

Atmos. Meas. Tech. Discuss., referee comment RC1  
<https://doi.org/10.5194/amt-2022-250-RC1>, 2022  
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## Comment on amt-2022-250

Anonymous Referee #1

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Referee comment on "New Absolute Cavity Pyrgeometer equation by application of Kirchhoff's law and adding a convection term" by Bruce W. Forgan et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-250-RC1>, 2022

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Comments to Editor:  
Dear Editor,

This manuscript provides a new valuable equation for the Absolute Cavity Pyrgeometer (ACP). The authors present theoretical derivation of the new equation and evaluate the calculation results by the new equation and the existing one very carefully. The authors also point out the problems to be solved in the equation in the future, and the proposed new equation is expected quite useful for calculation of the reference terrestrial irradiance from the ACP measurements.

I would recommend it for acceptance after the very minor points listed below.

line 1: The word in the title of "Radiometer" would be better to be changed as "Pyrgeometer".

line 28: Same as above.

line 72: The word "Trb(t)" in the Eq. (7) should be written as "Tb(t)".

line 80: "x" should be added in the description of S value as "7.044×10<sup>-4</sup>" and the unit for S should be added as "K/μV" after the value.

line 102: In the numerator of the first term on the right side of the Eq. (13), there is one missing parenthesis of ")" before "K".

line 104: Same as above in the Eq. (14).

line 116: Description of the equation number should have parenthesis as "Eq. (11)" the same as the other equations.

line 304: The ACP thermopile responsivity should be written as "Csolar" instead of "Cs" the same as in the other description.

line 317: "WIRIS2" in the second parenthesis should be written as "WIRIS4".

line 330: The order of parameters description should be the same as that in the Figure 2.

line 484: The word "cooling" is written twice, but either one of them is considered as "heating".

line 581: "x" should be added in the description of S value as "7.044×10<sup>-4</sup>".

I hope that my comment is very useful for the improvement of the article.  
Thank you.

Best regards,  
Nozomu

Comments to Authors:  
Dear Authors,

I think this study provides a new valuable equation for the Absolute Cavity Pyrgeometer (ACP). The theoretical derivation of the new equation and evaluation of the calculation results by the new equation and the existing one are described very carefully. And the problems to be solved in the equation in the future are precisely pointed out, the proposed new equation is expected quite useful for calculation of the reference terrestrial irradiance from the ACP measurements.

I would recommend the very minor points below before its publication.

line 1: The word in the title of "Radiometer" would be better to be changed as "Pyrgeometer".

line 28: Same as above.

line 72: The word "Trb(t)" in the Eq. (7) should be written as "Tb(t)".

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line 581: "x" should be added in the description of S value as " $7.044 \times 10^{-4}$ ".

I hope that my comment is very useful for the improvement of the article. Thank you for your attention.