

# ***Interactive comment on “Improving our understanding of wind extremes from Bangladesh tropical cyclones: insights from a high-resolution convection-permitting numerical model” by Hamish Steptoe and Theo Economou***

## **Anonymous Referee #1**

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### General comments

The authors present maps of exceedance intervals of extreme wind in Bangladesh, created using 9 ensemble members of 12 historic tropical cyclones. These maps are very clear and highlight the substantial risk facing north-western provinces, far away from the coast. Using return periods makes this study easy to interpret in the hazard risk community, where there is a lot of uncertainty around tropical cyclone risk. The authors use a novel tool of generalized additive models to condense 9 ensemble members into a coherent spatial summary. The authors pose an interesting scientific

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question and show results that should be of interest to a wide and diversified audience.

This paper is very well written, and the figures are relevant and discussed appropriately in the results. The method comprehensive and clear, with mathematical formulae well defined. The technical aspects of the paper are handled well and should be understandable by fellow scientists. There is a detailed limitations section, which describes the problems with using model data and its availability.

This paper is a good length with no need for supplementary material. The references are accessible and sufficient in number, although Hersbach (2020) should be cited for ERA5.

The author gives proper credit to their contribution and that of the co-author (Line 235). The authors also include data analysis code and data availability statement.

The key conclusion is that “some northern provinces, up to 200 km inland, may experience conditions equal to or exceeding a very severe cyclonic storm event with a likelihood equal to coastal regions less than 50 km inland.” The authors use sufficient data to come to these conclusions, with 12 historic storms and 9 ensemble members. Such a statement is important for disaster risk reduction.

#### Specific comments

Is it possible to remain consistent in the units? Figures 1, 3, and 5 use m/s, Figure 4 uses knots, and Table 1 uses km/h.

The title could be made more relevant, mentioning return periods / exceedance probability, and the generalized additive model, e.g. The use of generalised additive models to examine extreme wind return periods from tropical cyclones in Bangladesh.

#### Technical corrections

Space between: 4.4 km

Line 66: Add 9-member: “generate 9-member ensemble simulations of 12 historical

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tropical cyclone”

Line 40: Change ‘course’ to ‘coarse’

Line 58: Change ‘combe’ to ‘comb’

Line 194: Include in brackets what the resolution of ERA5 is, as low for this study but not low in comparison to other reanalysis products. “Given the relatively low ERA5 resolution (x)”

Lines 210-211: Add a citation following this statement: “current generation weather forecast models are capable of accurately predicting the landfall location and track of tropical cyclones in the BoB many days in advance.”

Line 141: Change ‘of high wind speed’ to ‘to high wind speed’.

Note in the figures that the town labels are the 18 most populated.

Town names difficult to see in some of the figures.

Figure 2 caption: Change from “of (Augustin et al., 2012)” to “of Augustin et al. (2012)”

Figure 3: Superscript -1 for the units. Also change ‘outlines’ to ‘outlined’.

Table 1: Change ‘define’ to ‘defined’.

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