**Atmospheric
Chemistry
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Discussions**

Interactive
Comment

Interactive comment on "Cloud and surface classification using SCIAMACHY polarization measurement devices" *by* W. A. Lotz et al.

Anonymous Referee #2

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General comments

The authors developed a cloud and surface classification using SCIAMACHY polarization measurement devices and validate the classification using MERIS data and METAR data. The comparisons show good agreement. This is a new product using SCIAMACHY data, it will contribute to the cloud and trace gas retrievals from SCIAMACHY science data.

Specific comments

1) Page 9861, line 21-22, 'A well-tuned set of threshold for b, r, and R5 help to classify ice, water and generic clouds as well as ..., (see Tables 3/4)' . What is the threshold for generic clouds, which is not clear from Table 3, 4.

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2) Page 9861, line 25, Multiple classification are allowed. Are there any reasons to allow the multiple classification? For example in table 3, ice cloud bright white and white have overlap in r, b range. As I understand that the authors check the b, r values to determine the clouds, then use R5 to separate water and ice clouds. I suggest that the authors explain in a few words how table 3 is used. It is not very clear to the reader if only list the values.

3) Page 9862, line 10, the authors mentioned that the NDVI n depends on the health state of the plant. Does it depend on the season as well?

4) Page 9863, line 8, for sun glint 'The proper geometrical conditions: an absolute value of an azimuth difference of 40 degree between line of sight and sun position .... '. Have you tried to calculate geometrical conditions for sun glint from the scattering angle as used by de Graaf and Stammes (2005)?

5) Page 9864, line 5, 10, 15, I am confused by the ' $>=R5<$ ' ?

6) Page 9866, line 15, 'Both figures also reveal strength and weakness: SPICS is capable to detect even geometrically thin clouds.' How do you know it is geometrically or optically thin clouds? Perhaps it is better to use optically thin clouds here.

7) In the conclusion the authors also described the future plans, such as more validations. It is very important to have more validations. I often wonder if the thresholds depend on season, latitude and so on.

Technical corrections

1) Page 9856, line 26, O2-A-band $->$ O_{2} A-band, $_{2}$ is subscript.

2) Page 9857, line 10, please change the 'sun-glint' to ' sun glint', to be consistent in the paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 9855, 2008.