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Atmospheric Measurement Techniques Discussions

Interactive comment on "Automatic cloud top height determination using a cost-effective time-lapse camera system" *by* H. M. Schulz et al.

Anonymous Referee #1

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GENERAL COMMENTS

The paper presents an automatic technique for measuring the height ZCT of the top of a cloud layer (perhaps fog) in a mountain area from a fixed camera that sees the cloud layer from above. ZCT is calculated by detecting points of intersection of the top of the cloud layer with the terrain and using a digital elevation model of the terrain. The aim is a feasible, cost-effective method of producing good-quality site-specific cloud top height data, available for the validation of algorithms that estimate cloud top height from satellite observations.

The topic of the paper is within the scope of AMT. The paper is well organized and written, and the figures are clear. The references seem appropriate. Methods are

generally described carefully and the level of detail seems enough to allow replication. I recommend the publication in AMT, but I have some comments, suggestions and questions, which I hope the authors can address.

SPECIFIC COMMENTS

The abstract (and title) would be clearer if it was mentioned that the technique is meant for mountain areas and a camera placed above the cloud layer.

As the aim of the technique is to provide data for the validation of algorithms using imagery from GEO or LEO satellites, it would be illustrative to give the horizontal resolution of such imagery (especially current GEO satellites viewing the area) and compare the pixel size to the geographical extension of the Taroko Gorge.

The study focuses on cloud top height (ZCT), and the paper actually gives only an indication of how the technique described for ZCT could be extended to ZCB (cloud bottom height). However, sometimes the paper gives the impression that the study is equally concerned with ZCT and ZCB. For instance, the sentence in P3 L9-10 is misleading, as the technique is not validated for ZCB.

TECHNICAL CORRECTIONS

- P1 L21 (and others). It sounds more appropriate to use "estimate" instead of "calculate", both for ZCB and ZCT, considering the uncertainties involved (and mentioned by the authors in L29-32).

- P1 L23. Please check "If ZDEM is equal to or below ZCB".

- P2 L11. The expression "inter-diurnal dynamic" sounds somewhat odd. Do authors mean "day-to-day variation"?

- P3 L9-10. Please rephrase, as the study does not attempt to validate the technique for ZCB.

- P4 L12. It would be interesting to know how often the main camera is immersed in

clouds, roughly. The height of its location sets an artificial upper limit to the values of ZCT that can be provided by the system in that environment.

- P5 L29-31. Please rephrase, as it is not quite clear. Presumably it refers to those times when the main camera is immersed in clouds. How is that condition detected?

- P6 L25. What is the meaning of "the horizon is visible"? Does it mean not obscured by clouds?

- P7 L4-11. This is not quite clear. Consider rephrasing to explain how the edge image is obtained and how the fit between horizons is calculated.

- P14, 4.3.1 Validation using the validation cam. The number of cases in the confusion matrix is a very small number compared with the number of scenes (8400). It would be interesting to know why only such a small fraction of the number of scenes is suitable for validation with the validation cam.

- P15, L3. Please check "vertical distance of less than 50 m".

- P18 L8. Please check "POD and FAR are low". Presumably it is POFD.

- P18, L23-24. It would be helpful if this useful information (or similar) is included in the abstract.

- P19, L5. Actually not for the whole valley, but for the part of the valley seen by the main camera, which may be a fraction of it.

- Appendix A. Please check POD formula.

- Fig. 5. There is a line from "mean image" to "match virtual camera to real camera". Is that correct? From the description, it looks that this is only done if the scene is suitable for the adjustment.

- Fig. 5. Please check all instances of "seperate".

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 2783, 2014.