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Interactive comment on "glmGUI v1.0: an R-based Geographical User Interface and toolbox for GLM (General Lake Model) simulations" *by* Thomas Bueche et al.

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Received and published: 14 February 2019

GENERAL COMMENTS: This paper introduces a new R-based graphical interface for the open-source General Lake Model (GLM), which simulates one-dimensional lake thermodynamics. It includes input and output processing and visualisation facilities, in addition to an autocalibration routine. I deem the creation of this GUI very useful, especially as it might introduce to lake thermodynamic modelling people who are not familiar with scripting. As I say this, I especially refer to governmental environmental agencies, who would strongly benefit from lake and reservoir thermodynamic modelling for their water management activities. In the manuscript, the created workspace

itself is clearly presented and the two validation case studies are suitable and properly developed, except from a few queries listed in the "Specific comments" section of this review. That's why I'm giving this paper the "minor revisions" judgement. However, the Authors should carefully inspect the manuscript, preferably with the help of an experienced (native) English speaker, as some sentences are unclear and there are many incorrect expressions. I highlighted a significant part of them in the "Technical corrections" list below, but there are many others to be addressed. Regarding the structure of the paper: 1) Appendices A and B are more suited to be included as part of the Supplementary material, forming two separate technical reports, given that the focus of the paper and of the journal is on the glmGUI package and not on the development of the case studies; 2) Appendices C and D should be moved to the main text, the former because having to look up each time many pages forward in the paper to understand the meaning of model parameters makes understanding passages troublesome for people unfamiliar with GLM, the latter because the counterpart figure for Lake Ammersee (Fig. 9) is already part of the main text. The paper would strongly benefit from reorganising the material in the Appendices, receiving a more compact outlook.

SPECIFIC COMMENTS: P4, L10-11. Use of a Kalman filter to fill missing values of meteorological time series should be briefly discussed, highlighting the advantages with respect to simpler interpolation methods. P4, L15-16. This is true for shallow lakes, such as Lake Baratz, but doesn't hold for lakes already as deep as Lake Ammersee, at least for ordinary level variations. Please revise. P5, L1-2. While a single RMSE water temperature error indicator may be significant for shallow lakes, in which however the 1D approximation is less reliable, for deep holomictic lakes it is usually better to distinguish the errors for surface and deep waters, as a single metric would be strongly biased by hypolimnetic temperatures displaying small variations from the initial conditions, i.e. small errors, hiding larger errors in the epilimnion. I think that the possibility to consider multiple metrics across the lake depth and also relative error ones (e.g. rRMSE) should be introduced in a future update of the package. Please discuss this. P5, L3. Please define the MBE index. P5, L15-16. Please explain bet-

ter. P5, L17-18. This sentence is not needed. P6, L6-7. Reverse "input" and "output" in the sentence. A sensitivity analysis investigates the sensitivity of the model results with respect to variations of the input parameters, not the opposite. P7, L1-2. Please explain better. P7, L21-22. The "r" parameter should be the size of the sample (i.e. the number of tested values) for each calibrated parameter, not the resolution (i.e. the spacing between tested values). P8, L5. What is the Grifone station being used for? It'not clear at this point in the manuscript. P9, L12-14. What did Lenhart et al. (2002) state? Please explain better. P9, L12-14. The Authors should disclose that wind affects the simulation of lake levels through its influence on evaporation. P9, L18-22. This passage should be explained better. P10, Fig. 4. Such information would be more efficiently conveyed by a table (see Table 1 for the Lake Ammersee case). P15, L12. What is the meaning of "factors of discharge"? P15, L20-22. What was the total number of performed simulations and how long did they take overall? I would like to ask the same also for the previous Lake Baratz case. P16, L4-5. The RMSE and MBE values reduced with respect to what? P16, L11-12. This contradicts the statement at P16, L6-8. Please clarify. P16, Fig. 8. Looking at this plot I would not state that the achieved model fit is "very satisfactory" (P16, L5). Large errors dominate for most of the simulated period. P18, L6-9. The Authors should discuss the possibility to employ in the future more refined calibration methods than the adopted plain Monte Carlo approach, such as MCMC (Markov chain Monte Carlo) and other methods, which allow better addressing the computational effort. P18, L14-16. Please explain better. P18, L27-28. The Authors should stress that the main benefit of GLM in a hydrological analysis is that lake evaporation is calculated with higher accuracy than by using classic formulas. P20, L12. Why and how was the observation setup demolished? It's just my personal curiosity. P20, L17. I do not understand well the meaning of the R^2 index for the lake station itself. Please explain. P21, L6-8. Specify that these are average differences. P23, L7-8. Please explain better.

TECHNICAL CORRECTIONS: P1, L29-30. The structure of the sentence is twisted. Write something like: "Lakes are often considered to be "sentinels of change", as they

respond to changes in their environment (Williamson et al., 2009, Hipsey et al., 2017)".
P2, L6-9. This sentence is too long and should be split. P2, L11. Do the Authors
mean "reservoirs" in place of "irrogations"? P2, L14. Add a comma after "GLM". P2,
L17. Do the Authors mean "goal" in place of "maxim"? P2, L19. Replace "usability
friendly" with "user-friendly". P3, L2. Don't capitalize "Mediterranean", it might induce
confusion in the name of the lake. P3, L2-4. This sentence should be revised. P3,
L8-9. This sentence should be revised. P3, L18. Replace "in and" with "at a". P3,
L22. Remove "of" after "R", replace "the" with "a" after "and". P3, L25. Add a hyphen
between "window" and "based". P4, L5-6. Replace "control" with "input". P4, L7-8.
This sentence should be revised. P5, L3-4. This sentence should be revised. P5,
L9-11. This sentence should be revised. P6, L2-3. Black dots cannot be seen, as
they make up black lines by being aligned and manifold. P8, L12. This sentence
should be revised. P9, L2-5. This sentence should be revised. P9, L18. The sentence
"According..." should begin in a new line. P10, L10. Replace "proofs" with "proves".
P11, L5-8. These sentences should be revised. P13, L3. Replace "is" with "of". P13,
L4. Replace "seasons" with "years". P15, L5. Add a comma after "31.12.2017". P15,
L10. Capitalise "Secchi-disk". P15, L12. Add a colon after "inflows" in place of "of".
P16, L6-9. These sentences should be revised. P17, L4. Replace "in" with "at" after
"epilimnion". P17, L5. Replace "satisfactory" with "satisfactorily". P17, L12. Do the
Authors mean "cornerstone" in place of "centerpeace"? P17, L16. Replace "for" with
"by". P18, L1-3. This sentence should be revised. P18, L4-5. This sentence should
be revised. P18, L18. Remove "the". P18, L23. Do the Authors mean "efficiency" in
place of "expedience"? P18, L25. Replace "smaller" with "shallower". P18, L32-33.
This sentence should be revised. P19, L3. Replace "of" with "for". P19, L9. Remove
"expenditure of". P19, L21. Add "this" after "in". P20, L10. Replace "environment" with
"proximity", "a" with "an", "rafting on" with "located at". P20, L16. Replace "station" with
"stations". P22, L6-8. This sentence should be revised P23, L7. Replace "form" with
"from". P25, L9-10. The structure of the sentence is twisted. P29, L3. Add "were"
before "surveyed", replace "place" with "placed". P29, L4. Replace "manually" with

"manual". P30, L5. Replace "observation" with "observations". P31, L3. Replace "in" with "at". P31, L5. Replace "of" with "at". P31, L16. Replace "free" with "freely". P35, L2. Replace "in" with "at". P35, L12. Replace "unrealistic" with "unrealistically". P35, L13. Replace "in" with "at".

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