

Interactive comment on “A RGB channel operation for removal of the difference of atmospheric scattering and its application on total sky cloud detection” by Jun Yang et al.

Anonymous Referee #1

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Overview: This article proposes a new method of cloud detection for ground based sky RGB images. It is the latest in a series of algorithms for this purposed proposed by this group. A new element is an approach to estimate the clear-sky values based on multiple channels. Additionally, differencing and threshold methods of cloud detection are combined here to make this a step forward in the evolution of cloud recognition algorithms. The approach merits publication, however, to greatly improve the presentation and accurately convey the algorithm to the public the authors should add several details, for example to the process of estimating clear-sky values, before the article is finalized.

Comments:

C1

The authors need to explain where the coefficients come from for the RAS channel computation (page 4, line 21). Do these apply for any sensor or just this TCI model? What about RAS values less than zero? I don't see values less than zero in Figures 1f, 2g & 2h, for example. How are they handled when performing the cloud detection portion of the algorithm?

Fig. 3 doesn't add much information for understanding the algorithm. If you wish to keep it, then the steps in the CSBD box should be listed, as well as the solar position box.

First paragraph of section 3.2 leaves me confused about what 'sun positioning algorithm' was used. The Yang et al. (2015) article mentions at least 4 methods. If you are using the steps given specifically in Yang et al. (2015), then please state that. If not, then state what is different. Does a special calibration of the fish-eye lens need to be done in order to map the image pixel to a particular sky elevation-azimuth direction?

How were the thresholds used in the article determined? Are they universal or do they change with instrument or location? Examples are page 6, line 16 & page 7, line 12-13. This is an essential element of a successful cloud identification scheme. So, details must be included.

The text at the end of section 3.2 (page 6, line 22-page 7, line 3) is not clear in explaining the use of the CSBL. Essentially, is an image from the CSBL used for the clear-sky image? If so, then how is the RAS of the original sky image used? Likewise, how is the 'empirical coefficient' on page 6, line 29 derived? Does the CSBL need to be created using the same instrument which collects the original sky image to which the cloud detection algorithm is being applied?

The comparison presented in section 4 should clarify if the images used are separate from the CSBL. Results from the CSBD should also be listed in table 1 to make the case that this latest algorithm is superior to others. Additionally, is the recognition error rate an over or under estimate by the algorithm compared to the standard? The standard

C2

deviation in the mean error for the different cases should be also given in table 1.

Details:

Page 1, Line 13: "...identify cloud pixels. If the sun is visible in..."

Page 2, Line 5: "Recorded downwelling..."

Page 2, Line 7: "...phenomenon in clear sky conditions..."

Page 5, line 28: "In the DTCA algorithm..."

Page 7, line 9: Need reference for the "automatic white balancing".

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-222, 2016.