Anonymous Referee #2

The authors provide the Tibetan Plateau lake-catchment characteristics dataset, which contains a wide range of information such as topographic, climatic, land characteristics, and anthropogenic activity characteristics. The dataset will be a valuable input for relevant hydrologic or climatic studies in the region. The manuscript is generally well written, clear, and easy to follow. I have only a few comments on the manuscript.

Reply:

We appreciate the reviewers' positive and helpful comments on our manuscript. We have addressed all of the concerns of the reviewer in the revised manuscript, and the point-by-point responses are given below.

General comments:

The authors extract catchment attributes from various exiting datasets, such as MERIT Hydro dataset, SoilGrids, CMFD. Please add more descriptions of how those data are generated/obtained (are they observation-based? model-processed? machine learning-based?).

Reply: We have added more descriptions of how the used datasets were generated/obtained (L341-344, L347-348, L360-361, and L317-327).

L341-344: "MERIT DEM was produced by eliminating major error components (e.g. absolute bias, stripe noise, speckle noise, and tree height bias) from existing DEMs (SRTM3 DEM, AW3D DEM, and VFP-DEM). It has a resolution of 3″ (~90 m at the equator) and the land areas mapped with ±2 m or better vertical accuracy were 58% (Yamazaki et al., 2017)."

L347-348: "The CMFD meteorological dataset used in this study was produced through fusion of remote sensing products, reanalysis dataset and in-situ observations."

L360-361: "The SoilGrids 2.0 dataset used in this study was generated by machine learning methods, utilizing approximately 240 000 soil observations worldwide and more than 400 environmental variables as inputs."

L317-327: "2) remote-sensed submonthly water level and volume data (2000-2017) extracted from Landsat images and altimetry data based on lake shoreline positions (Li et al., 2019), ~monthly water level data (2010-2020) extracted from multi-sensor altimetry data (Xu et al., 2022), lake area and mass change data at five-year intervals (1976-2020) extracted from satellite stereo and multispectral images (Zhang et al., 2021), 3) remote-sensed daily fractional snow cover based on the MODIS surface reflectance product MO/YD09GA covering the period 2000-2022 (Jiang et al., 2022), daily snow depth data (1980-2019) produced through the fusion of five gridded snow depth datasets using machine learning methods (Che et al., 2021), and daily snow water equivalent data (2002-2011) based on AMSR-E brightness temperature (Qiu et al., 2018b), 4) yearly glacier mass balance data (2000-2019) leveraging large-scale and openly available satellite and airborne elevation datasets (Hugonnet et al., 2021), 5) the decadal maximum freezing depth data of seasonal frozen-soil (1961-2020) produced by the support vector regression model based on in-situ measurements from 2001 to 2010 and spatial environmental variables (Wang and Ran, 2021)."

Given the use of existing datasets for obtaining the lake characteristics, I think the first part of the data development, i.e. catchment delineation is the critical step in your data development. Can you explain more about what kind of methods could be applied, and why you chose your method (instead of using Liu et al, 2020, which already exists) and any limitations/uncertainty of the method?

Reply: Traditional river-oriented catchment delineation methods are not suitable for the delineation of lake catchments. Liu et al (2020) proposed a lake-oriented approach to delineating endorheic catchments, which can be used to delineate the full catchments of endorheic lakes in this study. But there are more tasks in this study, including the delineation of both full catchments and inter-lake catchments for endorheic lakes and upstream lakes, the construction of topological relationship among lakes/lake-catchments, and the tracing of flow path among upstream and stream lakes. Therefore, we developed a software using the C and Python programming language to implement these tasks, and the source code are open (https://github.com/LoserOne-ovo/basin_delineation). This has been explained in the revised manuscript (L101-107).

I am not sure if I did something wrong, but I failed to connect to FTP to see the LCC-TP. I got the error saying "Home directory not available - aborting". - can you provide the full path of the dataset?

Reply: This dataset can be visited at the following FTP, server: 210.72.14.198, username: download_366550, password: 15147322. We also uploaded the dataset to the figshare website: https://figshare.com/articles/dataset/A_dataset_of_lake-catchment_characteristics_for_the_Tibetan_Plateau_v1_0_/20222178.

Specific comments:

Fig.2: it would be helpful if you mark the first, second, and third steps (L82; "Three steps") of the procedure also in the figure.

Reply: The first, second, and third steps have been marked in Fig. 4.

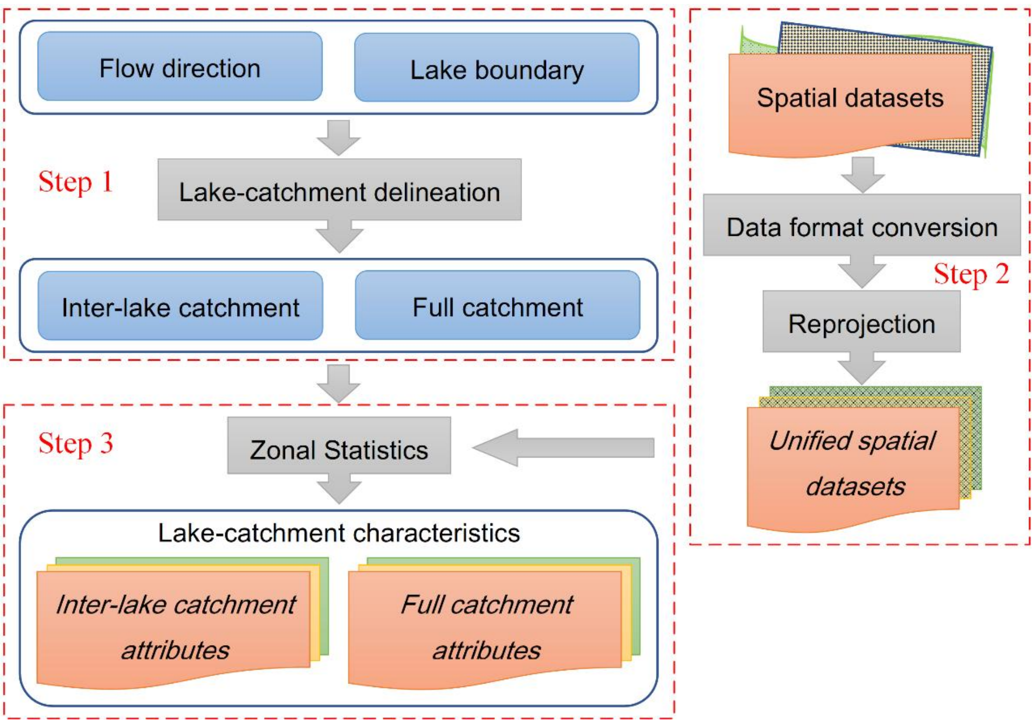
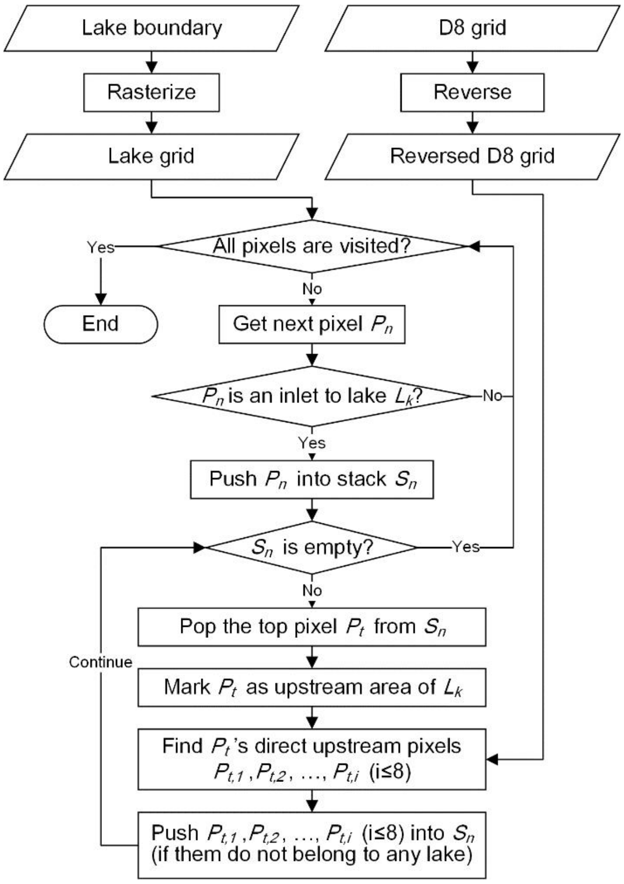


Fig.4: until when does the "continue" repeat (i.e. from "stack is empty?" to "push its upstream pixels into tack")?

Reply: Thank you very much for carefully reading the chart and providing the nice suggestion. We have revised the flowchart to make it clearer. There are two nested loops in the flowchart: for the external loop, if all the pixels are visited, the loop will stop; for the inner loop, if the stack is empty, the loop will stop.



L165-167: do you mean you provide multiple relief values computed with different window sizes? What is the purpose of using multiple window sizes?

Reply: Yes, we computed multiple relief values using different window sizes (i.e. 5×5, 11×11, 21×21, 31×31, 41×41, and 51×51) in this study. For the researches focusing on small-scale terrain variation, a small window size is appropriate; when the focus is large-scale terrain variation, a larger window size is preferred. To meet the needs of different analysis scenarios, we provide multiple relief values computed with different window sizes. This has been explained in the revised manuscript (L180-182).