

Interactive comment on “Modeling the effects of cold front passages on the heat fluxes and thermal structure of a tropical hydroelectric reservoir” by M. P. Curtarelli et al.

Anonymous Referee #3

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The manuscript describes the effects of cold front passages on the heat fluxes and thermal structure using a 3D hydrodynamic model, which considered different time-scale data to calibrate the model intended to capture the complex physical and thermal patterns of a tropical reservoir. The article is very well written and the results are very interesting. The authors did a nice piece of work on modelling short time-scale simulations. However the discussion section needs to be expanded and well quoted. Bellow some comments to improve the manuscript. Major comments 1. The main study aim needs to be reformulated. The investigation of effects of cold front passages on the heat fluxes and thermal structure was already conducted on the previously paper from

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Alcântara et al. (2010). The main contribution of this manuscript was to evaluate the effect of cold front passages on spatial heterogeneity of thermal regimes using a 3D hydrodynamic model. The aim must be properly stated. 2. The assumption to consider Corumbá River inflow equal to the Corumbá Reservoir outflow likely underestimate the Corumbá River inflow because the influence of adjacent watershed was negligible (35 km of river reach can be important in terms of volume). This contribution can be estimated using regionalization, for instance. Also, evaporation in tropical large water surfaces is another term to consider. Please, try to take into account this effects or at least provide a discussion about this limitation on the results. 3. In general data from Satellite is not accurate when comparing to observed data. Please provide the accuracy of those estimations or provide a discussion about this limitation on the results. Has precipitation from satellite been used to evaluate the effects of cold front passages? 4. The methodology to evaluate cold front effects on stratification and mixing processes (e.g. Brunt–Vaisala frequency, Lake number, Schmidt stability) should be described on "Methodology section". 5. The discussion needs a major redevelopment with a good literature backup. Additionally other questions must be considered such as increase of Bowen ratio during cold fronts, and the maximum loss of sensible heat flux during F4 were expected? Also, upwelling events were observed during F4 passage?

Minor comments 1. In "Site description" section - are wind intensity averaged values? 2. Change "The data are collected..." to "The data were collected" 3. Please inform the frequency of time series of total inflow, outflow and water level 4. Change "... adapted from the work of Casulli and Cheng (1992) to " adapted from Casulli and Cheng (1992) "

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