1-Modeling Lake Titicaca Daily and Monthly Evaporation

Dear reviewer:

Surprisingly the climate warming in this regions today exceeds the average global warming, the evaporation is one the variables that might be altered enormously. Then as it is pointed out the evaporation issue is crucial for this lake, also the interest is to propose a practical models for their implementation, beside the couple of models proposed already by Delclaux et al. (2006), which are dependent on only solar radiation and wind factor data.

According to the previous studies of evaporation in other places there have been found important differences by applying the daily and monthly computation. We think that in order to study the climate change assessment on the models at different time scale, for the case of Titicaca Lake, must be defined the appropriate models at both time scales and also based on our available data. For the first time we obtained high resolution met data for this Lake in the last couple of years. Thus the outputs from climate changes scenarios at any time scale should be able to analysis for this Lake.

Major comments:

C1: The abstract part should show the essence of the paper, including the significance of this research, methods used and conclusions. However, the authors paid too much attention to the research results while ignoring the data source and the significance of this paper I suggest the authors add the content I mentioned above in the abstract

Answer to comment-C1:
- Yes we will include the recommendations about the significance of this research and as well about the new data used on this paper. Yes the interest of the paper is not only the results, mainly are the models defined for the climate change assessing, on which context with the discussions about the possibility of using, and finally is to show the results and between different time scales.

As so far we have rewritten the abstract of the paper as it follows:

- **Abstract.** Lake Titicaca is a crucial water resource for the Altiplano, in the central part of the Andean Mountain range, and one of the lakes most affected by climate warming. Since surface evaporation explains most of the lake´s water losses, reliable estimates are paramount for the prediction of global warming impacts on the Lake Titicaca and for the region´s water resources planning and adaptation to climate changes. This study investigated the suitability of fours methods for the assessment of Lake Titicaca´s evaporation at daily and monthly time scales. These methods are: water balance, heat balance, mass transfer and Penman´s equation. Evaporation losses were calculated following the four methods using both, daily meteorological records and their monthly averages. We found that the most reliable method for determining the annual lake evaporation was the heat balance approach, although the Penman equation allows an easier implementation based on generally available meteorological parameters. The main difficulty for the use

of the heat balance method is that heat storage changes must be knowing in advance. Since convection from the surface layers is intense during nights resulting in well-mixed top layer every morning, changes in heat storage were estimates from the measured morning surface temperature. The mean annual lake evaporation was for to be1700 mm year^{-1}. Monthly evaporation computed using daily and monthly mean between the models results in minor differences.

C2: The introduction part is basically organized well. However, the methods or the models are ignored in this section, additional information on the theoretical background would be useful here. I suggest moving 3.1 section here

Answer to comment-C2:
- Yes is a good idea to move to this chapter the section 3.1, also beside the theoretical improvement the paper objective also will be refined based on the above background.

C3: Method: In this part, the authors pay too much attention to theoretical background, in my opinion, basic introduction and literature about the Theoretical background should be removed to introduction part

Answer to comment-C3:
- Yes some of the theoretical background will be removed or moved to the upper. Yes the references to the equations will be included.

C4: Four evaporation estimation methods were applied in this study, water balance, energy balance, mass transfer, and the Penman method, I think the authors could add a reference for the equations.

Answer to comment C4:
- Yes the authors of all the equation will added.

C5: In the conclusion part, it would be more comprehensive and clear for the authors to conclude the significance as well as the limitation of the research, and with stating the limitations of this research, the suggested research direction for continued studies could be given at the end of this part.

Answer to comment-5: Conclusions
- About the limitations and the advantages about the models used we will describe, especially in respect to models to be used for climate changes assessing at different time scales. Then will have the significance of the study, but also pointing out some recommendations that the models used might improve it in the future using spatial observation data for instance.

Minor comments:

Answer to comment-5: Final comments.
- Yes, we realized that units must be included, also we will correct the symbols and the reference chapter.

An advance, thank you very much for your valuable remarks for improving our paper.