

Interactive comment on “Mapping long-term evapotranspiration losses in the catchment of the shrinking Lake Poopó” by Juan Torres-Batló et al.

Anonymous Referee #1

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Based on the works cited in the introduction of this study, the catchment under investigation represents an ideal case study on the challenges facing sustainable water resources management due to competing water use demands, coupled with climate-related water scarcity. Many such catchments suffer from lack of ground-based observations of key hydrological variables and even where available their spatial distribution is often inadequate to capture the spatial variability of hydrological processes. Thus, efforts by the authors in this study to utilize remote sensing datasets to analyze the spatial-temporal dynamics of hydrological processes is commendable. However, I have a negative recommendation for this paper based on critical issues highlighted below;

i. The title of the paper, “Mapping long-term evapotranspiration losses in the catchment of the shrinking Lake Poopó” is conflicting with the aim of the study based on the con-

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clusion of the study which suggests that the aim was to link agricultural intensification to the declining lake levels.

ii. The introduction is poorly written with no coherent link between ideas presented in the paragraphs. The gap based on previous studies is not well articulated. Thus the scientific contribution and aim of the study are not clear. Besides, the introduction is too short, and the literature review is inadequate

iii. Declining lake water levels is a pertinent issue in this catchment, and as highlighted in the short literature review, there are several possible causes. As such, analyzing trends in precipitation, evapotranspiration, and vegetation dynamics without a proper catchment water balance analysis may not reveal the real cause of lake water level decline. It is a bit strange that quantitative analysis related to lake water levels does not suffice, not even in Fig. 4 on trend analysis.

iv. The study analyzes the effects of agricultural intensification on the catchment water balance, yet only a static land cover map is used for over ten years. Based on this, it is not possible to identify areas where land use changed over ten years.

v. Statistical results of the validation of the unified land cover map are not presented.

vi. The choice of a single date image (P7 – L6) to derive a water mask is not justified. Why this particular date? The water, mask should be time-varying to reflect seasonal changes in the extent of water bodies.

vii. Based on the precipitation validation results presented in Fig. 2, a consistent over-estimate by the CHIRPS product is observed. A bias correction scheme is necessary; otherwise the increase in precipitation from the analysis may be due to the biases from the rainfall product used. Analysis such as the double mass curve analysis is also necessary to identify possible errors in datasets or human-induced changes in rainfall run-off relationships. This could act as a good starting point for the catchment water balance analysis.

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viii. The Mann-Kendall test is central to this study, yet there is barely any literature in this study on this method, other alternatives, and why this method, in particular, is suited for this study. Also, the scenarios under which the method was applied are not described. Were the analysis done under the assumption of short term persistence or long term persistence? Tabular presentation of the trend analysis results is missing.

Other technical issues include;

- i. Use the word general instead of generalized (P1-L12), (P10-L16), the word decisive (P2-L4) is also not appropriate in this context. Use “areas prone to flooding” not “floodable” (P9-L13).
- ii. Obvious (P1-L21), timid (P10-L8), accused (p11-L4) are not appropriate words in scientific writing.
- iii. Improper usage of articles and prepositions e.g. of instead of from (P1-L18), article the in “the agriculture” (P1-L28), “the Salar the Uyuni” (P3-L15), “the 65%” (P3-L26) among others
- iv. Sentence structure such as in P3-L15, P6-L10, P11-L4, P14-L30 makes it difficult to understand the authors’ message.
- v. Some statements are ambiguous e.g. “The last results agree with the findings” (P14-L26). Better refer to results in section x or y.
- vi. General grammar editing is needed.
- vii. Cross-reference using table or figure numbers and not below or above e.g. (P5-L4)
- viii. Some acronyms are used without prior definitions e.g. DP (P3-L1), TDPS (P3-L9).
- ix. No consistency in the formatting of tables. Table 1, 2 and 3 are all formatted differently.
- x. Some figures have very small fonts in the legend e.g. Fig. 5.

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xi. Some sections such as 3.3 are misplaced. To maintain flow in the document this section should be in section 3.1.2

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