Interactive comment on "Validation of SCIAMACHY O_2 A band cloud heights using Cloudnet radar/lidar measurements" by Wang and Stammes

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In Sect. 3 and 4.1 the methodology for comparison between the operational ESA-5.02 SACURA, FRESCO and Cloudnet radar cloud top height retrievals is explained.

The SACURA algorithm flags each retrieval depending on the simultaneous fit of cloud bottom and top height, given the cloud optical thickness value calculated in the continuum outside the oxygen absorption band.

The definitions of the quality flags for the scientific implementation of SACURA are given in Tab. 4, p. 1555 in Lelli et al., 2012 [**1**]. The definition of the quality flags for the operational ESA-5.02 SACURA implementation are given in the SCIAMACHY - L2_OL I/ODD document, p. 51 [**2**].

Referring to Fig. 3 (p. 8637) of the present manuscript, it can be seen that the operational SACURA exhibits two sharp peaks (at CTH 1 km and CF = 0). This is an indication that no quality flagging has been applied to the operational SACURA product.

As can be seen in Fig. 11 (p. 1561) in Lelli et al., 2012 ([**1**]), the very same peak at 1 km corresponds to the blue curve (i.e. Flag 1, indicating that cloud top height convergence hasn't been reached). Consequently those values should be excluded from every statistics, if looking at the top of a cloud. For the convenience of the authors, I plotted the operational SACURA (ESA-5.02) flag histograms for the whole mission in Fig. 1, together with the color-coded flag legend (as in Lelli et al. 2012) and the blue histogram centered at CTH bin 1 km resembles the situation described above.

Moreover, Fig. 5 (p. 8639) shows scatterplots between the operational SACURA and Cloudnet retrievals. To my understanding the reported correlation coefficients are calculated with all the points contained in the plot. However, taking into account retrievals with CF=0 and CTH=0 km (the black stars) is not valid. Please note that in the ESA-5.02 SACURA L2 Offline product cloud-free pixels are reported as pixels with CF=0 and CTH=0 km. This consideration might point again to a missing application of quality flagging and might change the calculated correlation coefficients.

In a similar manner, it seems that FRESCO retrievals plotted in Fig. 4 (p. 8636) exhibit a cut-off at 15 km (supported by the peak in the FRESCO histogram, Fig. 3(a), p. 8637). Removing this cut-off value would not change the regression/correlation coefficients as well?

In summary, in the text is not really clear how the compared datasets are selected and whether quality flagging has been applied to operational SACURA product. The authors should clarify this aspect.

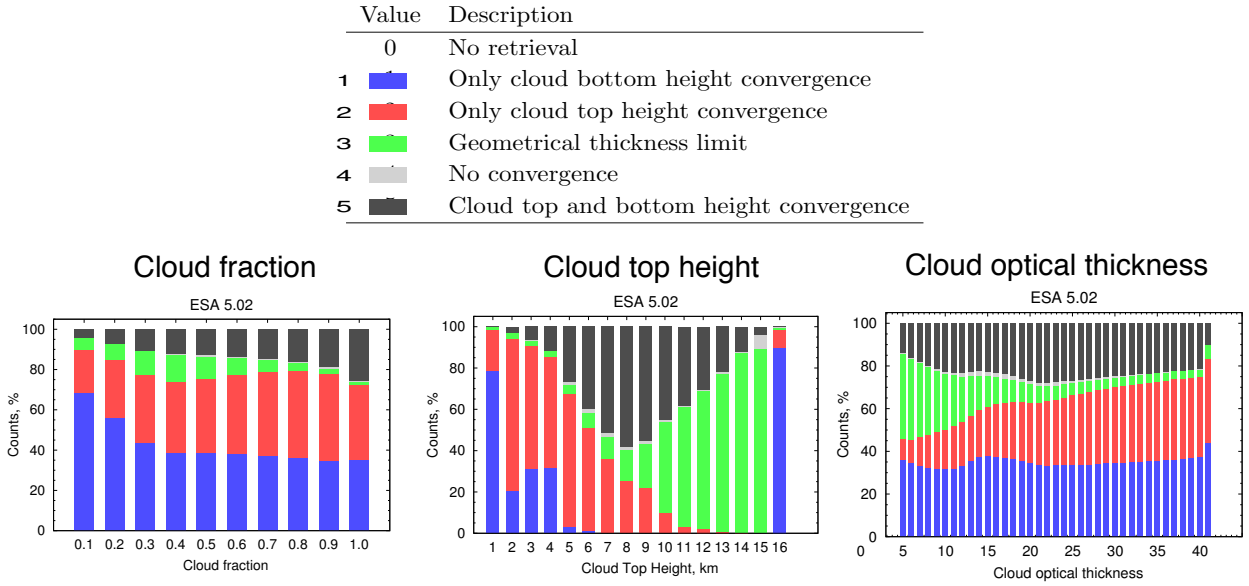

Figure 1: (Top) Legend of SACURA quality flags. (Bottom) Histograms of SACURA quality flags, ESA 5.02 L2OL product for three cloud parameter. Time period: whole mission.

References:

[**1**] Lelli et al., Seven years of global retrieval of cloud properties using space-borne data of GOME, AMT, doi:10.5194/amt-5-1551-2012

[**2**] ENVISAT - SCIAMACHY - L2 OL I/ODD, ENV-ID-DLR-SCI-2200-4, Issue 5/A. 19 January 2010