Answer to Editor

Dear Dr. Matt,

We sincerely appreciate your valuable feedback and the opportunity to revise our manuscript. We also thank the reviewers for their insightful comments, which have helped us refine and strengthen our work. In this response, we outline the key revisions made to address the concerns raised by you and clarify the contributions of our study.

A major concern was ensuring that our findings extend beyond a site-specific application. We have now explicitly highlighted that the key methodological contribution of this study lies in the calibration approach using a modified Manning-Strickler (MS) equation, which enables accurate discharge estimation in tide-dominated river systems with minimal in-situ data. This calibration method has broader applicability to similar complex hydrodynamic environments where data scarcity is a challenge. Additionally, we emphasize that 1D modeling remains the most efficient choice for estimating water levels and discharges in river networks, particularly where bathymetric data is limited. While 2D models are essential for urban flood modeling, as discussed by Schreiber et al. (2023), their computational cost and data requirements make them less practical for the type of discharge estimation we focus on.

We recognize the need to provide a more thorough justification for the use of a 1D model over a 2D approach. To clarify this, we have expanded the discussion in the introduction and methods section. First, in terms of computational efficiency, a 1D model can simulate a full year in just five minutes, which is significantly faster than 2D models, making it ideal for uncertainty quantification, scenario testing, and practical applications in data-limited settings. Furthermore, 1D models facilitate Monte Carlo methods. As demonstrated in similar tidal systems by Terraz & Mendez-Rio (2023), 1D modeling has been successfully used for computing statistical parameters such as Sobol indices to characterize spatially distributed friction coefficients. Finally, unlike 2D models that focus on floodplain dynamics, our study is centered on accurate discharge and water level estimation, which aligns with the strengths of a 1D approach.

The suggestion to incorporate Markov Chain Monte Carlo (MCMC) or other uncertainty quantification techniques is well taken. However, we clarify that the primary aim of this technical note is to present a novel calibration technique rather than a full uncertainty analysis. We acknowledge the importance of uncertainty quantification and discuss it as a potential avenue for future research, where the validated 1D model can be used in probabilistic framework.

In response to concerns about the clarity of our writing, we have thoroughly revised key sections. In the abstract, we have removed vague statements and provided precise error metrics (rRMSE reductions) to quantify model accuracy. In the introduction, the study’s aims have been reframed to focus on overcoming challenges associated with 1D model calibration. In the methods section, we have clarified details regarding calibration and validation periods to improve transparency.

Thank you again for your time and consideration.

Best regards,

The authors

References :

Schreiber et al. (2023). Nat. Hazards Earth Syst. Sci., 23, 2313–2332; https://doi.org/10.5194/nhess-23-2313-2023

Terraz, T & Mendez-Rios, F. (2013). Coupling Mage with Melissa to Compute Ubiquitous Sobol Indices for River Hydraulics. Advances in Hydroinformatics—SimHydro 2023 Volume 1, Ed.: Gourbesville, F. & Caignaert, G., Springer, pp. 25-39