Thank you so much, we appreciate the kind words and the thorough review. Also, congratulations on training the next generation of climate scientists from such a young age.

- Please add numbers to the equations.

  done

- Line 156: Which intensity metric did you take from IBTrACS – and if you took Vmax: did you also correct for the fact that different ocean basins in IBTrACS have different wind recording standards (in case you took the WMO_WIND variable)? See IBTrACS documentation for more information on this: https://www.ncei.noaa.gov/sites/default/files/2021-07/IBTrACS_v04_column_documentation.pdf

  Yes, we take Vmax. We use the USA agencies 1-min sustained winds (Vmax) as these are consistently available globally (1-min sustained for all basins).

  This is clarified on l 414-416 as follows: "All IBTrACS results are shown using the "USA_WIND" data field from HURDAT database (Landsea and Frankin, 2013) and the U.S. Navy Joint Typhoon Warning Center (JTWC) as it is based on a globally consistent and well documented methodology (Knapp and Kruk 2010)."

- It is not clear why the equation on line 261 is the way it is – what determined to square the probability of the wind shear?

  This question is similar to the discussion with Reviewer 1 on comments #2 and #4, where we clarify our intentions when formulating these simple physics-based parametrizations. We start from a static baseline, where historical records are used to define default estimates. This is the standard approach in TC stochastic event generation, but it fails to account for climate variability. As a first step towards a more dynamic approach, we then add scaling parameters based on climate variables known to impact TC formation. This is similar in concepts to other genesis potential indices, but we keep the level of tuning of our formulation to a minimum.

  The decision to square the wind shear component in eq. 2 was motivated by a desire to increase the importance of the term relative to SST and MSLP (see also answer to comment #4 by reviewer 1) as in our early development phase, it was improving the

narrow temporal window of activity in the Main Development Region particularly (mostly only active over 2 months). However, in this final version weighted with the historical information, there is little impact in squaring the wind shear or not.

- Line 270: I think you misspelled my last name, it's Bloemendaal (and not the German equivalent 😵)

Done (apologies!)

- Line 324: Can you briefly explain these methods?

In Bruneau et al. (2024), V_m is modeled indirectly through the estimation of the coefficient α in $V_m = \alpha\Delta p^{1/2}$. This α parameter can be related to the Holland B parameter as $B = \rho e\alpha^2$ (Knaff et al. 2011b). The power 1/2 in the equation represents cyclostrophic balance (Knaff and Zehr 2007).

The α parameter is modelled via quantile regression forest, and the features consist of centre pressure at t and t-1, the mean sea level pressure and wind shear as well as a flag for the basin and the knowledge of being overwater or overland.

 A summary of the above has been added to the manuscript (l351-354)

Line 372 – 376: Can you comment on how well this ensemble product performs in simulating the climate? Is there an ENSO bias present in this model that could potentially affect your outcomes? (i.e. see Seager et al., 2019 https://www.nature.com/articles/s41558-019-0505-x)

Chen et al. 2021 (chen_etal_jc2021.pdf) have investigated ENSO in E3SM-1-0, CESM2, and GFDL-CM4 models, and they show that capturing the full ENSO dynamic is still challenging but they highlight that models are getting better in capturing ENSO characteristics than their predecessors (including amplitude, time scale, spatial patterns).

We have now added a paragraph discussing the measures we took to bias-correct the CESM data (l 602-614). We do however acknowledge that by using a single climate model (even with a large ensemble of members) we are exposed to potential model biases (including the representation of the ENSO cycle – see Chen et al. reference above). To address this issue we would need to run a similar experiment with alternative sources of climate data, which is beyond the scope of the current study (but something we are planning to do in the future).

A comment was added in the conclusion (l656-657).

More fundamentally, and as pointed out by the reviewer via the article referenced, there is also a chance that this ENSO bias is more fundamental to all current generation climate models. Here we do not offer a ready solution but still believe our

results to be of value in understanding how TC risk could differ in physically realistic alternative climates.

- Could you also model natural variability like the MJO?

The forcing data we use is monthly, which makes it difficult to simulate intra-seasonal modes of variability like the MJO (for which a full cycle typically occurs in 30-60 days). In its current state the system is better suited to simulate the impact of longer term variability cycles like ENSO or the AMO.

- Line 528: while I understand it can be hard to calculate the return period of the most extreme event in a 44-year period, and that you therefore decided to place it at the 44-yr return period, I do think it's good to acknowledge that these events realistically do not have a 44-year return period but likely a way higher return period. You do somewhat say this by saying "Quantifying the severity of rare extreme events from such a shore record of observation years is an obvious issue" but I would be a bit more explicit here.

This is a great point and we have added a comment to the main text to acknowledge it (l559-l561)

- Figure 13, caption: I would mention the 100km radius in the caption as well, not just in the running text

done

- Is the model going to be open-access or can (parts of) the code be accessed anywhere? I couldn't find anything on this in the text but I might have overlooked it.

The model is not on open-access, but we do share selected datasets for academic use cases. We currently have such agreement with a student at ETH Zurich focussing on future typhoon induced rainfall risk in the Philippines.