

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2022-131

Anonymous Referee #1

Referee comment on "Impact of sky conditions on net ecosystem productivity of a "floating blanket" wetland in southwest China" by Yamei Shao et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-131-RC1>, 2022

The manuscript presents an empirical analysis of the relationship between cloudiness and NEP. From the upstart I see a serious problem in the approach. Specifically, with regards to the variables they choose to analyze.

First, why look at effects on NEP? Radiation (par) has direct effects on photosynthesis and thus, GPP, and is not expected to affect Respiration. Any effect on respiration is indirect, either through increased sugar transport to the roots, or through increase temperature. Furthermore, in the analysis of WUE, why use ET and not transpiration? especially in a flooded wetland, the direct evaporation from the water surface and saturate soil related to radiation in a very different way that transpiration and has nothing to do with carbon uptake so it should not be included in WUE.

Second, the key driver of this analysis, cloudiness, was not observed, instead it is derived indirectly. More serious is that direct and diffuse PAR fractions were not observed (a sensor for direct/diffuse shortwave radiation exist and is not very expensive). This study modelled direct/diffuse PAR from the calculated cloudiness index and observed total PAR using the empirical equations (eq 8-12) by Reindle et al 1990. These equations were parameterized in coastal northern (US and Europe) locations, which is a very different than the climate type, latitude and elevation of the current study site (this site is at least 1500 m above the highest site of Reindle). I therefore question the accuracy of the Reindle equations to this site.

Finally, all environmental variables covary, with strong diurnal and seasonal cycles. For example, if you repeat the analysis from table 1 but based on time of day (e.g., compare 7-9 am to 12-2 pm) in the summer you will find very different alpha, Pmax and Rd. The point here is that the effects you attribute to more diffuse radiation, could be actually the effects of lower temperature or higher humidity. Your analysis approach does very little to disentangle the covarying drivers of transpiration and photosynthesis. Your path analysis confirms it (without actually solving the problem).

Especially for a single-site study, which is not generalizable from the start, getting more depth in the analysis of the hypothetical effects and linking the observations better to current models for the effects of direct/diffuse radiation is critical, and missing from this study.

Other, easier to address comments:

How are you calculating Reco (eq. 2) ?

Table 1 and table 2 do not indicate any form of uncertainty (goodness of fit? RMSE?)

"Please contact the corresponding author to access data" is not a valid data availability statement. Please publish the half-hourly dataset of meteorological and flux observations. Preferably through ChinaFlux.