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Hydrology and Earth System Sciences Discussions

Interactive comment on "On the water thermal response to the passage of cold fronts: initial results for Itumbiara reservoir (Brazil)" *by* E. H. Alcântara et al.

Anonymous Referee #1

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In this paper, the authors used the data from an Integrated System for Environmental Monitoring station to quantify the influence of cold front passage on the thermal stratification cycle of a tropical hydroelectric reservoir in Brazil. They also studied how cold front passage affects sensible and latent heat fluxes which were indirectly estimated using their equations (4) and (5). This reviewer has some concerns and specific questions as below:

Major questions

1. The definition of cold front is vaguely used in this paper. Actually, a cold front is

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defined as the leading edge of a cooler mass of air, replacing (at ground level) a warmer mass of air. How did it affect their results a few days? What methods did they use to identify cold front passage through their data?

2. I am not sure if it is correct to use satellite images to show the evolution of the cold front through identifying cloud patterns since high clouds are many hours later than cold front arrival.

3. Many processes (similar to those stated in this paper) associated with the influence of cold fronts on meteorological variables and fluxes have been extensively over large inland waters in North America (e.g., Blanken et al., 2000; Lenters et al., 2005; Liu et al., 2009). Surprisingly, those studies were not cited and compared here.

4. How did they account for the influence of stability on the flux exchange in their equations (4) and (5) which use the constant coefficients of turbulent exchange? However, stratification is proven to be very important in controlling flux in association with cold front passage (Blanken et al., 2000; Liu et al., 2009).

5. Is it possible to do more quantitative analysis about the influence of cold front passage on fluxes and meteorological variables in Section 3.3, using their hourly data.

6. It seems to me that the stripped area in Figure 7 doesn't correspond to the passage of cold front. It should be earlier to me? It needs to be double-checked, probably using their half hourly data. Check this for other figures.

7. Can the SI units be used throughout the paper?

8. Wind intensity?

9. The paper needs to be re-organized. There are a lot of grammar errors. Some sentences don't make sense to me.

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10. Some figures are too small to me to read.

11. Can contour lines be used in Figure 11. It is difficult to read the color differences.

I recommend its major revision.

References:

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Lenters, J. D., T. K. Kratz, and C. J. Bowser (2005),Effects of climate variability on lake evaporation: Results from a long-term energy budget study of Sparkling Lake, northern Wisconsin (USA), *J. Hydrolo.*, 308, 168–195.

Liu, H. P., Y. Zhang, S. Liu, H. Jiang, L. Sheng, and Q. L. Williams (2009), Eddy covariance measurements of surface energy budget and evaporation in a cool season over southern open water in Mississippi, *J. Geophys. Res.*, 114, D04110, doi:10.1029/2008JD010891.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 9437, 2010.