General comments:

This manuscript describes a one-dimensional model (i.e. GOTM) study for Lake Erken to analyze long-term changes of its thermal structure. As a major result, the model shows good performance in reproducing Lake Erken's past water temperatures and based on the statistical analysis, the lake temperatures rose rapidly during last fifty years, especially in the recent decades.

This is an interesting and important study, which could be considered for publication after a minor revision. Given the high simulation accuracy (based on the low RMSE), the model is capable in reconstructing lake temperatures for a long-term period, which provides a valuable database to analyze its changes under the climate warming. Based on my point of view, this paper is well organized and its content, especially the discussion part is valuable for the further development of GOTM. Detailed comments are shown below.

Detailed comments:

L10 in page 3: daily precipitation was used in driving the model, while the other six datasets were put into the model as hourly resolution. This sounds strange to me. Are different climate variables allowed to put into the model with different temporal resolution?

L30 in page 4: Why the measured water temperatures with 30 minutes resolution were averaged to daily, not the hourly mean values for the model calibration? In this way, the diurnal variation of the water temperature is missing. Could you give an explanation here?

L 3 in page 5: I am afraid the wind factor of 1.28 is a little bit high, since wind is measured in or quite close to the lake (based on Figure 1). Could you explain why you use such a high wind factor here?

L1 in page 6: how did you define the thermocline depth in the study? As I know, there are two ways in defining the thermocline depth in rLakeAnalyzer (i.e. seasonal=TRUE/FALSE). The results, from the two approaches, are different (see "Read, J. S., Hamilton, D. P., Jones, I. D., Muraoka, K., Winslow, L. A., Kroiss, R., Wu, C. H. & Gaiser, E. (2011). Derivation of lake mixing and stratification indices from high-resolution lake buoy data. Environmental Modelling and Software 26:1325-1336").

L4 in page 9: As stronger evidence for such changing trend, could you also use the measured water temperature to do a Mann-Kendall test? In the paper, all the statistical tests are based on the simulated

temperature, it is better to prove the simulated trend also based on the measured values. If it takes you so much time to do this work for all the three cases (i.e whole-lake, epilimnion and hyplimnion), I recommended to test the observed trend for the summer epilimnion, because the simulated temperatures of the layer significantly increased in the whole period.

L7 in page 12: I am confused here, you said that the summer epilimentic temperature significantly increased for the whole period, but not significantly increased in two sub-intervals? To me, it sounds like a paradox. Please check it.

Also, as shown in Blenckner 2002, Lake Erken is always ice-covered for the whole winter and the ice melts between March and early May. It is a weak point to use GOTM, without a ice module, to simulate such a lake with a long ice duration. I suggest adding some sentences, in this part, to clarify this limitation. Considering the future model development, it is a valuable work to include ice part into GOTM which could also be added into the Discussion.

Yours sincerely

Chenxi Mi at Magdeburg