Decision to sd-2020-51

Submitted on 10 Jul 2020
The response of small and shallow lakes to climate change: new insights from hindcast modelling
Francesco Piccioni, Céline Casenave, Bruno Jacques Lemaire, Patrick Le Moigne, Philippe Dubois, and Brigitte Vinçon-Leite

Dear Dr. Piccioni,

I have now looked at the MS and your responses to the reviews and want to communicate my decision to you as Handling Editor.

Both reviews had been constructive and also quite similar in their major concerns. The major problem from my point of view is the limited novelty of your work as the literature is already flooded with simulation studies on climate change effects on lakes, at least on the case study level. I take this concern very serious as ESD is seeking novel research contents!

Although your MS is well written and technically sound, I am still not satisfied with the current version of the MS and your responses to the reviewers. But I also think that the work has potential and may become a contribution after a serious revision.

A strong point is the 3D model approach, which is (still) not yet well exploited. Besides working with specific thresholds and indices, you could also analyse and display probability density functions of your variables. For example, how is the pdf of surface water temperatures (during summer or winter or whole year?) change from decade to decade (it does not make sense to do that for each year separately). The same approach can be used to analyse spatial heterogeneity, i.e. show horizontal variability by calculating the temperature anomalies (difference between horizontally averaged temperature and single-cell temperatures) over space and then show pdfs or any other clever form of data aggregation. The pdf will also enable a more detailed statistical approach and exploits the 3D model setting.

I also believe the concepts of GDD and NGD are weak concepts as they miss important aspects (e.g. heat stress as mentioned by one reviewer). For example, you could similarly evaluate the number of days with water temperature above 25°C in order to characterise heat waves or heat stress. At best, the critical temperature is not just 25°C (I chose arbitrarily), but is rather a temperature that has a reliable ecological interpretation, e.g. the temperature from which cyanophytes may become dominant. I remember that Jeff Huismann has worked on that, but I do not want to guide you through the literature. Instead, you should make a thorough literature review and come up with a (or several) meaningful criterion.

I encourage you to invest more energy in the evaluation of your simulation results as the simulation itself and the corresponding modelling task has not much novelty! I expect that you not simply my following my proposed ideas but also develop own ways.

If you decide to revise, a new evaluation will be required and I cannot guarantee acceptance of the MS.

Best whishes,

Karsten Rinke (Handling Editor)