

***Interactive comment on “The semianalytical cloud retrieval algorithm for SCIAMACHY II. The application to MERIS and SCIAMACHY data” by A. A. Kokhanovsky et al.***

**Anonymous Referee #1**

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The paper “The semianalytical cloud retrieval algorithm for SCIAMACHY II. The application to MERIS and SCIAMACHY data” discusses a very interesting approach for the retrieval of different cloud parameters using SCIAMACHY data. But the paper cannot be accepted without substantial changes. The paper should therefore be accepted subject to major revisions.

The major part of the paper discusses the influence of SCIAMACHY calibration problems on the SACURA cloud products. This is an important issue. The assumption, that MERIS data is well calibrated compared to SCIAMACHY data seems to be adequate

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with respect to the known calibration problems of the SCIAMACHY instruments. The authors show the retrieval of a correction factor based on the intercomparison of reflectances from SCIAMACHY and MERIS. Furthermore, the differences between the improved and an earlier release of SACURA retrievals are discussed. I agree with the authors that this is a major conclusion of the paper (page 1817, line 5; page 1818, line 16), whereas the new result is not the existence of the calibration problem itself, but its influence to SACURA cloud products. But therefore it is necessary to mention the calibration problems also in the abstract and a more detailed discussion of the calibration correction has to be done for the conclusions. Nevertheless, a problem of the SACURA correction factor is the small dataset used for the retrieval. Only 7 SCIAMACHY states are used for investigation. The results are similar to earlier studies, but this is not discussed in detail. The paper also does not discuss possible dependencies of the correction factor on further parameters like the solar zenith angle. The authors have to include more SCIAMACHY data for the retrieval of the correction factor or they have to discuss in detail why a small dataset is sufficient for the retrieval based on earlier studies of the SCIAMACHY calibration problems. Beside of their own paper on this subject, also the work of other groups should be cited, e.g. Acarreta, J. R. and Stammes, P.: Calibration comparison between SCIAMACHY and MERIS onboard of ENVISAT, IEEE GRSL, 2, 31-35, 2005.

With respect to the title, I assume that the authors apply SACURA to MERIS and SCIAMACHY. In Sect. 2 and 5 the authors therefore compare SACURA results retrieved from SCIAMACHY data with SACURA results retrieved from MERIS data. This should be clarified in Sect. 2 and the abstract, because the reader could also think, that SACURA data is compared to the official level-2-data product of MERIS. Nevertheless, the intercomparison between SCIAMACHY and MERIS is a useful discussion of the paper.

If SCIAMACHY cloud products are presented in a scientific paper, existing cloud products have to be cited in an adequate way. This is not done for the retrieval of cloud top

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height. The FRESCO data product, which is often used with SCIAMACHY data, should be cited in Sect. 4 or in the introduction. The authors may simply add one or two sentences describing the difference between SACURA and the FRESCO algorithm. I think this is necessary in this context, even if the intercomparison between FRESCO and SACURA is already discussed in a different paper. Fig. 12 could be removed. There is only one information I can receive from this image: SACURA retrieves a wide range of cloud top heights for the selected states. The image is not useful without more detailed intercomparisons, the variation of the retrieved cloud top height can be mentioned in the text.

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Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1813, 2006.

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