

Response to the referees

We thank the referee for the constructive comments. Please find our point by point response to the comments below:

1. I think the major issue is with the claim that study propose a novel method e.g., in abstract (line 26) and in (line 791) conclusion. However, the presentation of the methods and analysis suggest retreating from that assertion. Specifically, the claim of novelty outlined in line 80-82 - using a synthetic configuration of reservoirs to study hydro/ecological impact - does not constitute a novel approach. The authors should reassess their claims regarding the novelty of their method and accurately articulate the realistic contributions of their work.

Response: Based on our literature review there is a gap in assessing the impact of multiple dams on the provision of ecosystem services *at daily time step when pre-dams data is unavailable* (lines 68-69) and this paper fills this gap – hence by doing so we highlight that the approach is novel (in addition to plug and play approach that allows on top of this a means to assess synthetically based dams anywhere).

We have now emphasized that “The approach is novel not only because it offers the analysis of alterations in ecosystem services at daily scale when pre-dam data is unavailable but also because dams can be synthetically placed anywhere in the river network and the corresponding alterations in flow regimes simulated in a flexible manner.” (Lines 13-16) and made adaptations also in Line 791. In the same go we also clarify that while the approach can deal with synthetically placed reservoirs, this paper only works with combinations of existing reservoirs as a proof of concept and a first step in demonstrating the approach (e.g. see line 16). Thus the changes are now aligned with the methodology implemented in the paper.

To avoid repetition and any misunderstanding, we have removed the word novel from line 80-82.

2. Some of the statements made are vague, not specific, and lack convincing backing from data or information. Example, (Line 67-68) "However, there are no studies that assess the impact of multiple dams on the provision of ecosystem services at macro basin scales and at daily time step when pre-dams data is unavailable"

Response: Our literature review suggests there are no such studies at daily scale when no pre-dam data is available. We have therefore adapted the statement as:

“However, our literature review suggests that there are no studies that assess the impact of multiple dams on the provision of ecosystem services at daily time step when pre-dams data is unavailable.”

3. Lines 13-15 sounds like a novel approach was proposed, but as per the response it is unique application for this particular basin only, which should be corrected.

Response: please see our response to comment 1.

4. The use of normalized index is more appropriate choice than using FSR. In Figure 12 Please explain what the error bars represents (is that maximum - minimum or quantiles?). Again, what does the intersection points represent?

Response: The error bars around the mean values of agricultural production and NFDI, for a given reservoir scenario, are one standard deviations of the agricultural production and NFDI simulations for the reservoir scenario over different years. We have adapted the caption of the figure accordingly, please see lines 603-605.

5. Lines 236 -239: It is still unclear what is the motivation for selecting [L/T] as unit of discharge for calibration while other figures are shown in discharge unit. In table S.3, MAE for reservoir is shown in cubic meter per day but MAE for sub-basin is shown in mm per day. Why divide the volumetric flow by area?

Response: This was an error, the MAE units for reservoir are also in mm/day and not cub m per day. We have now corrected the units.