Review of WCD-2024-3435
"The Role of Topography, Land and Sea Surface Temperature on Quasi-Stationary Waves in Northern Hemisphere Winter: Insights from CAM6 Simulations"

by
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Recommendation: Minor Revisions

Fei & White (2025) examine the effect of stationary forcings (e.g., topography, SSTs) on quasi-stationary wave (QSW) characteristics using a set of 100-year CAM6 simulations with varying SSTs, topography, and land-sea distribution. The authors find that background conditions associated with stationary wave number and transient eddies explain most of the variance in spatial QSW distributions.

Overall, the manuscript is well organized and well written. The authors provide a thorough introduction with a nice overview of how quasi-stationary waves relate to other atmospheric and environmental features/processes. The methods, overall, appear sound and in line with previous work, and I appreciate the organized approach to isolating different stationary forcings with the model simulations. The results are also generally well presented—the authors do well to walk the reader through fairly detailed comparisons. I also appreciate the inclusion of various sensitivity tests throughout to test robustness of presented results.

There are a few places in need of additional information or clarification after which I believe this manuscript to be suitable for publication in *Weather and Climate Dynamics*.

Comments

L50–52: In addition to ENSO, how would convection related to the MJO impact QSWs?

L60: Remove "this" between "in" and "highly".

L100: Replace "resolution" with "grid spacing" as the two are not synonymous (i.e., features are resolved at 4–6 times the grid spacing).

L100–101: Given the time spent in the Introduction on diabatic heating influences, it would be worth a short discussion (perhaps in Section 4) on how this coarse grid spacing (and therefore, lack of diabatic processes) may influence your results.

L122–125: How was the spatial extent for the HEAT SST anomalies chosen?

L155, L162: Suggest putting two equations on separate lines.

L176: Should "CESM2" be "CAM6"?

Fig. 1: I wonder if making each line slightly transparent would help the reader with interpretation, especially with identifying areas of overlap between experiments.

Fig. 2: Missing y-axis labels.

Fig. 2: Missing reference to panels (d), (e), and (f) in figure caption.

Fig. 3: Suggest including a pattern correlation coefficient analysis here to strengthen your ERA5-CNTL comparisons more objectively.

L260: Specify which section "later" refers to.

L279–281: Remove parenthetical sentence structure and split into two sentences to increase readability.

L316: Add "Figure" before "A7a to A7d".

L320: Suggest reordering Appendix figures so they are referenced in order in the text.

L326: Should the last "value" be "Ks value"?

Fig. 6: Suggest smoothing contours to help reduce noise and highlight signals.

L355: Is this really true for (a)? The correlation is only 0.19.

L357–358: It appears the right correlations are weaker in (a) and (c) but right and left correlations in (b) and (d) are fairly similar. Please add additional discussion to explain this difference in result.

L440: Acronym already defined in L70.

Section 5: The conclusions would benefit from bringing the presented results back to some of the implications of QSWs discussed in the Introduction. For example, what do these identified relationships between QSWs and certain variables mean for, say, forecasting QSWs and their effects on weather conditions?