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Atmospheric Measurement Techniques Discussions

Interactive comment on "Synergetic cloud fraction determination for SCIAMACHY using MERIS" *by* C. Schlundt et al.

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Reply to Anonymous Referee #1

(a) and (b) Explain what 240 km (7200 km^2) means:
The spatial resolution in the nadir scan mode is determined by the combination of the scan speed and the integration time of the detectors. The scan speed along track is determined by the spacecraft speed of approximately 7km/s. The across track speed is determined by the nadir scan mirror rate, resulting in a scan speed of approximately 240 km/s on ground. Therefore, the effective spatial resolution varies along the orbit for the different data products, influenced by S/N requirements and by data

rate limitations. On board co-adding results in a typical spatial resolution in nadir of approximately 30 km along track by 240 km across track for all 8000 detector pixels. To minimize the loss of spatial information due to on board co-adding, selected spectral windows, so-called clusters, can be processed on board with reduced co-adding. This results in a higher nadir spatial resolution for important constituents, such as O_2, NO_2, H_2O, aerosols and clouds, of 30 km along track by 60 km across track.
We will remove 240 km (and 7200 km) from the text, since MICROS uses only SCIAMACHY ground pixels having a typical spatial resolution of 30 km along track by 60 km across track.

(c) Page 3, column 2, paragraph 3, line12:
We will remove this sentence.

(d) and (f) How were empirical thresholds determined?:
The absolute accuracy in top-of-atmosphere (TOA) reflectance is for MERIS about 3 % (Delwart et al., 2003; Martiny et al., 2005).
The reflectance thresholds (spectral contrast and minimum reflectance) has been determined by Kokhanovsky (2001). The other empirical thresholds were found analysing case studies until they were valid globally.

(e) Aerosols in MICROS:
We have not yet implemented an aerosol index in MICROS. However, we made some case studies (e.g. eruption of island volcano, April 2010) where MICROS identified the dust plume as optically thin clouds.

(g) Typo:
We have corrected for "On the one hand".

(h) Figure 8 not mentioned in the text:
Figure 8 is mentioned several times on page 8, column 1, paragraph 2.

(i) Figure X (b) and (f):
We would like to keep (b) and (f) as they are.

(j) “most simultaneous occurrences”:
This means that we calculated a two dimensional density function (histogram) of two data sets using a bin size of 0.01. The colour code is the following: If only one measurement is located inside of a bin, the result is coloured in black. If more than 1 but less than 4 measurements are located inside of a bin, the result is coloured in yellow. If more than 4 measurements are located inside of a bin, the results is coloured in red.
We will add this explaination to each figure caption (8, 9 and 10).

References

Delwart, S., Bourg, L., and Huot, J. P.: MERIS 1st year: Early calibration results, Proceedings of the International Society for Optical Engineering (SPIE): Sensors, Systems and Next-Generation Satellite VII, Barcelona, Spain vol. 5234, pp. 379–390, 2003.

Kokhanovsky, A. A.: Reflection and transmission of polarized light by optically thick weakly absorbing random media, J. Opt. Soc. Am., 18, 883–887, 2001.

Martiny, N., Santer, S., and Smolskaia, I.: Vicarious calibration of MERIS over dark waters in the near infrared, Remote Sens. Environ., 94, 475–490, 2005a.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 3601, 2010.