Saltwater intrusion is a serious concern for coastal regions. In this paper, the attention is paid to the Lower Chao Phraya River. The effects of hydrological droughts on saltwater intrusion is investigated by both wavelet analysis and hydrodynamic models. In general, the paper presents an interesting case study. There are five comments for further improvements of the paper:

We sincerely thank the reviewer for the careful review, insightful comments, and valuable suggestions, which have greatly improved the clarity and quality of our manuscript. We are encouraged by the reviewer's positive recognition of the importance and relevance of our study focusing on saltwater intrusion in the Lower Chao Phraya River.

Below, we provide a detailed point-by-point response to each of the reviewer's comments and clearly outline the revisions made in the manuscript to address them.

-First of all, saltwater intrusion is in general an old topic. There are quite a number of previous publications. For a few examples, please refer to Liu et al. (2020), Liu et al. (2019) and Weng et al. (2024). The authors may want to highlight what new insights this paper presents.

Response:

We thank the reviewer for highlighting important previous studies and encouraging us to clarify the novel contributions of our work. In response, we have revised the manuscript to explicitly emphasize the unique insights provided by this study. Specifically, our work advances understanding of saltwater intrusion mechanisms in the Lower Chao Phraya River (LCPYR) through the following key findings:

Characterization of drought-dependent and relaxation relationships

We elucidate how basin-scale drought magnitudes influence salinity intrusion (drought-dependent relationship) and highlight the complexities arising when local hydro-climatic conditions temporarily interrupt this linkage (relaxation relationship). The drought-dependent mechanism underscores the importance of basin-scale hydro-climatic variability, while the relaxation relationship emphasizes the significance of local climate variability.

Pinpointing salinity intrusion sources using a physically based numerical model

The numerical model explicitly identifies and prioritizes the key drivers of saltwater intrusion. It also clarifies the relaxation mode suggested by wavelet analysis, highlighting previously underappreciated factors such as urban runoff and freshwater supply management near the river's downstream end.

Insight into Improving the Effectiveness of Freshwater Redistribution (Water Hammer Technique)

We demonstrate and reevaluate the effectiveness of strategically timed freshwater redistribution ("water hammer"), emphasizing duration and discharge volume. This technique, previously unexplored in the LCPYR context, is critically assessed, and we provide revised recommendations alongside proactive and long-term strategies for managing salinity intrusion.

These additions clarify our study's contribution, differentiating it from existing literature and providing practical insights into improved management practices.

-The second comment relates to the first one. Every case study is unique to some extent. Therefore, the authors may want to illustrate some unique characteristics of the Lower Chao Phraya River. In particular, the "study area" and "data" can be presented in the same section. In this way, people can better understand the background.

Response: We thank the reviewer for highlighting the importance of clearly illustrating the unique characteristics of the Lower Chao Phraya River (LCPYR). To address this suggestion, we have revised the manuscript to explicitly emphasize these unique aspects, as follows.

"Topographically, prominent estuaries in Indochina and East Asia, such as the Irrawaddy, Salween, Mekong, and Pearl Rivers, are positioned on the windward side relative to the prevailing monsoon winds. Consequently, their seasonal flow regimes are influenced by both monsoon and synoptic weather systems. In contrast, the Chao Phraya River and its estuary lie on the leeward side of the mainland, causing the rainfall-runoff regime to be predominantly controlled by synoptic-scale weather patterns rather than direct monsoon influence. While the dry period in the Chao Phraya basin generally aligns with regional mainland climatic conditions, a unique local hydro-climatic feature is the occasional occurrence of wet episodes triggered by southerly or southeasterly winds across the inner Gulf of Thailand during the dry season. Although the underlying mechanisms driving this phenomenon remain understudied, it notably induces temporary wet periods that significantly accelerate the dilution of salinity levels in the LCPYR during otherwise dry conditions."

In particular, the "study area" and "data" can be presented in the same section. In this way, people can better understand the background.

Response: Done, we have integrated the "Study Area" and "Data" sections into one comprehensive section.

-Thirdly, the methods of wavelet analysis and hydrodynamic models are currently presented in two sections. The authors may want to combine them into one section.

Response: Done, we have combined the previously separate sections detailing wavelet analysis and hydrodynamic modeling into a unified Methodology section.

-The fourth comment relates to the third one. What new findings are made through the combined use of wavelet analysis and hydrodynamic models? In particular, can some early warnings be developed from the combined use?

Response: We thank the reviewer for this insightful comment to clarify new insights arising from the combined application of wavelet analysis and hydrodynamic modeling. We have revised the manuscript to clearly highlight these findings, which we summarize below:

New Insight from Combined Methods:

A key finding from the combined wavelet and hydrodynamic analyses is that local hydro-climatic variability, especially urban runoff from nearby watersheds, can significantly enhance salinity dilution even during severe drought conditions. This local influence, which has not been previously reported in the context of the Lower Chao Phraya River, corresponds directly with the relaxation relationship identified through wavelet analysis. Our numerical simulations further validated the critical importance of this urban runoff influence. Neglecting this factor resulted in reduced model accuracy, underscoring the potential for misinformed mitigation strategies and inefficient utilization of upstream freshwater resources.

Implications for Early Warning Systems:

Wavelet analysis effectively reveals the historical evolution of variability modes, including active and inactive phases of drought. However, its predictive capability is inherently limited by the wavelet's cone of influence (COI), restricting its practical application for forecasting and early warning. An alternative approach proposed in our study involves directly monitoring drought characteristics such as duration and magnitude through standardized indices (e.g., the rolling standardized discharge anomaly (RSDA) and rolling standardized precipitation anomaly (RSPA)). Coupled with insights from numerical modeling or predictive systems, these indices may help anticipate future salinity conditions, offering practical potential for early warning applications. Nonetheless, further investigation is needed to refine and validate this integrated forecasting approach.

-Fifthly, the abstract tells that "... offer essential insights to guide management strategies and the development of prediction tools for the LCPYR and surrounding regions." More details are in demand.

Response: We appreciate the reviewer's valuable suggestion to provide additional details regarding the management strategies and prediction tools outlined in our abstract.

To address this comment, we have revised the manuscript to clearly specify and elaborate on the practical implications of our findings. In particular, we now detail:

- **Immediate mitigation measures:** We illustrate the application and refinement of the freshwater redistribution technique, termed the "water hammer," focusing on optimizing the duration and volume of freshwater releases to effectively mitigate saltwater intrusion during emergent drought periods.
- **Long-term proactive strategies:** We highlight strategies incorporating the influence of urban runoff and tributary inflows on salinity intrusion. Furthermore, we discuss the potential development of a robust predictive framework that integrates hydrological and climatic variability to enhance long-term planning and early warning capabilities.

These elaborations are explicitly provided in the revised manuscript, offering a clearer understanding of the practical significance and applicability of our research findings.

References:

Liu, D., Chen, X. and Lou, Z., 2010. A model for the optimal allocation of water resources in a saltwater intrusion area: a case study in Pearl River Delta in China. Water resources management, 24, pp.63-81.

Liu, B., Peng, S., Liao, Y. and Wang, H., 2019. The characteristics and causes of increasingly severe saltwater intrusion in Pearl River Estuary. Estuarine, coastal and shelf science, 220, pp.54-63.

Weng, P., Tian, Y., Zhou, H., Zheng, Y. and Jiang, Y., 2024. Saltwater intrusion early warning in Pearl River delta based on the temporal clustering method. Journal of Environmental Management, 349, p.119443.

Response:

We appreciate the reviewer's suggestion. The recommended references have been included to acknowledge key contributions from related studies in other estuarine systems.