

Interactive comment on “Complementary principle of evaporation: From original linear relationship to generalized nonlinear functions” by Songjun Han and Fuqiang Tian

Anonymous Referee #1

Received and published: 31 December 2019

The paper summarizes the history of the complementary principle of evaporation, with an emphasis on how the symmetric linear complementary relationship develops to generalized nonlinear functions. In general, I enjoyed reading such a review on the CR, which was widely used to estimate ET over different spatial and/or temporal scales.

My main comment is there are still some works worth being discussed, though this review is overall complete: 1) The perspective of Lhomme and Guilioni (2006, 2010) which relates potential evaporation to surface resistance. 2) Aminzadeh et al. (2016)'s CR with E_p defined by a surface temperature

Also, there are a few latest CR studies in 2019 that are highly relevant to the submitted

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manuscript, e.g., Anayah & Kaluarachchi (2019) and Brutsaert et al. (2019). Could the authors discussed a little bit?

Specific Comments: Line 19: Is the boundary condition here specified to the wet environment?

Line 40: Recent publications using GCR in 2019 for estimating evaporation should be added here.

Line 87: “while” should be replaced by “whereas”?

Line 107: the “realistic” is compared to the former model. I think adding “more” here may be better.

Line 110: “wss”??

Line 167: “The asymmetric CR is widely used”, please revised this sentence

Line 179: More statements on the asymmetric CR should be added, including the negative relationship between E/Epo and Epa/Epo was treated as an extension of the original CR, and the validation in several locations.

Line 246: “Han and Tian (2018) further validated the sigmoid feature”: Please state the work more detailed because there are still controversies on it.

Line 270: What is the essential difference between B15 and H12? Is “B15 inherits all three types of evaporation dated from the original CR”? Please rearrange these sentences.

Line 304: The varying characteristics of the PT coefficient should be introduced here

Line 359: Brutsaert’s recent work by using $c=0$ and varying PT coefficient should be added. Check Brutsaert et al. (2019). The Conclusion part could be improved. I wonder are there any outlooks for future studies on CR could be summarized using a few sentences here?

Reference: Aminzadeh, M., Roderick, M. L., & Or, D. (2016). A generalized complementary relationship between actual and potential evaporation defined by a reference surface temperature. *Water Resources Research*, 52(1), 385-406. doi:10.1002/2015wr017969

Anayah, F. M., & Kaluarachchi, J. J. (2019). Estimating Global Distribution of Evapotranspiration and Water Balance Using Complementary Methods. *Atmosphere-Ocean*, 57(4), 279-294. doi:10.1080/07055900.2019.1656052

Brutsaert, W., Cheng, L., & Zhang, L. (2019). Spatial Distribution of Global Landscape Evaporation in the Early Twenty First Century by Means of a Generalized Complementary Approach. *Journal of Hydrometeorology*. doi:10.1175/jhm-d-19-0208.1

Lhomme, J. P., & Guillioni, L. (2006). Comments on some articles about the complementary relationship. *Journal of Hydrology*, 323, 1-3.

Lhomme, J. P., & Guillioni, L. (2010). On the link between potential evaporation and regional evaporation from a CBL perspective. *Theoretical and Applied Climatology*, 101(1), 143-147.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-545>, 2019.

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