This paper addresses the problem of salinity intrusion in the Lower Chao Phraya River in Thailand, by combining local observations and numerical modeling. Their study can be applied to estuarine systems worldwide and represents a complete approach for building a valuable forecasts system and for understanding the key drivers of salinity intrusions.

I suggest the Author to make few modifications in the following points, especially to provide more details in the methods:

Response:

We sincerely thank the reviewer for the constructive and supportive feedback. We appreciate the recognition of the study's relevance and have carefully addressed all comments. The manuscript has been revised accordingly, with specific responses and corresponding changes detailed below.

Study Area:

Figure 1: Please describe the figure more in detail (e.g. what is the color bar representing?), add a reference length scale bar and add a reference map to identify the position of this region, with respect to a broader region (e.g. whole Thailand and neighboring countries).

Response:

We thank the reviewer for the helpful suggestion regarding Figure 1. The figure has been revised accordingly to improve clarity and geographic context (see attachment).

Specifically:

A reference length scale bar has been added.

An inset map now provides broader spatial context, showing the location of the study area within Thailand and neighboring countries.

The color bar and elevation shading are now described in the caption to clarify the topographic gradient (in meters above mean sea level).

These revisions aim to enhance the readability and usefulness of the figure for an international audience.

Lines 66-70: Repetition of the introduction, I suggest to remove this lines.

Response

The repetitive content in lines 66–70 has been removed as suggested

Lines 81-85: Are there any references for such observational data? Please add them, whether present

Response

We thank the reviewer for this suggestion. In response, we have added appropriate references and expanded the description of the hydrological background for the Lower Chao Phraya River (LCPYR) in the revised manuscript. The revised text now reads:

"The total inflow to the LCPYR is primarily regulated by two major upstream dams: the Chao Phraya (CPY) Dam and the Rama VI Dam. Observational data obtained from the National Hydroinformatics Data Center of Thailand (NHC, www.thaiwater.net; accessed on 1 April 2025) indicate that the CPY Dam releases an average dry-season inflow of approximately 80 m^3/s, which can peak at over 2,000 m^3/s during flood events. This seasonal variation reflects the broader monsoonal influence on river discharge. Similar patterns have been described in long-term records by Bidorn et al. (2021), who analyzed 70 years of hydrological data for the delta. The consistently low dry-season flows may also reflect operational practices aimed at maintaining dam stability and ensuring a minimum downstream water level, as suggested by Molle et al. (2001). Rama VI Dam contributes additional flow, with observed discharges ranging from approximately 20 m^3/s during dry periods to 800 m^3/s during high-flow conditions. Furthermore, downstream water abstraction for metropolitan water supply, particularly in the Bangkok Metropolitan Region, reduces net inflow by an average of 55 m^3/s (Pokavanich and Guo, 2024). Although additional lateral inflows and withdrawals exist, the lack of systematic in situ measurements introduces uncertainty into the full assessment of the river's water balance."

References added in the revised manuscript:

Bidorn, B., Sok, K., Bidorn, K., & Burnett, W.C. (2021). An analysis of the factors responsible for the shoreline retreat of the Chao Phraya Delta (Thailand). Science of the Total Environment, 769, 145253. https://doi.org/10.1016/j.scitotenv.2021.145253

Molle, F., Chompadist, C., Srijantr, T., & Keawkulaya, J. (2001). Dry-season water allocation and management in the Chao Phraya Delta. DORASDELTA Research Report, DORAS Center, Kasetsart University.

Data and Methods:

Lines 112-113: How data are detrended? Please add some information on the method used to detrend time series.

Response

We thank the reviewer for the comment. As requested, we have added details on the detrending method in the revised manuscript. Specifically, we applied a LOWESS (Locally Weighted Scatterplot Smoothing) filter with a smoothing parameter of f = 0.01 to extract the trend component. The time series spans from January 1, 2015, to May 14, 2021, and the smoothing parameter corresponds to a window of approximately 25 days within this period. The detrended signal was then obtained by subtracting the LOWESS-derived trend from the original time series.

Equations 1 and 2: How the rolling mean is evaluated. Is there any variable transformation for daily streamflow and rainfall before computing the index or daily rainfall and streamflow have already a gaussian distribution? What period the rolling mean is referred to (SPI3, SPI6, ...)? Please be more accurate in the description of SDI and SPI.

Response

We thank the reviewer for highlighting this important point. We acknowledge that our original explanations may have caused confusion, and we have revised Sections 3.2 and 3.3 to provide clearer definitions and a more precise description of the indices used.

In the revised manuscript, we define the Rolling Standardized Discharge Anomaly (RSDA) and Rolling Standardized Precipitation Anomaly (RSPA) as follows:

$RSDA(t) = [Q(t) − Q_{mean\_dry}] / σ_{Q\_rolling}(t)$
$RSPA(t) = [P(t) − P_{mean\_dry}] / σ_{P\_rolling}(t)$

Where:

- Q(t) and P(t) are daily streamflow and precipitation at time t,
- Q_mean_dry and P_mean_dry are dry-season means,
- σ_Q_rolling(t) and σ_P_rolling(t) are 60-day rolling standard deviations centered on t.

This approach does not assume Gaussian-distributed input or involve prior data transformation. Instead, it captures short-term variability relative to local dry-season conditions, making it more responsive to non-stationary hydrological extremes.

Unlike traditional indices such as SDI or SPI (e.g., SPI-3, SPI-6), which rely on long-term aggregates and fitted parametric distributions, our indices use daily data and rolling statistics to support near-real-time monitoring.

Although the previous version did not clearly reflect it, the correct formulation was used consistently in our analysis. These definitions and conceptual distinctions have now been clearly incorporated into the revised manuscript to improve clarity and precision.

Line 141: Please check the site link. In my case, it is not working.

Response:

We thank the reviewer for pointing this out. The link has been corrected to the appropriate source: rwc.mwa.co.th.

Line 225: What is the GOFS 3.1 reanalysis product (HYCOM)? Please add a reference or further explanation.

Response

Thank you for the comment. We have clarified in the manuscript that the Global Ocean Forecasting System (GOFS) v3.1, produced using the HYbrid Coordinate Ocean Model

(HYCOM), provides global ocean forecast data. We used its salinity forecast product to define the downstream boundary condition. Data are available at:

https://www.hycom.org/dataserver/gofs-3pt1/analysis

https://www7320.nrlssc.navy.mil/GLBhycomcice1-12/

(accessed April 8, 2025)

Results and discussion:

Generally, sections 6.3.2 and section 6.3.3 are very difficult to follow, due to many experiments and acronyms. Tables help, but the reading would be improved by summarizing such sections and maybe introducing a schematic summarizing all the experiments.

Response

We thank the reviewer for the thoughtful and constructive comment regarding the complexity and readability of Sections 6.3.2 and 6.3.3. We acknowledge that the density of scenario testing, acronyms, and sensitivity analysis may have made these sections difficult to follow.

In response, we have thoroughly revised both sections to enhance clarity and coherence. Specifically:

The narrative has been streamlined by reducing repetitive technical content and grouping related findings more clearly.

The sensitivity analysis is now structured around the key components of the net inflow equation, with clear topic sentences and transitions to guide the reader.

The January 2020 salinity intrusion case study has been moved to precede the sensitivity experiments, providing real-world context and motivating the tested parameters.

Quantitative results are more clearly linked to Table 2 and supplementary figures, improving readability without overwhelming the main text.

A concluding summary has been added to Section 6.3.3 to synthesize results within the broader conceptual framework of drought-dependent and relaxation-driven salinity dynamics.

Finally, we have added a schematic diagram summarizing the experimental setup, inputs, and modeled outcomes to support comprehension, as suggested.

We believe these revisions significantly improve the readability and logical flow of the manuscript, and we sincerely appreciate the reviewer's guidance in strengthening this section.

Figure 5: Are horizontal lines marking the periods of 14, 182, and 365 days? I am not sure about the 182 days line.

Response:

Thank you for your observation. The horizontal lines marking periods of 14, 182, and 365 days have now been verified and clarified in the figure and caption. The 182-day line has been corrected to reflect the appropriate sub-annual cycle.

Line 354: Please define Higher High Water and Lower High Water

Response:

Definitions for Higher High Water (H.H.W.) and Lower High Water (L.H.W.) have been added to the manuscript as follows:

Higher High Water (H.H.W.): The higher of the high tides occurring on a given day. In semidiurnal tidal regimes, two high tides typically occur per day.

Lower High Water (L.H.W.): The lower of the high tides occurring on the same day.

Figure 6: Please substitute cms unit with m3/s

Response

The unit "cms" has been replaced with the correct "m^3/s" notation throughout the figure and caption.

Line 493: correct de-pending

Response

The hyphenation error "de-pending" has been corrected.

Line 551: Non-tidal Sea Level Effects: missing bold text

Response

The missing bold text for the heading "Non-tidal Sea Level Effects" has been corrected.

Line 572: correct mitiga-tion

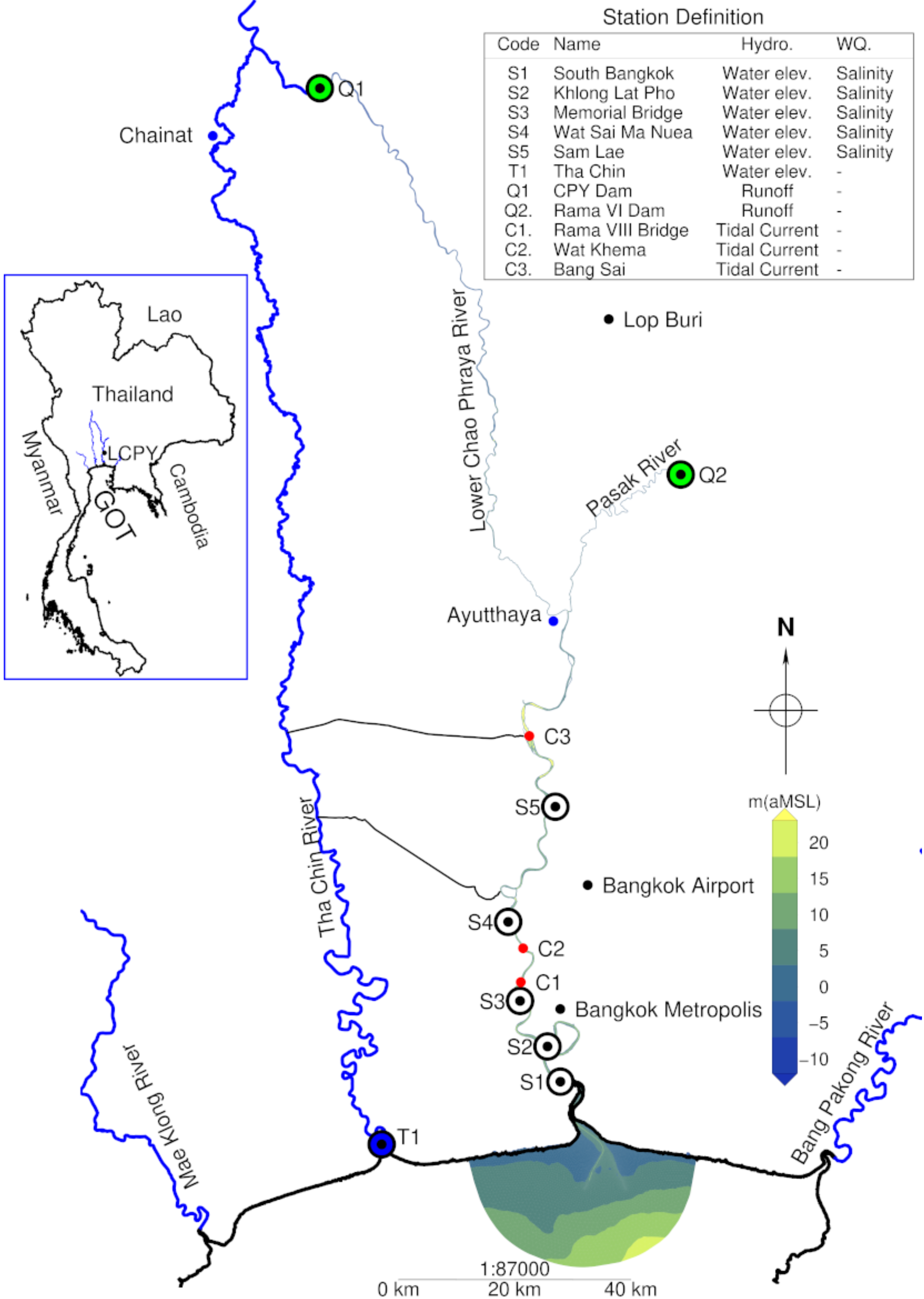
Response

The hyphenation error in "mitiga-tion" has been corrected.

Line 602: correct cli-mate

Response

The word "cli-mate" has been corrected to "climate".



Station Definition

Code	Name	Hydro.	WQ.
S1	South Bangkok	Water elev.	Salinity
S2	Khlong Lat Pho	Water elev.	Salinity
S3	Memorial Bridge	Water elev.	Salinity
S4	Wat Sai Ma Nuea	Water elev.	Salinity
S5	Sam Lae	Water elev.	Salinity
T1	Tha Chin	Water elev.	-
Q1	CPY Dam	Runoff	-
Q2.	Rama VI Dam	Runoff	-
C1.	Rama VIII Bridge	Tidal Current	-
C2.	Wat Khema	Tidal Current	-
C3.	Bang Sai	Tidal Current	-