Answer to Reviewer 3

General Comments

In this paper the authors describe the development of an openly accessible web-based platform for visualization and data access of 54 lakes modelling in Switzerland. The lake modelling is conducted with a one-dimensional lake model Simstrat v2.1, which is the core scientific component of this paper. The other important component of this paper is the lake modelling platform, which is beneficial to both the general public and researchers. It is good that both components are included in this study; nevertheless, both components are not thoroughly introduced. As a scientific publication, higher portion of new scientific modules in Simstrat v2.1 and using Simstrat v2.1 for the scientific findings in a single event or from long-term climatic trends can benefit this paper.

We thank Reviewer 3 for his/her comments. We have largely reworked the manuscript to better show how the web-based platform can be used for scientific purpose. This is mostly evident in the section 3.1

Specific Comments

1. The drawback of one-dimensional lake model is the lack of water circulation; nevertheless, the thermal dynamic in the lake can be very different from small lake to large one. Surface of the 54 studied lakes ranges from 0.102-km2 of Lake Inkwilersee to 580-km2 of Lake Geneva, which are quite diverse in horizontal dimension. It is not mentioned in the paper about the limitations and differences of applying one-dimensional Simstrat v2.1 to small and large lakes.

The main limitation of 1D vertical model is that spatial variability is not accounted for. This is the reason why multibasin lakes like Lake Lucerne have been split into 4 different lakes characterised by distinct basin. This is the same for Lake Zurich, Lake Constance and Lake Lugano. We have written the following in the document: “For lakes with clearly defined multi basin such as Lake Lucerne, Lake Zurich, Lake Constance and Lake Lugano, each basin is considered as a separated lake connected to the other basins by inflows/outflows “

2. In this study, four parameters among 46 lakes were calibrated. Now only the temperatures of post-calibration root mean square error were described. It would be good to summarize the calibrating processes, and the physical meanings of the calibrated parameters and its relationship to lake area and lake characters.

We have added the following text:

“Model parameters are set to standard default values, and four of them are calibrated (see Table 2). The parameters *p_radin* and and *f_wind* scale the incoming long-wave radiation and the wind speed, respectively, and can be used to compensate for systematic differences between the meteorological conditions on the lake and at the closest meteo station. The parameter *a_seiche* determines the fraction of wind energy that feeds the internal seiches. This parameter is lake-specific, as it depends on the lake’s morphology and it's exposition to different wind directions. Finally, the parameter *p_albedo* scales the albedo of ice and snow

applied to incoming shortwave radiation, which depends on the ice/snow cover properties and is unknown for the individual lakes. The calibration parameters were selected according to their importance for the model (e.g. based on previous sensitivity analysis), and their number was deliberately kept small in order to keep the calibration process simple and focused. Calibration is performed using PEST v15.0 (see http://pesthomepage.org), a model-independent parameter estimation software (Doherty, 2016)"

3. P4, L1~5: In this study, the light absorption coefficient plays an important role determining incoming heat flux. Is there any reference, except current cited one (Poole and Atkins, 1929), using similar parameterization?

The parameterization of the light absorption using a beer lamber law parameterized by one coefficient is the standard for limnological study. We added a more recent references (already used in the manuscript) to highlight this

4. P4, L6: What is the percentage of the missing forcing data in this study? And what is the impact of discrepancy in the model?

We have modified the text as follow:

"The timeframe of the model is determined by the availability of the meteorological data (air temperature, solar radiation, humidity, wind, precipitation). Initial conditions for temperature and salinity are set using conductivity-temperature-depth (CTD) profiles or using the temperature information from the closest lake. We apply different data patching methods to remove data gaps from the forcing depending on the length of the data gap. For small data gaps with duration not exceeding one day, the dataset is linearly interpolated. In total < 1 % of the dataset is corrected using this approach. Longer data gaps of up to 20 days are replaced by the long-term average values for the corresponding day of the year. Only ~ 1.5 % of the dataset is corrected using this approach"

5. P4, L10~11: It is not clear how the variable "cloud coverage" is used in the model, as the measured solar radiation is available.

Cloud coverage is needed for estimating incoming long wave radiation while solar radiation are needed for short wave radiation.

6. P4, L13~14: Are all the lakes initialized for temperature and salinity using CTD profiles?

Most lakes are initialized with data from CTD profiles. When not available, use information from the closest lake. The small discrepancy with the real temperature profile is quickly reduced (after < 6 months). The text was modified to better indicate this

7. P5, L13: Why the platform is automatically updated with a weekly frequency?

We did not think it was necessary to update it more frequently but already got multiple request to reduce the update frequency to the day. There is no technical obstacle but we prefer to work in improving the pipeline first.

Textual Comments

1. P4, L27: Missing a comma “,” between the heat capacity of water and the volume of the lake.

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