

General comments

This paper presents an interesting approach by proposing an idealized framework for prescribing mid-latitude SST front in aquaplanet experiments. While the underlying concept and proposed framework are valuable, the manuscript requires **major revisions** before it can be considered for publication.

Specifically, there are errors in the unit notation within the equations and figures.

Furthermore, the physical interpretations of the sensitivity experiments are insufficient, as is the discussion regarding the differences and advantages of this approach compared to existing sensitivity experiments based on observational data.

Specific comments

Page 4, Line 110: Incorrect unit for α : Please check if it should be $^{\circ}\text{C} (100 \text{ km})^{-1}$

Page 4, Line 113: Since α is given in $^{\circ}\text{C} (100 \text{ km})^{-1}$ and ϕ_T represents latitude, unit conversion is required.

Page 6, Figure 1: Is the y -axis for $d/dy\text{SST}$ defined as positive northward (from the equator to the pole)? If so, the values in the graph should be negative.

Page 8, Section 4.2: Could you please clarify the sensitivity of the sensible heat flux? Also, it would be beneficial to present the vertical changes in temperature and water vapor structure, and to provide further discussion regarding their sensitivity and underlying physical mechanisms.

Page 10, Figure 3: Since the precipitation and evaporation plots are strongly dominated by the climatology, showing them as anomalies from the control experiment would make the results much clearer.

Page 11, Section 4.4: To improve readability and flow, please consider adding a brief introductory statement at the start of each subsection to outline its objective.

Page 14, Section 5: The manuscript lacks results and discussion demonstrating how the issues associated with using observational SSTs as boundary conditions—as raised in the Introduction—are addressed by the proposed SST profile. Furthermore, the authors should discuss whether this approach yields new insights that could not be obtained from existing studies.