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Earth System Science Data

Discussions

ESSDD

Interactive comment

Interactive comment on "Paleo-hydrologic reconstruction of 400 years of past flows at a weekly time step for major rivers of Western Canada" *by* Andrew R. Slaughter and Saman Razavi

Anonymous Referee #1

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The tree-ring data are used to reconstruct flow data in the Saskatchewan River Basin with a weekly time step over the past 400 years. The datasets and the methodology are valuable to the ESSD research community. The archived data is consistent with the manuscript and well organized with a readme that helps the users to efficiently use the data. Therefore, I recommend it to ESSD; however, I believe that addressing the following comments can clarify the methodology and increase its reproducibility of the work. 1. Arguably, as mentioned in the abstract, "Plausible scenarios of flows that fluctuate outside the envelope of variability of the gauging data are required to assess the

robustness of water resources systems to future conditions." The question that remains unanswered is: why should we make sure that the reconstructed flows "properly preserve the statistical properties of the reference flows, particularly, short- to long-term persistence and the structure of variability across time scales", mentioned later in the abstract and used in the methodology. 2. Page 5: "Similar to Razavi et al. (2016), only the four . . ." needs to be explained more in-depth in this manuscript to make it self-contained. 3. Adding to comment 2 above, the following methods/approaches need to be explained in Section 2 to make the manuscript self-contained: a. Page 5: why MLR is expected to reconstruct flow from tree ring data, adequately. b. Page 5: The "leave-one-out cross-validation strategy" c. Page 6: The "random matching" 4. Authors need to elaborate on the negative regression coefficients in table 1. Are they physically meaningful? Could the regression be constrained to take only non-negative coefficients? In the same table, variables (e.g. WWP and JOLA) have to be introduced. 5. Page 7: What do author mean by naturally in "The biennial reconstructed time series naturally demonstrate smaller variability compared with the biennial flows in the reference period, when MLR models are used for reconstruction." 6. The two-year instrumental periods briefly introduced in the abstract need to be explained more in-depth in Section 2. 7. The persistence calculation should be explained in Section 2.