

“A climatological characterization of North Atlantic winter jet streaks and their extremes”

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1 | METHODS AND DATA

L128–130: This is a very minor comment, but I believe lambda is often used for longitude and phi for latitude in many studies/textbooks. Consider switching conventions here to potentially avoid confusion.

Thank you for this comment. We adopted the suggestion.

L137-141: I might have missed it earlier, so apologies if I did, but this might be a good place to list the horizontal range of latitudes and longitudes that bound the North Atlantic domain considered in this study.

Thanks for that hint, we included the domain boundaries in this sentence, which now reads

If the wind speed maximum is positioned close to ($\pm 2.5^\circ E$) the boundary of the North Atlantic domain (defined as $100^\circ W-0^\circ E \times 20^\circ N-75^\circ N$ in this study), we compute the central longitude at this distance to the domain boundary.

2 | RESULTS

Manuscript wide: There are a few instances in which the counts of events are labeled inconsistently. For example, much of the manuscript refers to 1050 jet streak events but the caption for Fig. A1 mentions 1065 jet streaks. I recommend closely reviewing the manuscript prior to acceptance to make sure the sizes of subsets are consistently identified to avoid potential confusion. A similar recommendation also applies to figure captions both in the manuscript and appendices.

Thank you for pointing this out again and sorry for possible confusion in the read. We went through the manuscript again to check for all the mentions of jet streak counts in different categories as well as other numeric results. The resulting changes are best viewed in the \LaTeX -diff document.

L342: If the value of this correlation is known, it might be worth including it as part of this sentence.

Good point. We added the value and the line now reads:

We also observe a correlation of 0.56 between the mean and maximum peak jet streak intensity.

L418: It doesn't seem as if there are any red contours in Fig. 12. Consider a revision to this part of the text, accordingly

True, we corrected the 'red' to 'purple', such that the sentence now reads:

Despite the northeastward propagation of jet streaks during their life cycle, the averaged wind speed and PV exhibit minimal change during the four stages of a jet streak life cycle (grey and purple contours in Figs. 12 a–d).

L533: The parenthetical reference refers to four rows, but it appears there are only two rows within Fig. 16. Consider a revision accordingly.

Thank you, rows and columns were mixed up here, we corrected this.

3 | CONCLUSIONS AND OUTLOOK

L626: Consider swapping the order of the discussion here, since the first cluster in the figures corresponds to anticyclonic wavebreaking and the second cluster corresponds to the zonally oriented jet.

Thank you for this valuable suggestion, which was adopted (see \LaTeX -diff for changes).

L639: Should “southwest” be “southeast” here when describing the position of the surface anticyclone relative to the jet streak?

Correct, we changed that accordingly (See \LaTeX -diff for changes).

4 | APPENDIX

L718: It appears based off Fig. D1, that jet streaks that emerge directly after one that precedes it are shorter in length compared to those with a longer time between jet streaks. Consider a revision to the text accordingly.

Thanks for pointing this out, it is corrected in the new version of the manuscript.

5 | FIGURES AND TABLES

Fig. 1: I might have missed it, but I think a label for the dashed black contours in panels (b) and (c) might be missing from the caption. I'm assuming these contours are just illustrative isentropes.

Yes correct, thanks for pointing this omission out to us. We added a description to the caption now.

Fig. 14: The percentages listed in the caption for the time of genesis do not seem to match with those listed in the figure.

Yes, this is corrected now.

Fig. 18: The caption mentions the WCB outflow frequency is shown at 500 hPa, but the text references 400 hPa. Consider a revision accordingly for consistency.

Yes, the 400 hPa are correct. The new manuscript has this correct now, in all captions

Table 1: Should significance based on the bootstrap resamples be highlighted in the table? If not, I'm unclear how the bootstrapping approach relates to the definitions of the percentiles and standard deviation.

You are right that this was unclear. We added more explanation to the caption and added the standard deviation of the means and standard deviations for all subsets now, to give the table more substance.

Table 2: The example numbers provided in the caption do not match those listed in the table for Cluster 1. Also consider mentioning what the red text in the table corresponds to.

Thanks for pointing this out, it is corrected now. Also, we mention the meaning of the highlighting (now by using bold text) for clusters 1, 4, and 5 in the caption:

The clusters with a bold font are those with a SW-to-NE orientation and composites showing anticyclonic wavebreaking at time of peak jet streak intensity.

Fig. B1: Does the shading correspond to just the spatial PDF for extreme jet streak and are the contours associated with all jet streaks in the category? If so, consider adding more detail to the caption, accordingly. If not, why is the shading so much farther north than the composite wind speeds for the S-regime?

There was an error in the implementation of this figure. We corrected that and the correct version of the figure is included in the new version of the manuscript.

Fig. B2: The labeling of panels in this figure appears to be inconsistent with that in the text.

Yes, that is corrected now.

Fig. C1: It doesn't appear there are any black contours, as mentioned in the caption, but there are red contours.

Yes, that is corrected now.

Figs. G*: Looks like the 2 PVU contour is black rather than red, as indicated in the caption. The top left panel for G1 features different conventions compared to all other plots. It might be worth including a note for cluster 3 as to why no values are plotted for that cluster so that a reader isn't left wondering why.

We assume you refer to Figure G6. First, we corrected the PV contour description, thank you for pointing this out. Panel (a) was simply a mistake, we swapped it to contain the correct figure now.

Concerning the non-extreme cases in cluster 3, we added the following sentence to make things more clear:

Note that the lack of colors in Figs. (i) and (k) is not a mistake. Rather, there are no grid points with more than 10% WCB

outflow frequency on 400 hPa for non-extreme jet streaks in cluster 3.

Thank you again for being so careful and constructive in the review. Your comments greatly improved the quality of analysis and clarity of the manuscript.

REFERENCES