Anonymous Referee # 2

Overall, this is an interesting study that measured DOC, DIC and Chl a in a small lake monthly for two years of contrasting precipitation. Water inputs and outputs were estimated and the observed concentrations were compared to a model predicting daily concentrations and fluxes for a two year period. The model output was further explored by simulating results from two climate scenarios that altered the water distribution terms in the model. The motivation and objectives to understanding precipitation-driven influence on lake carbon cycling align with the journal scope and the results are likely of interest to readers if the work can be more clearly communicated. While the paper is generally well-organized, the methods and results lack detail and clarity. This manuscript requires further careful editing for English grammar and spelling throughout. I commend the authors for their efforts in merging field data collection with modeling on this important topic and I hope my comments below are constructive.

Response: I appreciate your positive and constructive comments. We have checked the manuscript thoroughly and completed an English proofreading. The manuscript has been revised, taking into account your comments as below.

General comments

(1) No data availability statement was included.

Response: We have added the data availability section,

"The data that support the findings of this study are adopted from our previous works, including Chiu et al. 2020, Lin et al. 2021, and Lin et al. 2022."

(2) Given the small size and shallow depth of this lake, does a single volume model predict average DIC, DOC, Chl a, and CO_2 evasion dynamics just as well as a two-layer model?

Response:　Because the thermal stratification was a vital process that controls the vertical profile of carbon concentration in YYL (Lin et al. 2021), this suggests that the two-layer system is more reasonable for charactering the DIC and DOC dynamics within the lake..

References:

Lin, H.-C., Chiu, C.-Y., Tsai, J.-W., Liu, W.-C., Tada, K., and Nakayama, K.: Influence of Thermal Stratification on Seasonal Net Ecosystem Production and Dissolved Inorganic Carbon in a Shallow Subtropical Lake, J. Geophys. Res.

Biogeosci., 126, https://doi.org/10.1029/2020JG005907, 2021.

Nakayama, K., Kawahara, Y., Kurimoto, Y., Tada, K., Lin, H.-C., Hung, M.-C., Hsueh, M.-L., and Tsai, J.-W.: Effects of oyster aquaculture on carbon capture and removal in a tropical mangrove lagoon in southwestern Taiwan, Sci. Total Environ, 156460, https://doi.org/10.1016/j.scitotenv.2022.156460, 2022.

Line specific comments

66-67 Change "practical" to partial

Response: Thank you, we have revised the typo.

81 Ejarque et al is not correctly cited in this sentence. The study was not a subtropical lake with typhoons. It was a mountain lake in the European Alps. However, the study is very relevant to this work and should be discussed in relation to the results in the discussion section.

Response: Thank you for your suggestion. We have removed the citation and added some sentences about this paper in discussion.

110-111 More information is needed to understand what was measured. What wavelengths were used to measure QSE? If this was an in-situ measurement, how were the results corrected for particle, temperature interreferences? What instrument was used?

Response: Thank you for your comment. We have added the specific wavelength (254 nm) in this sentence.

134-135 Was the portable fluorometer was used to measure Chl a? This should be specified.

Response: Thank you, we have added the wavelength in the sentence.

154-156 Water level was measured at a single river input. Was discharge also measured? How was water input estimated for the many other rivers? Was direct precipitation over the lake surface area also accounted for?

Response: We used the storage function model to estimate the river discharge using precipitation over the inflow river basin, and Nash–Sutcliffe model efficiency coefficient for the water level was > 0.70; thank you.

157-160 35% doesn't seem correct given the other precipitation values reported in the sentence. It also doesn't appear to match table 1 values.

Response: The 35.6 % is via total typhoon rainfall (2,254 mm) over the total precipitation (6,332 mm) from 2015 to 2016. Sorry to make you confused

Equations 1-6 Consider adding a table that clearly identifies each term, its units, and whether or not it was measured or fitted. The many terms are difficult to follow and are not immediately explained in the text before new equations are introduced.
Response: Thank you for your suggestion. Table 2 was added to explain the terms and units of Equations 1-6.

211 What is meant by absorption coefficient in units per day? Light attenuation typically has units per length.
Response: Thanks for your comment. The alpha_PU and alpha_PL are constants to obtain the absorption rates via Chlorophyll *a* concentrations, which are not the light attenuation (Table 2-3).

215-216 What type of regression? Linear/nonlinear?
Response: It is a multiple linear regression. We have revised it; thank you.

247 248 This sentence compares two periods of typhoon years.
Response: Yes, we have revised the sentence; thank you.

281 "perfectly" is subjective. Quantify this comparison including errors.
Response: Thank you, we have removed "perfectly" from the text.

286 Here alpha is referred to as a photosynthetic absorption rate, not a coefficient.
Response: It is a coefficient, not the absorption rate. We have revised it; thank you.

356-357 My understanding from the text above was that a mass balance was applied to remove the influx of riverine DOC from the NEP calculation. Otherwise, river inputs would dominate over autochthonous NEP in this small system. If riverine C is included in the NEP, then maybe NEP is not a good term for this model output. Perhaps it is better referred to as a DIC/DOC flux from mass balance.
Response: Thanks for your suggestions. We have revised the terms thoroughly.

710 I do not understand what is meant by "nonseasonal data" in this context. Can you use a different term?
Response: Thank you for your comment; we have changed "nonseasonal data" to "inter-annual data" in the manuscript.

Figure 6 should include confidence intervals for the daily modeled values.
Response: "Best-fit" means the best result for model fitting, so the data would not have a confidence interval. Nakayama et al. (2022) also have the best-fit results in figure 7. Thus, we cannot add the confidence interval in Figure 6; sorry about that.

Reference:
Nakayama, K., Kawahara, Y., Kurimoto, Y., Tada, K., Lin, H.-C., Hung, M.-C., Hsueh, M.-L., and Tsai, J.-W.: Effects of oyster aquaculture on carbon capture and removal in a tropical mangrove lagoon in southwestern Taiwan, Sci. Total Environ, 156460, https://doi.org/10.1016/j.scitotenv.2022.156460, 2022.