

Specific responses to the Referee1's comments

I am pleased to review the paper titled “Improving the calibration-free complementary evaporation principle by linking with the Budyko framework”. This paper focused on predicting terrestrial evapotranspiration. This method is interesting for calibration-free process. The manuscript is generally well written.

→ Thanks for the positive comments. We will revise the manuscript to consider the sound comments of the Referee2.

Major comments

There is not enough explanation regarding the model procedure.

→ For the CR method, Eq. (1a) is the only equation to estimate ET_a . If ET_w , ET_p , and E_{pmax} are available, then x and x_{min} could be identified and the y value is obtained. By multiplying ET_p to y , ET_a is simply calculated. Hence, there is no complex modeling procedures for this method. This simplicity is a great merit, but how to calculate ET_w is a difficult problem.

Oftentimes, ET_w is calculated with the Priestley-Taylor (PT) equation, but how one determines the PT coefficient without reference ET_a data is the focus of this study.

Minor comments

Please add the difference between the Szilagyi method and the previous method of calibration-free.

→ The Szilagyi et al.'s (2017) method is the calibration-free CR. And, we did use the same method, but propose an approach to determining its single parameter (i.e., the PT coefficient) by linking it with the Budyko framework. We will more clearly explain this in revision.

Eq 1b Why do you choose the min-max scaling?

→ This min-max scaling is physically essential, because it rescales the range of x from $[x_{min}, 1]$ to $[0, 1]$. This rescaling is to correct the implausible boundary condition used in Brutsaert (2015). In Brutsaert (2015), the minimum value of $x = ET_w/ET_p$ was assumed to be zero; however, Crago et al. (2016) argued that ET_p cannot be infinite in reality or ET_w is unlikely to be zero over a land surface. Hence, they mended this problem by introducing the maximum ET_p (i.e., E_{pmax}). If there is no water on a surface, ET_p should be adjusted to the maximum level (E_{pmax}) because all the available radiation would be transformed to the sensible heat flux. In this case, x is x_{min} , hence it ranges between x_{min} (no water) and 1 (ample water). The min-max rescaling of x provides a convenience to develop Eq. 1a by setting the range of the independent variable within $[0, 1]$.

References

- Brutsaert, W. (2015), A generalized complementary principle with physical constraints for land-surface evaporation, *Water Resour. Res.*, 51, 8087– 8093.
- Crago, R., Szilagyi, J., Qualls, R., and Huntington, J. (2016), Rescaling the complementary relationship for land surface evaporation, *Water Resour. Res.*, 52, 8461– 8471.