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**Atmospheric Measurement Techniques Discussions**

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

**Anonymous Referee #2**

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General comments:

The reearch paper "Synergetic cloud fraction determination for SCIAMACHY using MERIS" describes a MERIC cloud mask algorithm and it's use for cloud fraction determination for SCIAMACHY. The topic meets the aim and scopes of the journal. The paper is well structured. However, some methods are not clearly described. I hence recommend publication after some efforts to strengthen the paper are provided. I detail the questions below.



Special Comments:

1. Page 3608 Water identification: You mentioned the DEM model and a threshold check to identify water. What is really used for water classification? What happens for contrasting classifications? (e.g. land from GTOPO30 and water from thresholds)
2. Page 3609 Land classification: Please explain how the height information derived from the DEM are used.
3. Page 3613 Line 7-16: The thresholds (SC=1.04 and RMIN =0.2) are crucial for the algorithm. Describe how you found these values.
4. Page 3613 Line 7-16: The whiteness test are repeated if failed with a higher threshold for SC of 1.2. Why is then the first check (with SC=1.04) needed at all?
5. Page 3615 Cloud border and adjacency effects: Which adjacent pixels are flagged as cloudy? Which neigborhood definition is applied (4 or 8-pixel neighborhood)? How many additional, initially as cloud-free classified pixels are set as cloudy around an isolated cloudy MERIS pixel? What is the fraction of these pixels in a SCIAMACHY grid cell?
6. Page 3616: The RGB images are an important source of the qualitative evaluation of the algorithm. Thus, it should be explained which MERIS channels are used here.
7. Page 3620 Line 24: You only use correlation to prove good agreement. The bias values should be provided to support the discussions.
8. Page 2623 Line 12: Where is the DEM incorporated?

9. Figure 3 : This scheme is confusing. I would recommend arranging a less fancy decision tree flow chart or removing it.

10. Figures 8-10. The scatter-plots are better readable if they were plotted as contour of density of occurrence. As an example I could not see big differences in Fig. 8(1) and 8(e), but have to believe that correlation is very different. The histograms are also not very informative. I recommend using a logarithmic y-axis and to increase the bin size of the x-axis values.

11. Fig 10 (a) and (b): FRESCO exhibits a high number of cloud fractions between 0.5 and 0.9 in the scatter-plot. This feature doesn't appear in the histogram in Fig.10(b). I suppose this comes also from the poor graphic rendition and should be another reason to revise the images.

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