

Interactive
Comment

Interactive comment on “Quantification of atmospheric visibility with dual digital cameras during daytime and nighttime” by K. Du et al.

K. Du et al.

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The authors appreciate the two anonymous referees' constructive comments that are helpful for improving the quality of this manuscript. Below are point-to-point responses to the comments. The referees' comments are numbered and the corresponding author's responses are provided after each comment.

Anonymous Referee #3

(1) General comments: This manuscript presented a new digital photography based method for measuring atmospheric visibility. The manuscript is technically well organized, and the data support the feasibility of their method in field implementation. It could be accepted with additional explanation/information as indicated below.

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Response: The authors appreciate the positive comments on this manuscript. Please see below for our responses to his/her specific concerns.

Specific comments: (1) The authors should specify the upper and lower detection limits of visibility that this method can be used to measure.

Response: The lower limit of visibility measured using this method depends on the distance between the far camera and the target. The upper limit of visibility, however, relies on the distance between the two cameras. There should be sufficient attenuation of target/background contrast along the path between the two cameras. A sample calculation for upper and lower limits will be provided in the revised manuscript.

(2) According to the algorithm, the distances between the target and the two cameras are independent of the measured visibility. However, under low visibility conditions, the target may not be detected by the cameras if the distances are larger. So the question is, how does the distance of the target affect the accuracy and/or detection limits of this method, although the actual value of the distance is not a variable in this method?

Response: The authors agree that the distance of the target poses certain impact on the detection limit of the digital camera method in practice. A section will be added in the revised manuscript to address this practical consideration by giving an example of calculation to demonstrate how the distance of target determines the lower limit of visibility that can be detected with this method.

(3) To improve the technical presentation, I recommend including details regarding image analysis and camera operation to make it easier to use by other people. For example, what are the appropriate ranges for exposure time, aperture size, etc?

Response: During implementation of this method, the aperture size was fixed to F8.0 and the exposure time was adjusted automatically so that the pixel values of the target and background fell into the range of 30-220 to avoid distortion of the camera response from overexposure and underexposure. Detailed camera setting information will be

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added to the revised manuscript

(4) What are the limitations of this method, such as weather conditions, color of the target?

Response: The method does not work well in rain and snow weather conditions. It requires the target to be black or dark gray. In addition, it requires the two camera positions and the target to be in the same straight line. These details will be added to the revised manuscript.

(5) The authors used both “Eq. (x)” and “Equation (x)” to cite equations. The format should be consistent. For example, change Equation (x) to Eq. (x).

Response: The text will be revised according to the reviewer’s suggestion.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 43, 2013.

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