Public justification (visible to the public if the article is accepted and published):
I thank the authors for their responses to my comments.

Regarding point 1, I think a strong seasonal cycle poses a problem to correlation analysis that is similar to a case when time series have trends - if two timeseries trend, they will always be correlated even if there is no link between them. Therefore, I insist on removing the seasonal cycle to say that the intensity of the STJ impacts the intensity of COLs. The next question is then why COLs' intensity has a strong seasonal cycle, similar to the STJ? I think this is an interesting question that is worth a discussion in the paper. If you still want to propose that the seasonality in the STJ leads to seasonality in COLs' intensity, then this relationship should be explained.

Authors' response:

We have revised the paper and explored various approaches to address the seasonal cycle and its impact on the relationship between the subtropical jet and COL intensity. These approaches include calculating correlations for each month separately and removing the seasonal cycle and any trend using seasonal differencing on the subtropical jet intensity time series. However, we found that removing the seasonal cycle weakens the relationship between COL and jet intensity.

While we hypothesize potential mechanisms for COL intensification, such as induced wind shear along the subtropical jet edge, supported by observations of small-scale jet streams equatorward of COLs (Ndarana et al. 2021), further work is required to understand these relationships and the seasonal cycle. This is acknowledged in the revised manuscript.

We moved the scatter plots regarding the relationship between COL and jet intensities to supplementary material, but we discussed on the uncertainty regarding this relationship. Also, we believe that the uncertainty between COL and jet intensities does not invalidate previous findings regarding the relationship between (subtropical and polar) jet intensity and COL variability. Additionally, we included a reference supporting the idea that weaker subtropical jets facilitate COL development due to weaker eddy-mean flow interactions (Nie et al. 2023) and reinforced the distinct roles of both polar front and subtropical jets on the COL development, as discussed in Muñoz et al. (2020).

References

Muñoz, C., Schultz, D., Vaughan, G.: A midlatitude climatology and interannual variability of 200-and 500-hPa cut-off lows. Journal of Climate, 33, 2201-2222, 2020.

Ndarana, T., Rammopo, T. S., Bopape, M. J., Reason, C. J., and Chikoore, H.: Downstream development during South African cut-off low pressure systems, Atmospheric Research, 249, 105315, doi:10.1016/j.atmosres.2020.105315, 2021.

Nie, Y., Wu, J., Zuo, J., Ren, H. L., Scaife, A. A., Dunstone, N., & Hardiman, S. C.: Subseasonal prediction of early-summer Northeast Asian cut-off lows by BCC-CSM2-HR and GloSea5. Advances in Atmospheric Sciences, 40, 2127-2134, 2023.

To point 2, I appreciate the complexity and ambiguity of polar jet identification, but I am still concerned about why the wind speed is averaged on the poleward side of the polar jet located at 52S. To my knowledge, Bals-Elsholz et al. (2001) explored the split jet regime around New Zealand, where the polar jet is shifted poleward, however, in other regions its location would be closer to 50S (Simpson et al 2020). If you believe that 50-65S is the true location of the polar jet, it should be better justified (by analysis).

Authors' response:

We appreciate the editor's point regarding the need to address the zonal variation in the polar front jet. As shown in the figure below, the seasonally averaged zonal wind at 300 hPa reveals a clear shift in the polar front jet core's latitude. While it is located around 45-50°S across the South Atlantic and South Indian Oceans, it migrates poleward to around 60°S in the Australian region. To address this important aspect, we have included a sentence in the revised manuscript that justifies our chosen latitudinal range for the analysis. Thank you for helping us improve the methodological clarity of our work.

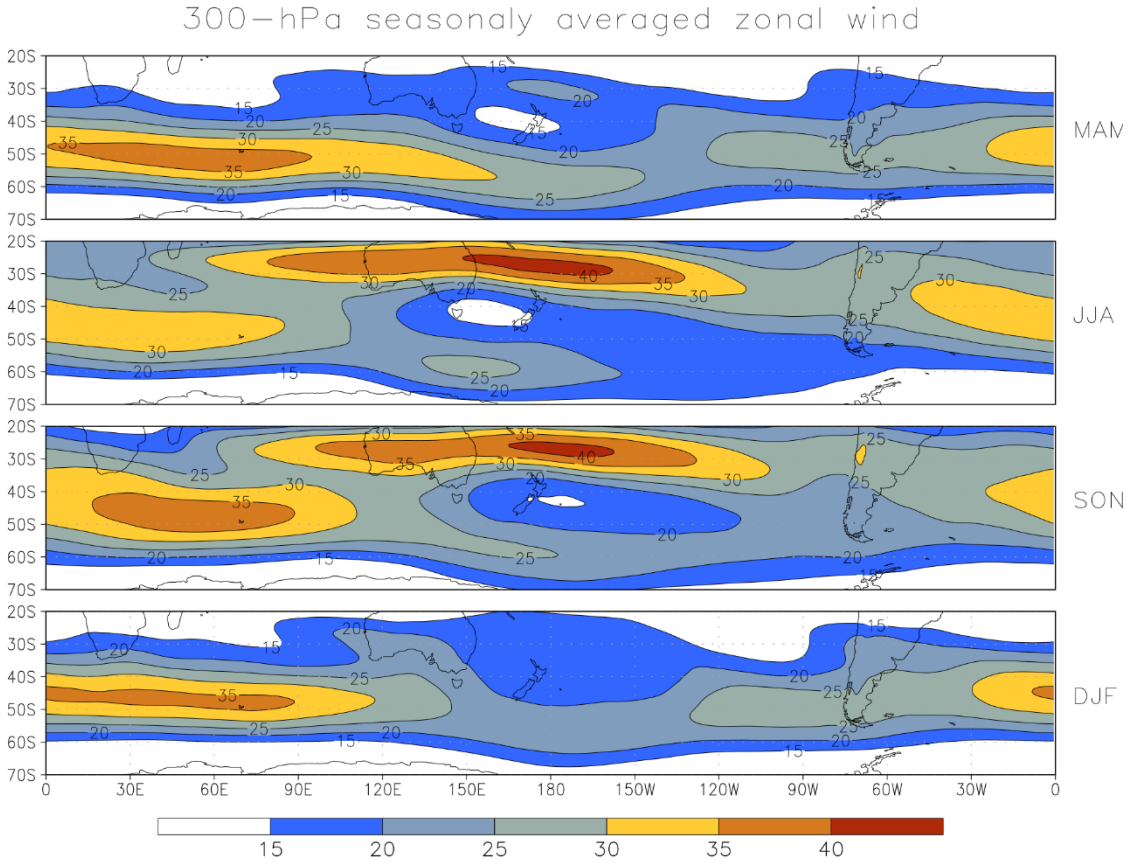

Figure: 300-hPa zonal mean wind in the Southern Hemisphere for Autumn (MAM), Winter (JJA), Spring (SON) and Summer (DJF). Zonal winds are plotted above 25 $m.s^{-1}$ for 5 $m.s^{-1}$ contour intervals.