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A Climatological Perspective on Cyclones and Surface Impacts in the Eastern Mediterranean Using Potential Vorticity-Based Classification

Reviewer Decision

The manuscript should be accepted subject to technical revisions.

Reviewer Summary/Narrative

I would like to thank the authors for their thoughtfulness and thoroughness while replying to the reviewers' comments. The effort put into these changes strengthened the science and flow of this manuscript. I appreciate the increased clarity of the SOM description and improved consistency of diction throughout the manuscript. Additionally, I appreciated the increased discussion of moisture, forcing for ascent, and precipitation. My only larger concern is about the calculation of the 10-m wind speed plots and whether they can/should be normalized. See my questions in the next section below.

I recommend this manuscript be accepted subject to technical revisions. See specific comments below.

Specific Minor Comments and Line-by-line Edits

L115: remove "fractions"

L142-145: This text can be removed. This is excellent justification for a reviewer comment, but an example is not needed in the manuscript text and breaks up the flow of the section.

L149: Choose a different phrase for "reference vector" since that wording is not used earlier in this section. Perhaps something like "…)) by matching the EMC's PV structure to the most similar SOM cluster PV structures."

L158-166: Replace "cyclones" with "EMCs" and ensure consistency throughout the manuscript.

L166: Add (N=#) for how many explosive EMCs.

L178: Replace "rainy season" to be consistent with Reviewer 1's comments and the rest of the manuscript.

Figure 1 caption: Replace "the fitlm function in MATLAB" with "a linear regression model." The exact coding function details are not necessary unless it is a function that is not commonly used or has specific quirks.

L193: Replace "south-west-to-north-east-tilted" with "positively" to be consistent with other synoptic studies. Replace other instances throughout the manuscript as well.

L208: Replace “cyclones” with “EMCs” and ensure consistency throughout the manuscript.

L208: List the number of explosive EMCs or please add that earlier in the manuscript.

L209: Elaborate concisely and describe what “these types” are

Figure 2: The magenta dots and blue diamonds are quite difficult to see. Is it possible to change their color and/or make them different shapes? I am specifically having difficulty with the magenta dots overlapping with he magenta PVU contours in Cluster 3.

Figure 2 caption: Replace all instances of “cyclone” with “EMC” and this black dots are “stippling” not “hatching”

L222: “accounts for” doesn’t seem to convey what is trying to be communicated here. Perhaps replace with “occurs most frequently in the months…”

L226: insert “EMC” before “PV patterns”

Figure 3 caption: remove “up”

L233, L236: add “hr” units for the time duration – thank you for including this in the manuscript!

L235: Describe geographically where they are stationary in the domain.

L237: “Intense” in what aspect? Wind and pressure?

L240, L244: add duration in parentheses to be consistent with the earlier part of the section. Throughout this entire section you could also add the deepening rate in parentheses as well.

L262: Remove “in the northern part of the domain” because “south of Turkey” is a more descriptive location

L264: Geographically describe the “southern areas” and you could include the values in parentheses after saying “less intense” to support this statement.

L272-275: Excellent additions!!

L283: Replace “the results reveal” with “Figure 5 reveals” and remove the figure reference at the end of the sentence.

L289: “situation” is not a very scientific term, recommend replacing

L292-293: Insert parentheses around Ravel-Rubin and Wernli 2015 citation

L293: insert comma after “Mediterranean”

L295-296: Explicitly state where geographically instead of “southern and eastern parts of the domain”

L297-298: Great addition!

L301: “the results” … specify what results

L304: “southern part of the domain” … specify geographically, also why is this colored white in Figure 5 when there is no white in the colorbar?

L310: What about moisture in addition the PV?

L317: Replace “south-west-to-north-east-tilted” with “positively” to be consistent with other synoptic studies. Replace other instances throughout the manuscript as well.

Figure 6: Replace bottom axis of rightmost figure with “ERA5 Precipitation per EMC (mm/24hr)” for clarity. Also, I think you cold remove the “b” points from the figure since they are not really discussed in the manuscript.

L382: The addition of the surface winds is really great! I think adding in a transition sentence at the start of section 3.6 would improve the flow of the manuscript.

L396: Specify which “coast”

L398: Insert “of 10-m wind speed” after “patterns”

Figure 8: add label for colorbar even if dimensionless. What time of the EMC life cycle is this composite? Negative values should still be added to the colorbar (even if white). What does the distribution look like for the climatological wind speeds? Is the distribution normal? Otherwise, you cannot do this. Why not just do an average anomaly? If you want to see what the average anomalies are significant, then perhaps just do bootstrapping and add stippling. The legend for the wind vector should be moved outside of the plot to not cover the high wind data.

L407: Replace “We here” with “In this section, we …”

Figure 9: replace “cyclones” with “EMCs”

L426: Is the 1 standard deviation change “extreme” for these storms? Also, perhaps add “…wind anomalies out of all EMCs.”

L460-462: Nice addition.

Figure 10 caption: “PVU surface (shading) and SLP (dashed lines)”