**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Total and partial cloud amount detection during summermonths 2005 at Westerland (Sylt, Germany)" *by* N. H. Schade et al.

Anonymous Referee #2

Received and published: 27 August 2008

1 General Comments

1.1 Significance

This paper examines the performance of an algorithm for the determination of cloud cover (APCADA), based on measurements taken at a North Sea site. The study presented is relevant in that use of APCADA may be an option at other sites.

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Interactive Discussion

Discussion Paper

1.2   Scientific Quality

The overall quality of presentation is good. However, the paper could be improved by adding more flow and coherence. Particularly, the motivation for this study is not stated clearly, nor are the aims. Both should be given in the first section and taken up again in the concluding section. Also, the argumentation needs to be improved in some places. More needs to be said on the data set used (see below).

1.3   Presentation Quality

Language and some figures need to be improved. See below.

2   Specific Comments

1. (Entire document): You should mention the size of the data set used (how many observations, what time frame, frequence of observations). Did you filter the data in any way? How? Why?

2. The abstract should have more focus, including motivation and aim of the study.

3. Abstract: your definition of "Total cloud amount" is circular.

4. Abstract/intro: Why do you assume human observations to represent the truth more accurately than the instruments? I know this is a common approach, but still a brief remark to this end would be useful.

5. p 13480: sky imager limited to daytime: what about IR imagers?

6. 13481: Ruffieux at al., 2005 is a summary paper. Is there a more specific reference?

7. While APCADA and sky camera are described, observations and their reliability are not mentioned.

8. "Because of the availability of pyrgeometer data during this campaign..." – This sounds like this study is a casual by-product. Is there any specific motivation for undertaking the research outlined in this paper?

9. What are the advantages/disadvantages of this location and time?

10. 13482: You use two different translations of DWD in short sequence. Please check dwd.de for the official translation and use that one only.

11. "Given this small distance it is assumed that cloud observations..." – what about situations with very low clouds?

12. 13483: Please justify your use of 0.75 as the threshold value.

13. Wouldn't it be a good option to leave out the marginal pixels instead?

14. Your use of 0.016 and 0.981 for 0/8 octa seems a bit strange. After all, octa is a defined fraction (1/8). Did you use an independent data set in your visual inspection?

15. 13484: Why do equations 3 and 4 have to be fitted to observations?

16. Why do you use 0.48 as your first guess?

17. What is the meaning of k_{amp}?

18. 13485: Figure 1 does show an upper limit of 0.951 for the clear cases. However, I would not use this as a threshold. As I understand it, theory would suggest a threshold of 1 – is that correct?

19. What do you mean by $k_{day(night)}$?

20. Why is LDR variability greatest in the range from 4–5 octa?

21. 13487: "...reflect the observations in 72 (58) % of all cases ..." – I think the figures should probably be 58 (72). Why would a higher tolerance result in a worse fit?

22. 13489: overall bias is reduced to -0.28 octa. Isn't that still a lot?

23. 13490: How could APCADA be improved to properly attribute medium-level altocumulus situations? These are of significant importance in marine locations.

24. 13491: Here you say that the TCA study was performed only to correct for user errors. What is the significance of this section in the context of this study?

3 Technical Corrections

Language needs improvement and should be checked by a native speaker or someone fully proficient in English. Particular attention should be paid to the following:

- Grammar/word order

- Use of tenses. In many cases throughout the paper, simple past would be more appropriate than past perfect.

- Hyphenation (e.g. "APCADA algorithm" without and "camera-derived" with hyphen)

- Use of apostrophes (e.g. "TCAs" instead of "TCA's")

- Singular/plural (e.g. "pixel" vs. "pixels")

Some specifics (incomplete!):

1. Throughout document: consider using "clear" instead of "cloud-free"

2. Throughout document: Please use "local time" instead of "MESZ"

3. Title: I suggest using "summer" instead of "summer months"

4. 13481: "for the interpretation OF the surface radiation budget"

5. "information", not "informations" – change throughout paper

6. "Alpine" not "Apline"

7. "...Partial Cloud Amount Detection Algorithm (APCADA) for estimating..."

8. "focusing on cloud-induced excess solar..."

9. 13482: "cloudy by its red/blue ratio"

10. "is simply taken from the ratio of the cloudy to all pixel" – change to: "is simply taken as the fraction of cloudy pixels".

11. 13483: "threshold FOR labeling"

12. "...might have affected the measurements"

13. 13484: After introducing an acronym (e.g. APCADA), the same can be used without the long form.

14. Equation 1: the denominator should probably be $\epsilon_{AC}\sigma T_L^4$ I guess.

15. After equation 2 change sentence order: "ϵ_{AC} the emissivity of a cloud-free sky, as described in ..."

16. 13485: "STD" obviously stands for standard deviation. Please say so.

17. 13486: Table 1, not 4.

18. 13487: "underestimates ... -1.01 octa" – double negative!

19. "aerosol scattering" instead of "scattering at aerosols"

20. 13489: "In other words ..." – sentence confusing and redundant. Please remove.

21. "Since the lower 15..." – change to "Since the lowermost 15° of solar elevation..."

22. Reference list: Berk et al. and Buck are not cited in the manuscript

23. Ohmura et al.: some special characters missing in names. Please list all authors instead of "et al."

24. Sutter et al.: some special characters missing in names.

25. Fig 1: "summer days"

26. Fig 3: "Standard deviation of LDR and cloud-free index ..."

27. Fig 6 + 10: change scaling to make more legible

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 13479, 2008.