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Atmospheric Measurement Techniques Discussions

Interactive comment on "ELIFAN, an algorithm for the estimation of cloud cover from sky imagers" *by* Marie Lothon et al.

Anonymous Referee #2

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General comments:

This manuscript presents an algorithm named ELIFAN for the estimation of cloud fraction from sky imagers. The evaluation based on one-year of RAPACE data with human eyes shows the good performance in cloud identification at the P2OA plain site. The results and conclusions are presented clearly and concisely. Cloud identification is the basis of estimation of cloud fraction. This paper has discussed the main weakness of ELIFAN during sunrise/sunset transition and the shortage in thin cirrus clouds. However, besides the thin cirrus clouds, aerosols and fogs are two big problems challenging the accuracy of cloud identification for visible images. Discussions about impacts of aerosols and fogs on ELIFAN are not presented in this paper. Since there are some obvious weaknesses in the innovation, methodology, and validation of ELIFAN, major

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revisions are suggested.

Specific comments:

1) This study focuses on the algorithm. Since there have been some algorithms of estimating cloud cover from all sky images, progress or advances of ELIFAN relative to previous researches or other algorithms should be addressed clearly in the introduction or section 3.1.

2) The ELIFAN contains an absolute and a differential threshold process to estimate the cloud cover. Is ELIFAN automatic? When the two cloud covers are different, which one will be used in "real-time" operation? More words should be added.

3) For the differential threshold method, how does the reference image be selected for an all sky image? How do you deal with the differences caused by solar position and background atmosphere which change with the time and location? In addition, settings of white-balance mode also exert influences on colors of images. Please add more statements of these problems.

4) There exist some thin clouds (near the solar circle, area around (400,700)) in Figure 5(a). Why do the authors think it is a clear sky?

5) Aerosols and fogs always show similar R/B features with clouds in visible images. They challenge the accuracy of cloud identification, especially for skies of low visibility. How about the visibility (or aerosol optical depth) of those days for the validation in section 3.4? How about the occurrence frequency of thin cirrus clouds? The performances of ELIFAN are dependent on the sky conditions of images. Please present some rough expressions of the sky conditions of days for validation.

6) What is the purpose of section 4? If it is aimed to show the performance of ELIFAN via comparisons with the pyranometer and ceilometer, the results are destined to be weak since the two instruments work in a different way. The pyranometer cannot estimate cloud cover. The ceilometer can estimate the occurrence frequency of

clouds during a period. Supposing that the formation of clouds is random, the occurrence frequency during a certain period might be regarded as cloud cover. However, the formations, evolutions and movements of clouds interact with the atmospheric and topographical conditions and show regional character. The differences between occurrence frequency and cloud cover change due to different atmospheric conditions and locations. Thus, it's deficient to deduce the strength or weakness of ELIFAN through the comparison. If it is aimed to show the complementarity of all sky camera and the ceilometer, the work somewhat departs from what the title indicates. Maybe, add "and its application" in the title to keep this section.

7) How about the transferability of ELIFAN? Is it applicable for other areas, for example areas of high aerosol optical depth? Do you have some special approaches to discriminate the aerosols or fogs from clouds? More discussions should be added.

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