RESPONSE TO REVIEWERS

August 5, 2025

Dear Editor,
we thank the Reviewers and the Editor for the time dedicated to reading and revising our manuscript. We have taken great care of answering your comments. Corrections to the technical comments of Reviewers RC1 and RC2 can be found in the tracked manuscript.
For Reviewer RC3, we provide our full answer letter below.

Sincerely,
Lia Rapella,
on behalf of the authors

General comments

The authors present an interesting study on the intensification of various extreme weather events from recent years. The analysis is interesting, although I would say not especially novel or ground-breaking considering previous work in this area particularly from the group of one of the authors. The novel aspect is the impact on airport operations, which is interesting, however I do question the direct role or systematic impact of these cyclones in recent years. A lot of the impact of the cyclones is down to the location of their track and this is unlikely to be a systematic increase either in the recent historical period or as the climate continues to warm. Therefore, I question if the airport impact and perceived increase is an actual increase or more just internal/natural variability? This is my only major comments that I would like the authors to address and discuss in this study.

We thank the Reviewer for their thoughtful feedback and for recognizing the interest in our study, particularly the novel aspect regarding impacts on airport operations. We appreciate the point regarding the potential influence of cyclone track variability and the challenges of attributing observed impacts to systematic changes rather than internal variability. We have added more details in the revised manuscript to highlight the role of cyclone track variability and internal climate variability in modulating the impact of extreme weather

on specific locations, such as airports. While our results suggest an increasing trend in wind speed and turbulence due to extreme events at specific airports, which is mostly due to anthropogenic climate change (at least in a statistical sense), we agree that further attribution studies should focus on the phases of internal natural variability to deeply assess its role. At the present, we can assess that in our 4 events natural variability played a minor role, although each phase of the large-scale modes (e.g., NAO) can play a role in modulating storm behaviour and associated risks.

Minor comments

0.1

L38 – some references to support these statements would be good.
We added some references, including the IPCC AR6 report (Chapter 11), to support.

0.2

L75/76 – are these events that you have chosen actually high impact events representative of the current climate, or are they big outliers of the present day distribution? It would be good to illustrate how the actual events compare to the analogues that you are showing. Are they more intense/weaker? How does the wind speeds compare?
We selected these events as they had significant impacts on airport operations with flights' delays and cancellations. However, we also assessed the differences between the 10-m wind patterns for each event with the composite of the analogues in the factual period (1989-2023). We can see clearly that each event is more intense in terms of wind speed close to the airports, thus strengthening the choice of the four events as representatives of extreme events with high impact on airport operations within the current climate. We modified the text to add this point.

0.3

Table 1 – can you be more quantitative with the values in this table. Simply stating "several" or "few" flights diverted is not especially evidential.
We removed the column "Flights diverted" in the table as there is no agreement nor accuracy in the sources about the number of diverted flights.

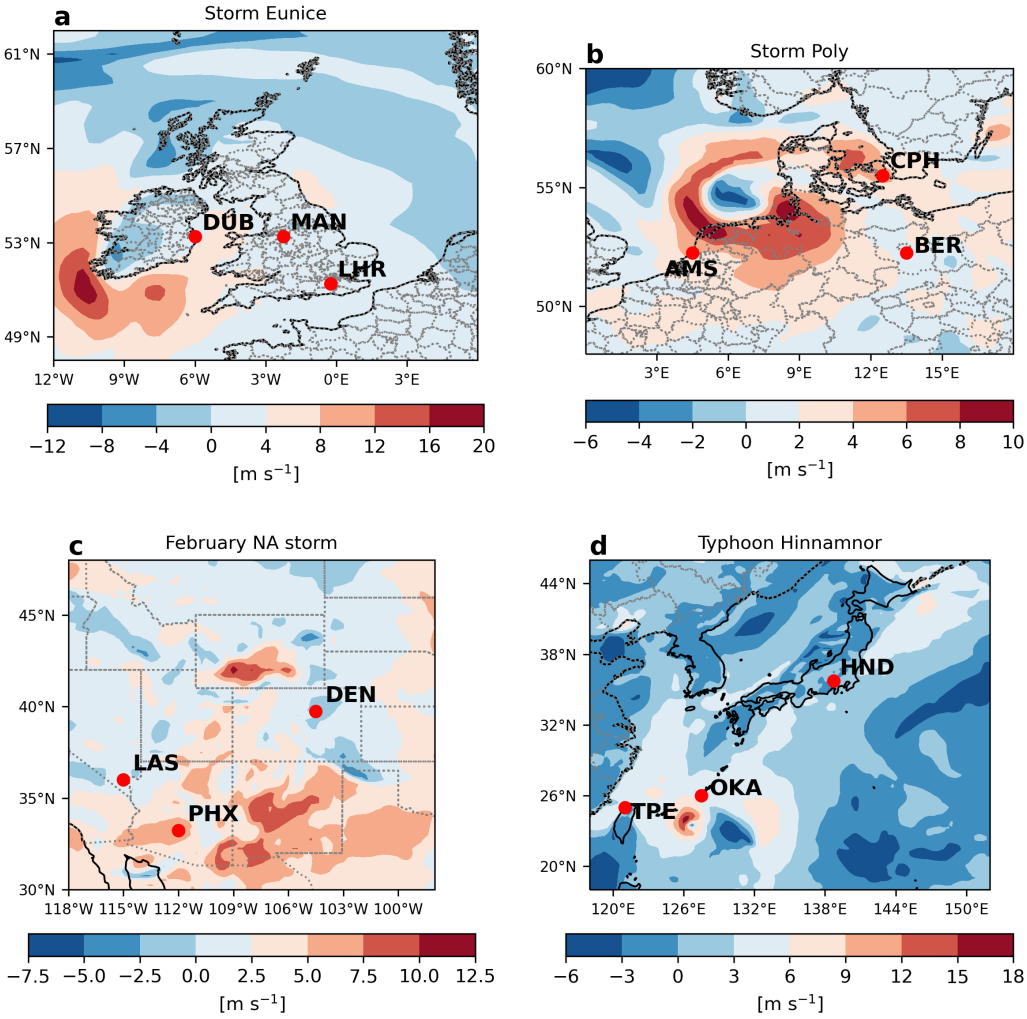

Figure 1: Difference between V 10m at the cyclone time and V 10m averaged over the time-steps corresponding to the analogues for the factual [1989-2023] period, for the 4 events analysed in the study.

0.4

L93 – why did you choose not to go back to 1940 with ERA5 for your analysis? Surely this would help you find more analogues and prove your case even further?
This is because ERA5 data are reliable starting from 1950.

0.5

L105 – what is this proxy? You need to introduce this metric.
We introduced the metric directly and we formulated differently the sentence.

0.6

L189-190 – it appears in fig. 2 that the strongest winds are weaker in the present day storms – could the authors also comment on this please as it somewhat disagrees with the "higher intensity" message trying to be communicated.
We agree that looking at the cyclone eye the wind speed is lower but considering that there is a change in the track of the cyclone we can see spreader effects of the wind speed (as expected). Indeed, our results suggest that wind speed variations are broader over the domain, especially in the southern part.

0.7

L199 – the more "extensive regions" of strong winds is in agreement with findings of windstorm footprints being larger in a warmer climate (see recent papers by Dolores-Tesillos et al., 2022 (https://doi.org/10.5194/wcd-3-429-2022) and Priestley et al., 2024 (https://doi.org/10.1002/qj.4849)) and should be discussed.
We thank the reviewer for this suggestion. We have incorporated this evidence in the revised manuscript. Specifically, we now discuss the agreement of our findings with the literature, highlighting the expansion of windstorm footprints in a warmer climate, as documented by Priestley et al., 2024 and Dolores-Tesillos et al., 2022.

0.8

L219-220 – there is some disagreement as the SLP centre appears deeper in Figure A2. Please discuss this and ensure that the stages of the timeline that you say are actually consistent.
We thank the reviewer for the observation. We would like to clarify that the cyclone time selected for the analysis of Storm Eunice corresponds to the time-step when the SLP reached a minimum over the British Islands region. In fact, as stated in LL 172-73, "As our focus is on impacts on airports disruptions, we have selected the British Islands as the spatial domain for the attribution analysis, given the

significant disruptions experienced in this region". However, we acknowledge that that lower SLP values may have occurred over other regions during the development of the cyclone.

0.9

L246 – storm Poly occurs in the Summer and yet here you discuss the winter. Are the analogues you have created for a different season as if so I would say this is not comparable. In Figure S6 you have JJAS, so please make sure there is a consistency (I imagine this is just a mis-naming in the main text) and that this is resolved.
We thank the reviewer for the observation. We mis-named in the main text, the considered analogues for Storm Poly are in the summer season, JJAS. We implemented the corrections accordingly.

0.10

L260/261 – As the above comment, please check the seasons and months being quoted as I again assume you mean DJFM?
As the above response, we wrote the wrong names of the months. We corrected figure A8 substituting JJAS with DJFM.

0.11

L277/278 – this widespread increase is not as apparent (or not that strong) in Figure 6 so please make this clear.
We changed the text to make it clearer.

0.12

L303/304 – you state the SLP is shallower in the text so this is not consistent with the increased intensity you quote here. Please be specific about what features you are referring to.
We clarified we refer to wind speed and turbulence in the text.

0.13

L322-324 - This argument I have difficulty with. There is still internal variability in the different states of the large-scale modes that could be causing this variation. The risk in the same NAO state can vary quite substantially. A good focus of this work needs to be on the fact that there is lots of internal variability, and even though these storms are getting more intense, the changes in track or location are likely to be as much of a contributor to change in risk as global warming.
We acknowledge that internal variability within each phase of the large-scale modes (e.g., NAO) can play a role in modulating storm

behaviour and associated risks. While our results suggest that anthropogenic climate change is the dominant driver behind the observed changes, we agree that variations in storm tracks or locations—even within the same phase of a given mode—can significantly influence risk. We clarified this point in the revised manuscript.