

Interactive comment on “Changes in tropical cyclones under stabilized 1.5 °C and 2.0 °C global warming scenarios as simulated by the Community Atmospheric Model under the HAPPI protocols” by Michael F. Wehner et al.

Michael F. Wehner et al.

mfwehner@lbl.gov

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Note responses are in **red**.

This is a nice paper that reports the results of state-of-the-art ensemble simulations of tropical cyclone formation using a high resolution climate model. The results are good although they are more along the lines of confirming what we already suspected rather than completely new results. I have only minor comments. P.2, Line 11: "are" should be "is" **Done**.

C1

P.2., Lines 14-17: This description of the methodology is not as clear as it could be. It only became clear to me what these lines meant when I read P.3, lines 34-35. These lines should be rephrased accordingly. **We changed the wording to "A stabilized anthropogenic climate change to these surface forcing functions is constant in time. By adding such a change to the observations, observed interannual variations are preserved."**

Figure 2: these aerosol effects appear quite large compared with the CO₂ forcing and indeed the authors say this on P.13. While the HAPPI experiments are no doubt more realistic for having included the possible effects of aerosols, do the authors have any plans to assess the impact of aerosols using new simulations? **It is on the list of things to do, behind simulations at higher levels of warming. This is a topic that should be discussed by the HAPPI principals, in order to develop an experimental protocol as this forcing is also important for other extreme events such as heat waves.**

P.9, Line 10, and P.14, Line 13: It is possible to test whether these poleward shifts are statistically significant or not use a K-S test or similar. **We tested the statistical significance of the poleward shift of the normalized track density by calculating its zonal mean for each individual year of each realization separately. Because there are so many years, the standard errors in these figures are quite small. The figure below shows the normalized track density with the lines widened to reflect plus and minus 1 standard error. In the region of interest, it is clear that the poleward shifts are highly statistically significant. In this calculation, we grouped the HAPPI1.5 and HAPPI2.0 simulations together but this does not affect our conclusion. We added this sentence "The statistical significance of the larger differences in normalized track density between the historical and warmer stabilized scenarios is very high as assessed by comparison of the standard errors."**

P.9, Line 17-18. The authors are probably correct that there may be effects on extra-tropical transition, but a reference would assist in making their point **We added Liu et al. 2017; Zarzycki et al. 2017**

C2

C3

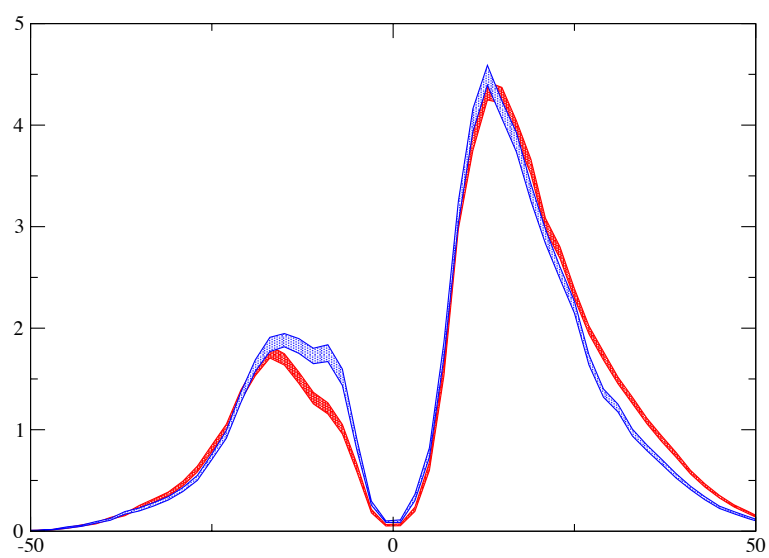


Fig. 1. Zonal track density with line width reflecting uncertainty expressed as standard error.

C4