Review of EGUsphere-2026-5422

The manuscript describes the characteristics of non-typhoon MCSs over southern China, using 1 km, 6-minute radar data and ERA5. The observations are used to improve the understanding of MCSs forming in two regions, S-GX and the PRD. The manuscript contributes to a better understanding of MCS formation in southern China during the post-flood rainy season. However, some parts of the manuscript would benefit from more detailed explanations and discussion of the findings. After these revisions, the paper would be suitable for publication in NHESS.

In general, in addition to the comments from the other referees, I believe the study would benefit from (1) a discussion of the limitations of the observational methods and variability within the study period. The manuscript does not make clear how the four study years relate to the mean climate or how they are influenced by multi-year climate variability. (2) The results could be strengthened through comparisons with previous studies on related topics and a discussion of uncertainties.

The following points should also be considered.

Major comments:

1. **Section 2.2, MCS identification and tracking:** To help readers understand the full MCS identification process, this section should be expanded. It states that MCSs are identified using a combination of objective criteria and manual inspection. The objective criteria are then described, but no information is provided about how manual inspection was used to identify non-TC MCSs.
2. **Section 2.3, Selection of similar synoptic pattern days:** If I understand correctly, you use 62 MCS days and 56 MCSs for the remainder of the analysis. It would be informative to show or describe the circulation patterns on MCS days, non-MCS days, and excluded non-MCS days without a matching circulation pattern, either here or in the results section. This would give readers direct insight into the circulations that favor MCS formation and could strengthen the later analysis of environmental conditions.
3. **Results:** In general, the results would benefit from a more detailed characterization of MCSs across the two regions and four years. The manuscript would be strengthened by (1) describing the differences in MCS characteristics between the two regions, including, for example, track duration, size, and precipitation rate or amount; and (2) discussing whether there are substantial differences among the four study years.
4. **Line 197:** “In contrast, MCSs over S-GX exhibit a bimodal diurnal distribution, with a peak from midnight to early morning and a peak in the afternoon.” This

suggests against the statement in both the abstract and conclusion that in the S-GX region both nocturnal and daytime formation are important.

5. **Figure 5:** In addition to the differences between mean MCS and non-MCS conditions, there appears to be considerable day-to-day variation, as indicated by the shaded area. This variation is not considered in the results, even though it appears substantial.
6. **Section beginning at Line 289:** The description could be more complete. It currently focuses on stronger convergence below 900 hPa (Fig. 8b) and increased ascending motion at approximately 900–600 hPa (Fig. 8d) but does not discuss differences at the other heights in the vertical profiles. The differences between the two regions (Figs. 8a–d and 8e–h) are also not clearly described.

Minor comments:

1. **Line 59:** The warm season is defined as April to September (Lines 37–38), but the months of the South China Dragon Boat Rainy Season should also be specified.
2. **Line 130:** "The present study focuses exclusively on non-TC MCSs, of which 72 were identified during the study period." Does this mean that all results are based on these 72 MCSs? The abstract seems to indicate that the study is based on 123 systems.
3. **Figure 1:** It would be informative to highlight the S-GX region as well as the PRD. This would clarify the locations of both study regions at the beginning of the manuscript.
4. **Figure 3:** The study region shown here differs from the one indicated in Figure 2c. Please use a consistent definition of the study region.
5. **Figure 4:** For easier interpretation, consider adding the non-MCS-day conditions as well. This would give the figure a structure similar to Figure 7 and would save readers from having to reconstruct the conditions from the differences between MCS and non-MCS days.
6. **Line 294:** Consider reporting the standard deviation alongside the mean values to illustrate the observed variability. The same applies to other mean values reported throughout the manuscript.
7. **Line 305:** It would be informative to report the mean CAPE values for both regions, regardless of MCS occurrence.
8. **Line 312:** The sentence "Combined with the afternoon peak of PRD MCS formation (Fig. 3), these characteristics suggest that PRD MCSs are more strongly influenced by local thermodynamic processes, including daytime boundary-layer heating and mesoscale thermal circulations" appears twice.

9. **Figure 9:** I believe that the S-GX and PRD MCS days are indicated as “left MCS” and “right MCS,” respectively, but these terms are not defined. Please clarify their meaning.