

***Interactive comment on* “Technical Note: Analytical Inversion of the Parametric Budyko Equations” by Nathan G. F. Reaver et al.**

Anonymous Referee #1

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This manuscript provides a derivation for expressing the Budyko parameters (n or w , more typically also referred to as ω) explicitly in terms of precipitation, evapo(transpi)ration, and potential ET. The paper argues that this is important as past studies could only indirectly infer n or w .

The paper seems technically correct. Being able to explicitly express n and w in terms of precipitation, evapo(transpi)ration, and potential ET can be useful in particular cases, but will not change anything fundamental to the outcome of any study. (Note that the search for factors that determine the catchment-specific parameters of parameterised Budyko curves seems to be largely irrelevant as there is no physical meaning of this parameter that would allow to meaningfully compare this parameter between catchments.)

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Since the paper seems technically correct, and some people can use it, I propose to publish this with very minor corrections, but I would encourage the authors to better describe what can and cannot be learned from the catchment specific parameter.

Line 25: To my knowledge, Schreiber (1904) did not use the concept of PET, and this has only been falsely attributed to Schreiber in later publications. It might be worth checking.

L32: Gentine et al. (2012) removed all catchments with Mediterranean and snowy climates, which are (for example in that same dataset) much less accurately following Budyko (see multiple MOPEX studies on climate seasonality effects on E/P and Q/P). Therefore I am not sure it's really appropriate to cite Gentine to support this statement. . .

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