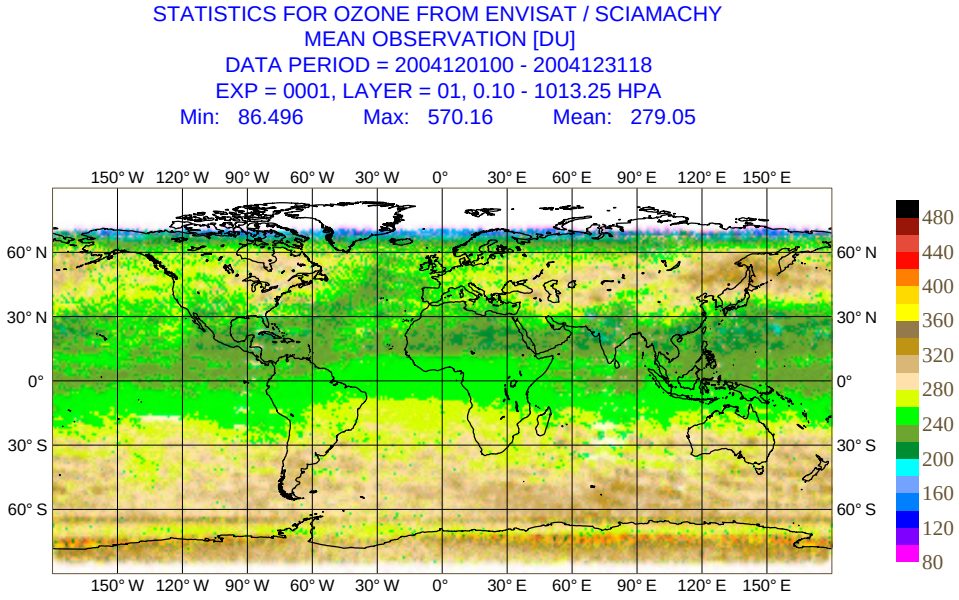

Fig. 8. Geographical distribution of mean observation values for ENVISAT SCIAMACHY NRT ozone data for December.

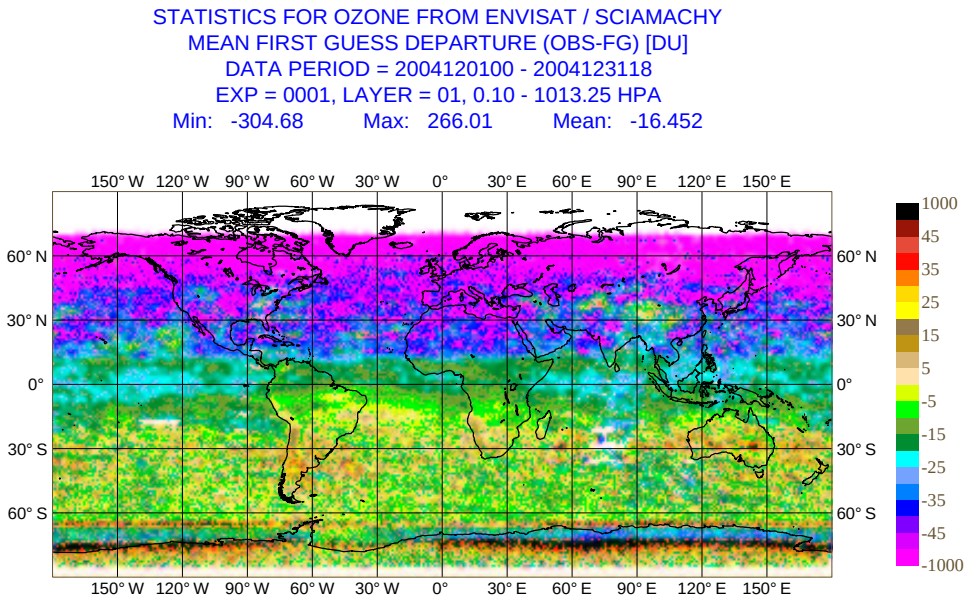

Fig. 9. Geographical distribution of mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data for December.

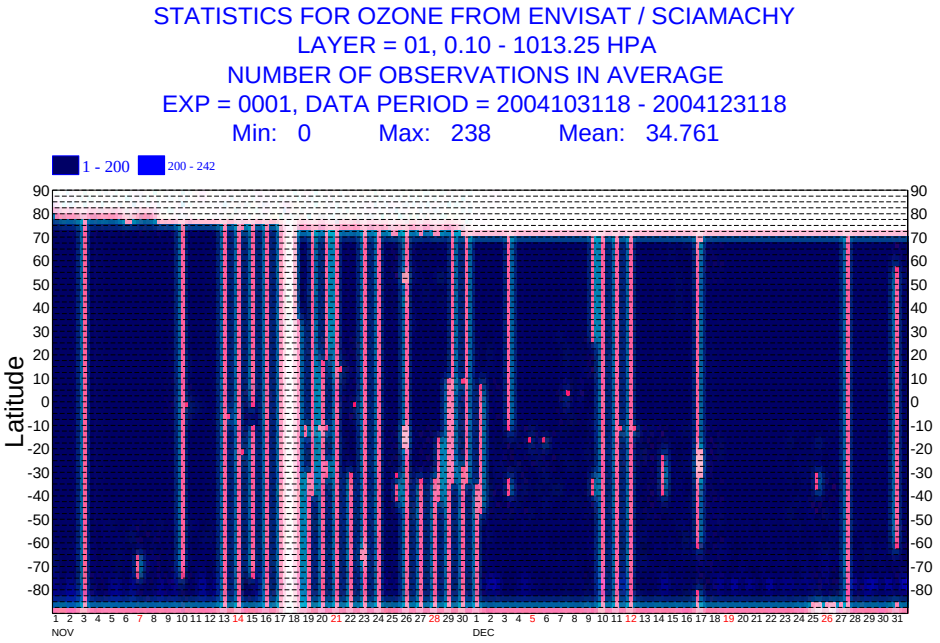

Fig. 10. Hovmoeller diagram of zonal mean number of data for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for November and December 2004.

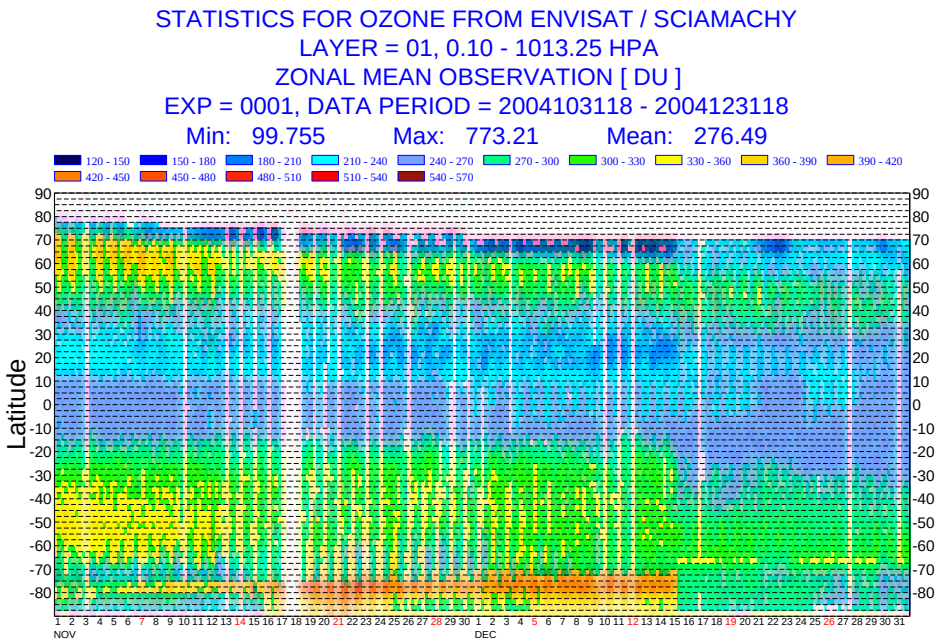

Fig. 11. Hovmoeller diagram of zonal mean observation values for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for November and December 2004.

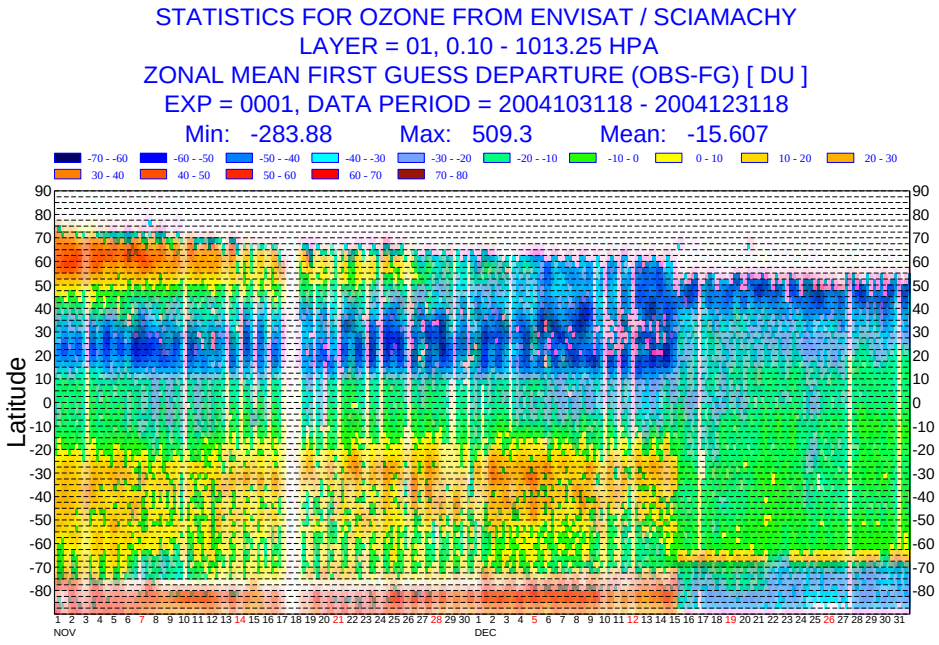

Fig. 12. Hovmoeller diagram of zonal mean first-guess departures for ENVISAT SCIAMACHY NRT ozone data per 6-hour cycle for November and December 2004.

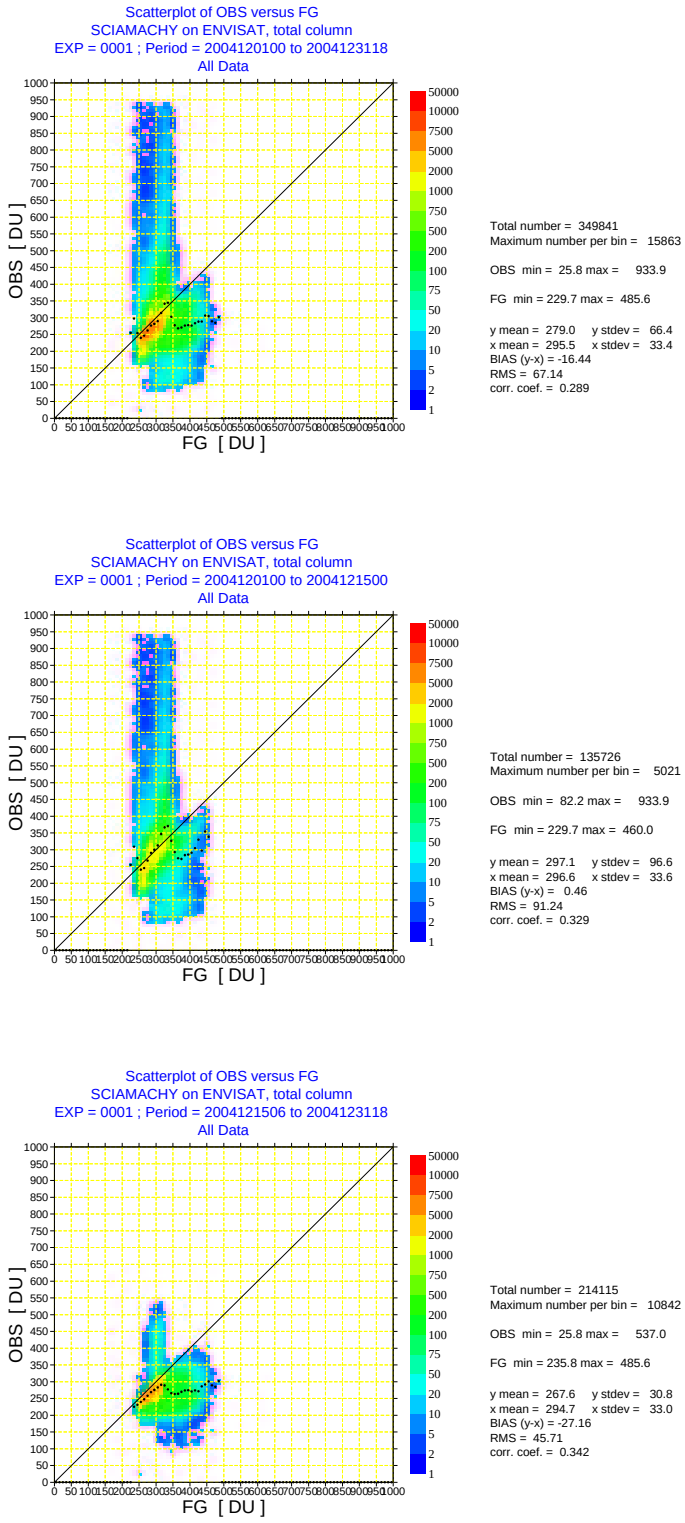

Fig. 13. Scatter plot of ENVISAT SCIAMACHY ozone values against first-guess ozone values for December 2004 (top panel) and for the periods 2004120100-2004121500 (middle panel) and 2004121506-2004123118 (bottom panel). The colours show the number per bin, the black dots the mean values per bin.

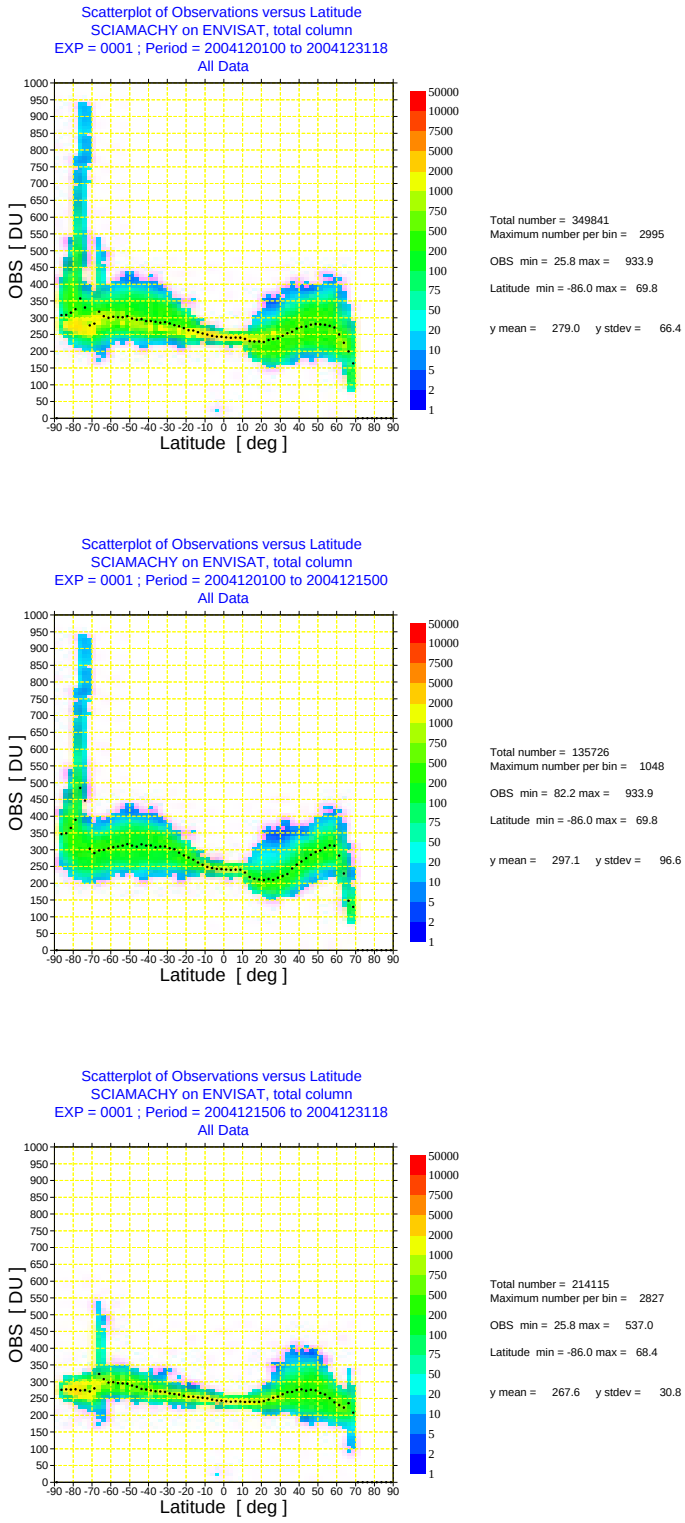

Fig. 14. Scatter plot of ENVISAT SCIAMACHY ozone against latitude for December 2004 (top panel) and for the periods 2004120100-2004121500 (middle panel) and 2004121506-2004123118 (bottom panel). The colours show the number per bin, the black dots the mean values per bin.

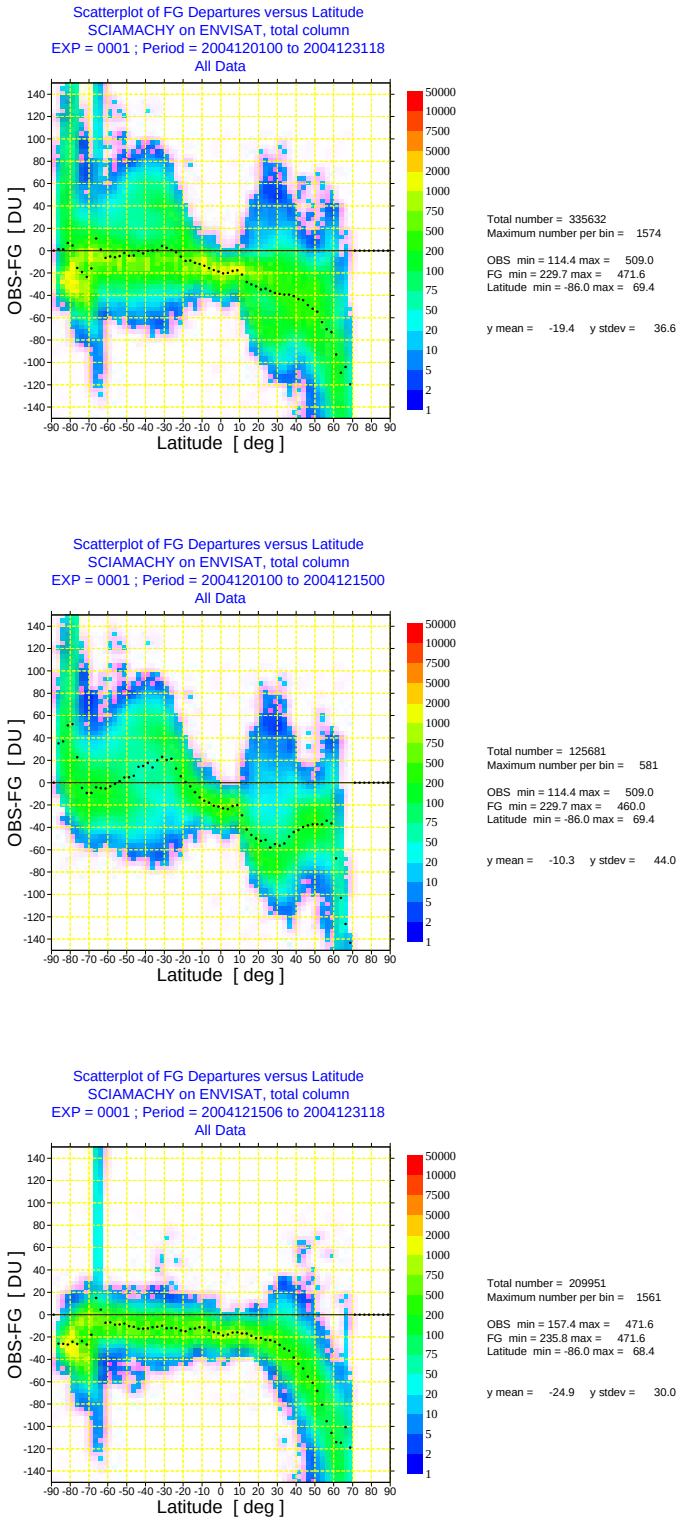

Fig. 15. Scatter plot of first-guess departures of ENVISAT SCIAMACHY ozone against latitude for December 2004(top panel) and for the periods 2004120100-2004121500 (middle panel) and 2004121506-2004123118 (bottom panel). The colours show the number per bin, the black dots the mean values per bin.