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Atmospheric Measurement Techniques Discussions

Interactive comment on "Improved identification of clouds and ice/snow covered surfaces in SCIAMACHY observations" *by* J. M. Krijger et al.

J. M. Krijger et al.

krijger@sron.nl

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Response to Referees

First we would like to thank all the referees for their useful comments.

Of course all the specific comments and minor issues mentioned will be included in the revised manuscript.

Several referees suggested a more comprehensive validation of the entire SPICI algorithm. While it would also have been the preference of the authors to validate the algorithm with multiple fully validated alternative datasets over a full period of 9 years

and on a global scale, simple data storage, let alone download times in the order of months, given the large data volumes involved, prevent this.

This was in fact also one of the main reasons for the development of SPICI. It overcomes the need to download other datasets, as scientist now have the choice to not obtain these huge datasets by slow download, but employing SPICI instead.

Given this limitation, and in order to provide as much relevant validation/comparisons as possible the algorithm has been compared with high quality datasets with state-of-the-art retrieval methods over specially selected geographical scenes of special interest to the algorithm at various times.

Hence we used a large (random) temporal sampling of MERIS (around once every two weeks for a period of 5 years) to validate the newly introduced degradation component of the SPICI algorithm over time. We used a FRESCO dataset with smaller temporal sampling but larger global spatial sampling as confirmation only. Yet the AATSR comparison over specially selected snowy scenes is to demonstrate independently the ability to distinguish between snow and clouds. After all this ability is one of the main additions of SPICI compared to other cloud-detection algorithms. We shall make this reasoning more clear in the revised manuscript.

Also we would like to stress that the employed comparison datasets are already quite large. For example, the MERIS comparison already uses almost 10^7 SCIAMACHY measurements, the FRESCO comparison 8×10^6, and the AATSR comparison a grand total of 64×10^6 AATSR measurements (corresponding with 2×10^5 SCIAMACHY measurements). As an internal consistency check, we've studied subsets (e.g. half or even quarter of the datasets) and obtained the same results. Given these large

number of measurements and the internal consistency, we have confidence the employed datasets are large enough to be representative.

We will expand the comparison analysis, by including clear and easy to understand tables detailing the results of the various comparisons over both time and space, which will show the representativeness of the employed datasets.

A very good point raised by the referees was the lack of independent validation of the SPICI algorithm over snow covered forest areas. Given the referees concerns we will indeed obtain a dataset to independently validate the algorithm's ability to distinguish between clouds and snow covered vegetated surfaces and include the results in the revised manuscript.

Again we would like to thank all the referees for their useful comments. Based upon their suggestions and the above points we look forward to submit a revised manuscript.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1113, 2011.