Review of the manuscript by Du et al

Title: The monsoon effect on energy and carbon exchange processes over a highland lake in southwest of China.

The study presents several years of energy and carbon dioxide fluxes measured at Lake Erhai. The focus is to investigate the different dynamics of fluxes and their drivers in three sub-periods, e.g. pre-monsoon, monsoon and post-monsoon. The dataset is interesting, the framework analysis and results/discussion comprehensive and well written. I can recommend the final publication in ACP after the following comments are properly addressed:

1) I suggest to re-structured the Results chapter. In my opinion subchapters 3.1, 3.2 and 3.3 could be merged and shortened in one sub-chapter related to environmental/atmospheric conditions. So many details on diurnal and seasonal variation of each radiation components is not so interesting and they could also be omitted. Instead, the focus could be more on net radiation, heat storage and turbulent fluxes (H and LE).

2) The CO2 (and LE) flux data are measured with an open-path (OP) sensor. Generally, I think the use of OP should be avoid over ecosystem where fluxes are expected to be quite small. The authors should add some discussion on this point, and also try to acknowledge the uncertainty due to WPL correction and the potential sign change in CO2 fluxes.

3) Related to the previous point, Have the authors made some independent measurements supporting the net uptake of CO2 for certain periods. Did the authors measure, for example, pCO2 in the water?

Minor comments:

- P1L24. "…is the main driver for Hs…" and not "drivers".
- P2L20. Replace "influence" with "affects".
- P5L10. "Webb-Pearman-Leuning".
- P5L9. Please explain what is the circular correlation procedure" or give the reference.
- Eq. 1. Use Δt to indicate the time difference.
- P6.L26. I guess 600 meters and 400 meters.
- P6L1. "….post-monsoon period…"
- P6L2. I would rephrase as "…filtered based on the footprint analysis."
- P6L14-15. The sentence "The diurnal……period." is not clear, please rephrase it.

- P6L34. Monsoon is sometime written with capital letters and sometimes not. Please write it consistently trough the text.
- P7L27). Ta was already defined above.
- P8L4-5. I would rephrase it as “The atmospheric surface layer is mainly near neutral stratified during the three study periods..”
- Sect 3.3. My suggestion is to remove this section.
- P10L15-20. Would the authors expect that there is no phytoplankton during the pre-monsoon period? What is the uncertainty associated with the CO2 fluxes? Could the authors show the error bars or the confidence intervals in Figure 7? Are the around midday CO2 fluxes significantly different than zero?
- P11L5. Please correct “period”.
- P11L30. The sentence is not clear. From where do the authors see a correlation between Rn and UΔT?
- P12L29-34. The text in this paragraph is somehow a repetition of what has been said above. Please remove/merge the text.
- P13L21-26. The rain is also enhancing the transport of carbon from land/catchment areas to the water system (lateral fluxes) enhancing DOC in the water (see for example Pumpanen et al., 2014) and potentially the pCO2.

References:

Pumpanen, J., Linden, A., Miettinen, H., Kolari, P., Ilvesniemi, H., Mammarella, I., Hari, P., Nikinmaa, E., Heinonsalo, J., Back, J., Ojala, A., Berninger, F., and Vesala, T., 2014. Precipitation and net ecosystem exchange are the most important drivers of DOC flux in upland boreal catchments, J. Geophys. Res. Biogeosci., 119, 1861–1878, doi:10.1002/2014JG002705