

## ***Interactive comment on “Understanding the performance of the FLake model over the African Great Lakes” by W. Thiery et al.***

**Anonymous Referee #2**

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The goal of this paper is to evaluate and understand the performance of the model FLake to reproduce the temperature regime of two African Great Lakes (Kivu and Tanganyika), in the context of climate modeling.

Before going further, I should mention that I cannot be considered as an expert in lake or climate modeling, even though I have been associated with a few studies about the hydrodynamics of Lake Tanganyika. I can therefore only judge this paper in terms of general interest for the scientific community.

That said, I found it very interesting to read. Not only the authors show under which conditions the model performs correctly, but they also explain the reasons why, and that is probably one of the more interesting aspects of the manuscript. Moreover, it is well written and well structured, and I believe it deserves to be published in GMD, after

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some minor revision.

I totally agree with the first reviewer concerning the title. It should be modified to clearly state that the paper does not deal with all the African Great Lakes.

A lot of acronyms and variables are used in the manuscript. Most of the time they are defined once and for all (some acronyms are never defined), but it is not so obvious to find the definition back when it occurs later in the text. I suggest to add a table with all acronyms, simulation names et variables.

Page 5145, line 2: ERA-Interim is not defined. Maybe it is obvious for climate modelers. It is not for everyone (at least me).

Page 5146, line 4: The authors say that the AWS record have a frequency of 15 or 30 minutes, but they are using hourly values to force the model. Did they take means or instantaneous values?

Page 5148, line 6: Flake → FLake

Page 5150, line 9: "By linearly increasing wind velocities at AWS 1 by 2.0 m/s". Do the authors mean that they have increase each wind velocity measurement by 2.0 m/s? If yes, it is not a linear increase but a constant increase. If not, I don't really understand what they did. Please clarify.

Page 5150, line 25: "Note however that this second correction (...) had little to no impact upon the final model modern outcome". Why not limiting the adjustment to wind velocity then?

Page 5157: Sensitivity study. Why limiting to Kivu? Please clarify.

Page 5159: FLake seems very sensitive to wind. As I said, I am not a climate modeler. However, I guess it should no be so easy to obtain very accurate winds in a climate model. It will have an influence on the behavior of FLake, as the authors mentioned several times in the manuscript. However, I would like the authors to discuss the feed-

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back on the climate model. If Flake does not reproduce the appropriate temperature regime of the lake (as it is not so unlikely to happen due to high sensitivity to wind forcing), how much the complete climate model will be affected?

Page 5160, last paragraph: very interesting!

Page 5161, line 9: "By setting the initial mixed layer depth (...)". Those initial conditions seem relatively arbitrary. Is it possible that we would arrive to other conclusions with other arbitrary values?

Page 5162, line 9: "(...) neither u nor T significantly differ from one season to another, since in both cases seasonal differences are never more than 25% and 10%, respectively, of the observed standard deviation (...), RH and LWIn both show a clear seasonality (...)" Maybe I missed something, but regarding Figures 13a and b, it seems to me that if RH and LWIn are considered to present a "clear seasonality", so does u.

Figures 5, 7 and 9: Why not showing RAW simulations? I understand that they do not provide the best results, but ERA-Interim simulations neither and they are presented. For the control simulations, it would be nice to display the error in addition.

Figures 10 and 12: I really like Taylor diagrams. I think those figures deserve to be displayed larger.

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Interactive comment on Geosci. Model Dev. Discuss., 6, 5141, 2013.