Review of *A Climatological Perspective on Cyclones and Surface Impacts in the Eastern Mediterranean Using Potential Vorticity-Based Classification* by Gens et al.

In this work, Eastern Mediterranean cyclones are separated into six classes based on their upper-level PV patterns over the region. The resulting classes reveal a clear link between upper-level dynamics, seasonality, and cyclone impacts in terms of mean and extreme precipitation and temperature. The study presents a novel and useful categorisation of Eastern Mediterranean cyclones, is well constructed, and is firmly grounded in the existing literature on the topic. I recommend publication in *Weather and Climate Dynamics* after the following minor revisions are addressed.

General Comments

Abstract: The abstract would benefit from shortening and simplification. It is relatively long and contains several lengthy, at times convoluted, sentences that could be improved in terms of clarity and readability.

Figure 6: I question the analysis of extremes based on precipitation accumulated and then averaged over such a wide region. In particular when convection plays a role, local precipitation totals can be very high despite relatively modest values of spatial averages over the entire domain. A discussion of this limitation, or an alternative metric that better captures local extremes, would strengthen the analysis. For example, I would suggest applying a similar analysis as this to ERA5 precipitation data, taken by grid-point or aggregated over small (land) regions.

Figure 7 : What is the range of top values in the different stations ? You hint to this in the text in lines 330, but I would appreciated a few more details about the distribution. Also, could you compare these results with a similar analysis applied to ERA5 precipitation data ?

Specific comments

Line 33 : « high » instead of « tremendous ». Generally, I would recommend to limit the use of the word « tremendous » in a scientific context.

Line 39 : You can add ref to Chiericoni et al. 2025 [1].

Lines 93-101 : I suggest using present tense, as in the rest of the manuscript.

Line 100 : « outside the 5th or 95th percentile range ».

Line 135 : Is the choice of six clusters subjectively based on the clustering outcome, or is it based on some metrics as in Givon et al. 2024 (described in Appendix A) ?

Line 164 : I understand what you mean with this sentence, but I find the term « rainy seasons » confusing. Consider rephrasing with the following : « The analysis uses annual periods running from 1 August to 31 July instead of calendar years. »

Line 175 : I would suggest « support » instead of « substantiate ».

Line 244 : You can refer to [2] to support your statement.

Lines 277-278: Portal et al. 2025, Figure S4 also shows that lightning frequency (i.e., a proxy of deep convection) conditioned on the presence of cyclones is high in the north-eastern Mediterranean in winter. This agrees with the findings described in the following sentence (lines 278-280).

Line 298 : I would suggest replacing « a trough extending westward » with « a south-west–to–north-east–tilted trough ».

Line 303 : Remove « however ».

Line 390-392 : I suggest the use of present tense.

References

[1] Chericoni, M., Fosser, G., Flaounas, E. *et al.* Unravelling drivers of the future Mediterranean precipitation paradox during cyclones. *npj Clim Atmos Sci* **8**, 260 (2025). https://doi.org/10.1038/s41612-025-01121-w

[2] Lavers, D. A., Simmons, A., Vamborg, F., and Rodwell, M. J.: An evaluation of ERA5 precipitation for climate monitoring, Q. J. Roy. Meteorol. Soc., 148, 3152–3165, 2022.