Response to Referee #1

We would like to thank Referee #1 for the constructive comments. The Referee mentions several important points that we will improve on in a revised version of the manuscript. Below, we address the comments of Referee #1, with the referee comments written in italics.

This is a good manuscript, appropriate for a technical note. Your historical description is unprecise: since you chose to start with an historical perspective, your history should not be approximate!

Thank you for this comment and the given references. We will update our historical description in the introduction.

All the Budyko framework starts with Oldekop's work (1911), if you want to get convinced by yourself, the original publication of Oldekop is available as a supplementary material of one of our papers : Andréassian et al. (2016). This is not a secret, Budyko cites widely the work of Oldekop as his source of inspiration. Recently, Zhang and Brutsaert (2021) even suggested to rename the « Budyko framework » into the « Oldekop framework »;

Indeed, we agree that the work of Oldekop (1911) served as a base of Budyko's work. We also mention this in line 8, but will more specifically state this in our revised manuscript. However, we also believe the work of Schreiber (1904) is important to mention here, as Budyko took the arithmatic mean of both curves. Note also that Zhang and Brutsaert (2021) talk about the Schreiber-Oldekop hypothesis.

From the point of view of the graphical representation, there were originally two concurrent representations : that ot Turc (1954) and that of Budyko (1948). Nobody seems to have noticed this difference, and as far as we know the paper by Andréassian et al. (2016) is the first to mention it and to present both representations side by side. Other authors are now using this distinction (see e.g. Moussa & Lhomme, 2016 ;Porporato, 2022). Note that we failed to explain clearly this distinction in our 2012 paper (Andréassian & Perrin, 2012)... shame on us ;

Thank you for these references, we will include them in our revised manuscript.

As far as I know, the most complete history of the Budyko-type formulas (Turc-Mezentsev and Tixeront-Fu) has been published as an appendix in Andréassian & Sari (2019) ;

Also here, thank you for these references, they are very helpful and we will include them in our revised manuscript.

line 10: this is inexact. This formula was proposed independently by Turc (1954) in France and Mezentsev (1955) in the Soviet Union. This is why we most often name it « Turc-Mezentsev »

We will correct this in our revised manuscript.