Reviewer Response 'Minimal influence of future Arctic sea ice loss on North Atlantic jet stream morphology' submitted to Weather and Climate Dynamics

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We thank the Editor for taking the time to consider our replies and for providing this additional feedback. Comments are in black and author responses are in blue.

Editor Comments

Thank you for responding to my comments. I'd like to further clarify whether you tested the sensitivity of the wind response to the latitudes used to calculate the temperature gradient. Specifically, you used the difference between 20–30°N and 40–50°N. I assume these latitudes were chosen because the strongest wind increase occurred between 30-40°N, even though these latitudes were less impacted by the changes in sea ice conditions (as shown in Fig. R1). Did you also examine latitudes further north, particularly around 60°N, where the largest wind decrease on the poleward side of the jet is observed? Perhaps that can be better explained by the sea ice change.

Yes, we examined the wind response near 60°N using a high latitude temperature gradient calculated as the temperature difference between 44-54°N and 64-74°N. These regions were chosen to coincide with the high latitude node of the zonal wind response index used in Figure 2 of the manuscript. However, there is also no relationship between the high latitude temperature gradient and the wind response at 500, 700 and 850 hPa (Figure R1) suggesting remote influences must dominate the wind response in this region.

While, as you mentioned in the paper, the wind speed in the core of the jet showed minimal changes, I believe the weakening (strengthening) of wind speed on the poleward (equatorward) flank of the jet is important, particularly for regional climates. Given that it is a fairly robust signal across the models as can be seen in Fig. 3 and 4, it might be worth highlighting this more in the paper (e.g., by mentioning that in the abstract).

We agree that these changes in the zonal mean wind should be better highlighted in the manuscript. Following the Editor's suggestion, we have added the following sentence to the abstract:
"Four of six models show a significant weakening of the westerlies on the poleward side of the North Atlantic jet and a strengthening on the equatorward side. However, there is no change in jet speed

and jet tilt across all models and no robust change in jet mass (area-weighted speed) when using the feature-based jet identification."

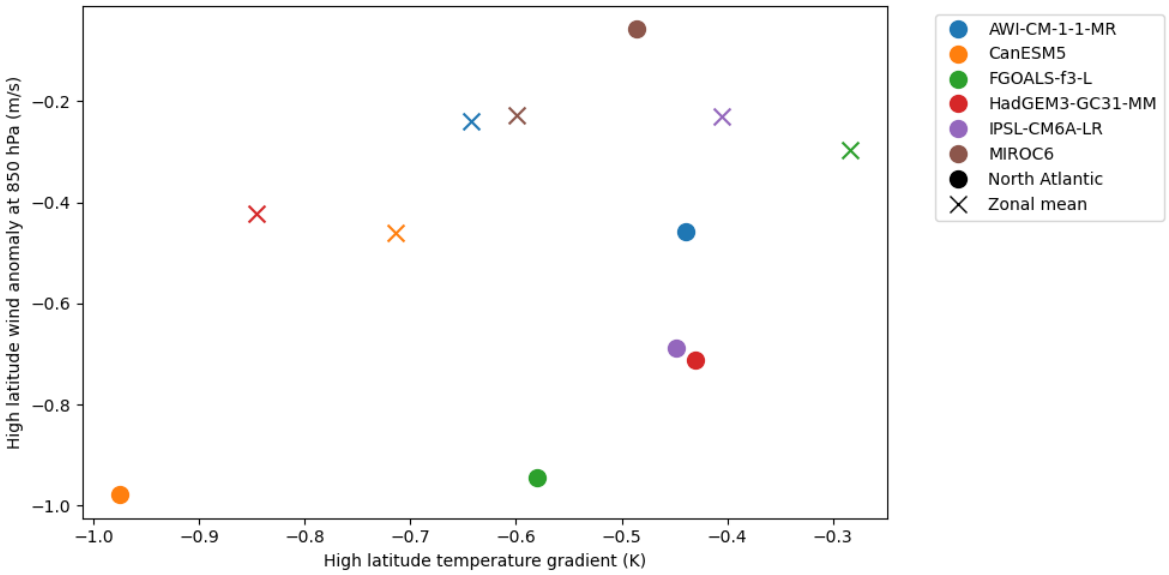

Figure R1: Relationship between high latitude temperature gradient change and high latitude wind response at 850 hPa due to future sea ice loss. Dots show the response in the North Atlantic sector and crosses show the zonal mean. Neither set of points show a significant inter-model correlation.