Response to Reviewer 1 Comments

We sincerely thank the reviewer for the thorough and constructive comments. The suggestions have significantly improved the clarity, rigor, and overall quality of the manuscript. All comments have been carefully addressed, and the manuscript has been revised accordingly. Detailed responses are provided below.

Comments 1: Research novelty not sufficiently highlighted. Although the Abstract and Introduction provide a comprehensive description of the study background and methodology, the novelty of the proposed approach compared with existing methods is not clearly articulated. I recommend that the authors strengthen the concluding part of both sections by explicitly stating the uniqueness of this study and clarifying how the proposed framework improves upon conventional approaches. This will better highlight the scientific contribution.

Response 1: Thank you for your valuable suggestion. We have revised both the Abstract and the Introduction to more clearly highlight the novelty and scientific contribution of this study.

Specifically, in the Abstract, we refined the description of the proposed framework by emphasizing its key innovation—namely, the integration of the Switch Prediction Method (SPM) with machine learning-based multi-step forecasting (MSF). In addition, we streamlined the presentation of results and reported representative quantitative performance from the best-performing model to improve clarity and impact.

In the Introduction, we have strengthened the concluding part by explicitly stating how the proposed framework differs from conventional approaches. In particular, we clarified that, unlike traditional ensemble methods that rely on static or probabilistic weighting schemes, the proposed method adopts a dynamic rainfall forecast selection mechanism based on real-time performance. Furthermore, we explicitly summarized the main contributions of this study in a structured manner, including (1) the development of an adaptive SPM-based ensemble framework, (2) the integration with MSF to mitigate uncertainty propagation, and (3) the application to 72-hour inflow forecasting for practical reservoir operation under typhoon conditions.

These revisions improve the clarity of the research novelty and more effectively position the proposed framework within the current state-of-the-art.

Comments 2: Outdated references. The list of references added by the authors appears to rely heavily on older studies. A scientific article should also reflect the state-of-the-art. It is recommended to include more recent literature and to provide a review of previous research on similar issues to enhance the timeliness and relevance of the study.

Response 2: Thank you for this important comment. We have revised the manuscript to incorporate more recent literature in order to better reflect the current state-of-the-art in hydrological forecasting and machine learning applications.

Specifically, several recent studies (published between 2024 and 2025) have been added to the Introduction and Methodology sections. These include works related to (1) advanced deep learning approaches for inflow and streamflow prediction, (2) hybrid frameworks combining data-driven and physically based models, and (3) multi-step forecasting strategies and their associated challenges. For example, recent studies such as Xu et al. (2024), Li et al. (2024), Teegavarapu et al. (2025), and Thaisiam et al. (2025) have been incorporated to strengthen the literature review and provide updated context for the proposed framework.

These revisions improve the timeliness and relevance of the manuscript and better position this study within the latest research developments.

Comments 3: Insufficient technical details of SPM.The Switch Prediction Method (SPM) is only briefly described, making it difficult for readers to fully understand its operational mechanism. More details are needed. This will also help ensure reproducibility.

Response 3: Thank you for this important comment. We have substantially revised the manuscript to provide a clearer and more detailed description of the Switch Prediction Method (SPM), with the aim of improving transparency and reproducibility.

First, the methodological description of SPM has been expanded to explicitly clarify its operational mechanism, including how multiple rainfall forecast products are evaluated and dynamically selected based on real-time performance. The overall workflow of SPM is now more clearly described in the Methodology section.

Second, to further enhance reproducibility, we have added a step-by-step description of the overall forecasting framework, detailing how SPM-integrated rainfall forecasts are combined with machine learning models and subsequently applied within the multi-step forecasting (MSF) process. This structured description allows readers to more easily follow and implement the proposed approach.

Third, the role of SPM within the MSF framework has been clarified, particularly in terms of how dynamic input selection helps mitigate uncertainty propagation in sequential forecasting. Additional explanations have been included to illustrate how the model transitions from observed data to forecast-based inputs during the 72-hour prediction process.

These revisions significantly improve the clarity of the methodological framework and ensure that the proposed approach can be more readily reproduced by other researchers.

Comments 4: Limited discussion on practical implications. The Discussion and Conclusion are focused mainly on the technical aspects of the model. However, the practical significance for reservoir operation remains underdeveloped. It is suggested to elaborate on how 72-hour inflow forecasts—even with certain errors—can still provide critical lead time for reservoir managers to adjust release strategies and enhance operational safety. This would substantially strengthen the applied value of the study.

Response 4: Thank you for this valuable suggestion. We have revised the manuscript to strengthen the discussion on the practical implications of the proposed framework for reservoir operation.

Specifically, a dedicated discussion section has been added to explicitly illustrate how 72-hour inflow forecasts can support real-world reservoir management. In this section, we emphasize that, although forecast uncertainties inevitably exist, the predicted timing and trend of inflow remain highly informative for operational decision-making. These forecasts provide critical lead time for reservoir managers to implement proactive strategies, such as pre-release operations, flood risk mitigation, and adaptive water allocation during typhoon events.

In addition, we further clarify that the integration of SPM with machine learning and multi-step forecasting improves the stability and reliability of long lead-time predictions, making the forecast information more actionable under uncertain conditions. Practical decision-making strategies, such as adopting conservative estimates or considering ensemble variability, are also discussed to demonstrate how forecast uncertainty can be effectively managed in operational contexts.

These revisions enhance the applied value of the study and better demonstrate the relevance of the proposed framework for real-world reservoir operation.

Comments 5: Future research directions too narrowly technical. The future work outlined in the Conclusion mainly emphasizes model improvement. To broaden the impact, the authors should consider including wider perspectives such as cross-basin applicability, feasibility under climate change conditions, or hybridization with physically-based models. This would enhance the forward-looking dimension of the paper and its relevance to a broader research community.

Response 5: Thank you for this constructive suggestion. We have revised the manuscript to broaden the scope of future research directions and enhance the forward-looking perspective of the study.

In the revised manuscript, the future research section has been expanded beyond model improvement to include several broader aspects. First, we discuss the potential applicability of the proposed framework to different river basins with varying hydrological characteristics, highlighting the need for cross-basin validation. Second, we address the challenges posed by climate change and non-stationary hydrometeorological conditions, emphasizing the importance of evaluating model robustness under changing environmental conditions. Third, we suggest the integration of data-driven approaches with physically based hydrological models to improve interpretability and generalization capability.

These additions extend the discussion from a purely technical perspective to a more comprehensive research outlook, strengthening the relevance of the study to a wider scientific and practical community.