

Weather Clim. Dynam. Discuss., referee comment RC1
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Comment on wcd-2022-59

Anonymous Referee #1

Referee comment on "Transient anticyclonic eddies and their relationship to atmospheric block persistence" by Charlie C. Suijters et al., Weather Clim. Dynam. Discuss.,
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This work focuses on the contribution of anticyclonic eddies to the maintenance of blocks, more particularly it investigates the relationship between anticyclonic eddies strength, zonal and meridional velocities, and the blocking persistence. Blocking events occurring in two areas of the Northern Hemisphere (the North Pacific and the North Atlantic/western Europe area) and during four seasons are studied here. The method used here to detect both the anticyclonic eddies and blocks is interesting. The science is sound; the article is well written and the figures and tables are clear. I have two major comments on this paper and a few minor comments.

Major comments:

- First, this paper is quite long for the number of results discussed here. I wonder if the authors could remove or shorten some sections:
 - Section 4.1 is a bit long as the result are very similar to previous studies. Figure 4 could be moved to the appendix and summarized in a couple of sentences.
 - Section 4.2 could also be summarized and merged with section 5.1. In addition, the values shown in Tables 1, 2 and 3 could be directly added on the figures to shorten the paper.
 - The curves shown in Figure 7 could be directly added on Figures 8 and 9 to remove Figure 7. Also, Figure 9 could be move to the Appendix as it does not show strong differences between the shortest 25% and longest 25% of blocks.

- Second, the paper is quite descriptive and does not address the dynamics behind the relationship between anticyclonic eddies and blocks as could be thought after reading the introduction (e.g. lines 57-60 or lines 78-81) or the title. It does not show how these anticyclonic eddies dynamically contribute to the persistence of blocks. The space gained by summarizing some sections as suggested above could be used by the authors to develop more the dynamics behind this relation.

Minor comments:

- Please, give more details in the Appendix on how the anticyclonic eddies are tracked.
- Line 112: Do you mean the monthly deviation from the zonal mean Z500?
- Figure 3: Could you plot the continent lines in a distinct colour to separate it better from the geopotential anomaly contours. In addition, maybe you should plot only the "ongoing" tracks to make the figure cleared?
- Figure 5: why do you show the blocks lasting less than 5 days?
- Figure 5: Could you add in the figure the number of blocks in each area and season (as shown in Table 1)?
- Lines 220-230: Could you add the values of the different percentiles in Figure 5?
- Line 252-256: could you add the number of eddies in parenthesis as done in lines 250-251?
- Figure 6: the colour of the dot plotted behind is not visible. Could the authors plot the relation between persistence and number of eddies in another panel? Or plot in another way the number of anticyclonic eddies
- Line 271: what is the duration of the anticyclonic eddies?
- In Figures 7, 8 and 9, there is no separation between the through and absorbed eddies?
- Figures 8 and 9: could you plot the shortest 50% of blocks and the longest 50% in a distinct colour to better differentiate the standard error.
- Line 335: replace "Selective Absorption Mechanism" by "SAM".