Reviewer #1

The manuscript uses in situ hydro-meteorological data to investigate the thermal regime, energy budget components and the evaporation amount of an alpine lake on the Tibetan Plateau. The objectives of this study meets the scope of HESS; the in situ measurements are important for the understanding of these high-elevation lakes and the conclusions are reasonable. I consider the manuscript being an important results for understanding of these high-elevation lakes in this important area. However, there are still some questions needed to be answered and some mistakes needs to be corrected. The following comments are given and a revision is needed for accepting the manuscript to be published.

Reply: Thanks for the comments. These comments are very helpful to improve the manuscript. We will revise the manuscript carefully according to these comments.

Major comments:

1, Ice cover forms during the winter season in Paiku Co. Thus, what's the influence of ice cover to your results? The energy budget and evaporation amounts during the ice covered season is quite different from those during ice free season. However, not enough information on ice processes are given in the manuscript. How to consider the energy budget and evaporation amounts during ice covered season in the manuscript? How to get the Bowen ratio during winter season? How much energy may be used for ice processes? As ice surface temperature is not observed, what's the influence of the ice processes to your results. All these information need to be addressed in detail in the revised manuscript.

Reply: We will add section 3.7 in revision to discuss the impact of lake ice phenology on lake evaporation and lake level change. In winter 2013/2014, Paiku Co was fully frozen up between middle January and middle April, as indicated by Landsat satellite images. During this period, lake evaporation is very low because the lake ice can effectively prohibit lake evaporation. In the winter 2014/2015, only the southern part of Paiku Co was frozen up. After that, only a small part around the shoreline was frozen, and the lake center was not frozen up any more. During our study period (June 2015-May 2018), lake ice occurs only at the shoreline intermittently. So the impact of lake ice on lake evaporation is not considered in this study.

The impact of lake evaporation on lake level changes will be discussed in section 3.7 in the revision. When the lake surface was frozen in winter 2013/2014, lake level at Paiku Co was very stable. However, when there was no or only small part of lake ice at Paiku Co since the winter 2015/2016, lake level dramatically decreased by 132 mm on average between middle January and middle April. This indicates that lake evaporation increased significantly when there is no lake ice. Therefore, change in lake ice phenology may have significant impact on lake water balance. As has been addressed by Lei et al (2018), Paiku Co has been shrinking since the 1970s. The disappearance of lake ice under climate warming may probably lead to more negative lake water balance and more rapid lake shrinkage in the future.

2, lake level variation is an important content of the manuscript, as shown in Introduction and discussion. However, the lake level measurements are missing in the manuscript. These information should be added in the manuscript.

Reply: Lake level changes at Paiku Co between 2013 and 2018 will be added in Fig. 11 in the

revision. The difference of lake level changes with or without lake ice will be discussed in section 3.7 and 4.3. Lake level at Paiku Co was very stable during the period when the lake surface was frozen (e.g. the winter of 2013/2014). However, lake level dropped significantly by 13.2 cm on average in winter when the lake surface was not completely frozen. This change in lake ice may have significant impact on the long-term lake water balance.

Minor comments:

2, line 24, "significant lake level decrease in post-monsoon season while slight in pre-monsoon". Slight what?

Reply: We will address the different rate of lake level changes in the revision.

3, line 92, S is the change in lake water energy, but in line 115, it is renamed as lake heat storage, in some place different names are used; it should be kept same. Similarly, what is the "total heat flux" in line 238 and 360?

Reply: Thanks for pointing out this. Lake heat storage is used in the revision. Total heat flux is the sum of sensible and latent heat fluxes.

4, In equation (3), Ra is the longwave radiation from lake surface, "a is the atmospheric emissivity, it should be water emissivity. However, in equation (2), it is defined as downward longwave radiation to lake. It should be corrected.

Reply: Thanks for pointing out this. We have corrected it in the revision.

5, In line 107, I think it is inappropriate to define Bowen ratio by "Gianniou and Antonopouls, 2007", some classic reference should be given here.

Reply: We will add some classic references about Bowen ration.

6, In line 118, the definition of _T is not clear? How many layers are defined in vertical direction?

Reply: We have addressed this in more detailed in the revision. Changes in lake heat storage are calculated at an interval of 5 m and therefore there are 13 layers in vertical direction. Lake volume is acquired according to the 5 m isobaths. Lake water temperature at each layer is taken as the average value at the top and bottom layer.

7, Line 135, "the largest temperature difference". Temperature difference between which layers. Similarly, line 137, what is the gradient between which layer?

Reply: Usually, lake water temperature is stable in surface layer and bottom layer, but it changes greatly at thermocline. The temperature difference is the difference of thermocline.

8, Line 172-175, water circulation along the south-north transection is not evidenced by the observations. Ever give evidence or remove the sentence.

Reply: We agree that further evidence is needed to confirm the water circulation. We will discuss it in the revision.

9, Line 187-191, the comparison of the two in situ measurements is not convincing, as the

environment and other background information are quite different. Thus, I suggest to remove this part, or give much more information on the comparison.
Reply: We agree that further evidence is needed to confirm this. We will remove it in the revision.

10, In line 257-258, as change in lake heat storage has quite similar variation with that of net radiation. Why a positive correlation is obtained between lake evaporation and water heat storage change, but a negative correlation with net radiation.
Reply: Lake heat storage exhibits similar seasonal variations with that of net radiation. When the net radiation is high between May and July, a lot of the energy is used to heat the lake water. Lake evaporation during this period is also low because only a small portion of energy is used as latent heat. When the net radiation is low between November and December, the lake water releases a lot of energy to the overlying atmosphere. Lake evaporation during this period is high because only a lot of energy from lake is also used as latent heat.

11, Figure 1 and Figure 2 can be combined together; Figure 3, A and B is given in the figure, but not in the notes; Figure 5, 10m and 20m comma is needed; Figure 8, a and b are used, but in figure it is (A) AND (B);Figure 9, Bowen ratio is given also for winter season, but is may not fit for winter ice covered season. 12, In line 63 “oC”; “W/m2”, I think it is better to use “W m-2”;
Reply: Thanks for the suggestions. We will revise these in the revision.