

Review of WCD-2025-218

“Tropical cyclone intensification and extratropical transition under alternate climate conditions: a case study of Hurricane Ophelia (2017)”

by

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Recommendation: Moderate Revisions

Ribberink et al. (2025) investigates the effect of warmer temperatures on the structure and evolution of Hurricane Ophelia (2017). The authors find that warmer temperatures led to a stronger storm with larger wind field. Additionally, Ophelia’s ETT was delayed and the storm maintained TC characteristics longer in the warmer environments.

This study is well-motivated by the growing concern of changes in ETT in the future and the likely impact on Western Europe. The manuscript is very well written and easy to follow. The methods all seem reasonable and consistent with previous work, and I appreciate including the dataset comparison to justify your choice of model initial conditions. The results are also in line with previous work on ETT and climate change.

I would, therefore, rate the overall presentation quality of this manuscript as “excellent”, the scientific significance as “excellent-to-good”, and the scientific quality as “excellent-to-good”. I have just a few comments and clarification questions before recommending publication in *Weather and Climate Dynamics*.

General Comments

- (1) Here are some additional ETT references to consider for inclusion throughout the introduction:

Arnott et al. (2004): <https://doi.org/10.1175/MWR2836.1>
Bieli et al. (2019): <https://doi.org/10.1175/JCLI-D-17-0518.1>
Bieli et al. (2020): <https://doi.org/10.1029/2019MS001878>
Kofron et al. (2010): <https://doi.org/10.1175/2010MWR3180.1>
Wood and Ritchie (2014): <https://doi.org/10.1175/JCLI-D-13-00645.1>

- (2) The following references may be useful additions to the discussion in L411–416:

Bieli et al. (2020): <https://doi.org/10.1029/2019MS001878>
Zarzycki et al. (2017): <https://doi.org/10.1002/2016MS000775>

Specific Comments

L11: Change “Post” to “post”.

L80: It looks like there may be a missing equation for the wind speed conversion?

L102: Replace “spatial resolution” with “horizontal grid spacing” as the two terms are not synonymous.

L113: Should introduce PGW acronym here since it’s used later.

L113: As a side note, PGW can also just involve altering thermodynamics rather than altering dynamical fields. The difference is that the temperature deltas are horizontally and vertically variable rather than uniform (e.g., [Lackmann 2013](#); [Lackmann 2015](#); [Jung and Lackmann 2019](#)).

L115: I appreciate taking a simple, constrained approach to this experiment, but wouldn’t the effects of a north/south jet shift, if it occurred, also be a meaningful result?

L169: How many pressure levels and at what spacing did you use for your simulations?

L179: What’s the shorter interval?

L196: What does 12 October indicate? Is this needed in the heading title?

L203–204: This is an interesting result—can you put this into context with previous work suggesting a potential TC slow down?

Figure 4: Panels (b)–(d) are very difficult to interpret due to the noise. Suggest applying a smoother to help highlight the signal.

L234–235: Can you clarify this statement about reaching the model’s capability?

Figure 5: I believe the legend is missing here.

L300: Can you elaborate on the increase in symmetry towards the end of Ophelia’s lifecycle? It this pointing to the storm reintensifying as an ETC and undergoing warm seclusion?

Table B1: I don’t see Table B1 referenced anywhere in the text. This does raise a question though—was CO2 increased in the future simulations?