**Reviewer #3**

This article provides an excellent work on local to large scale interaction of meteorological parameters for precipitation. It well defines the mesoscale and isolated convective systems over southeastern Texas region. There are some minor revisions needed before acceptance of the manuscript.

We thank the reviewer for their thoughtful and constructive comments and suggestions, which has substantially improved the quality of the manuscript. We have addressed all the reviewer's concerns and revised the manuscript accordingly. Our point-by-point responses are in blue and the modifications to the manuscript are quoted in green.

1. In introduction, provide more detailed description of local scale features and precipitation over Texas region.

The following paragraph has been added to the introduction:

*Southeastern Texas is characterized by high annual precipitation, attributable to its abundant moisture from the Gulf of Mexico, with significant seasonal variation (Statkewicz et al., 2021). This area is prone to intense summer convection storms, driven by sea breeze and daytime surface heating, as well as the impacts of tropical cyclones during the hurricane season (Caicedo et al., 2019; Darby, 2005). The winter season is typically marked by rainfall from cold fronts, while spring can see severe weather events like thunderstorms and occasionally tornadoes (Prat and Nelson, 2014). Nocturnal thunderstorms are common due to the warm, moist air transported by the GPLLJ from the Gulf (Berg et al., 2015; Day et al., 2010). Meanwhile, urban development in Houston metropolitan exacerbates flooding risks by reducing natural land absorption capacity (Van Oldenborgh et al., 2017; Chang et al., 2007; Burian and Shepherd, 2005). Precipitation patterns are influenced by both large-scale and local factors such as urbanization and sea breezes.*

2. Line number 44: "four large-scale meteorological patterns…...". What are these four? Please explain.

The four large-scale meteorological patterns identified in Wang et al. (2022) are pre-trough, post-trough, anticyclone, and transitional regimes. It has been clarified in the revised manuscript.

3. What is the reason of taking 2004 – 2017 year for analysis?

The convection dataset spans from 2004 to 2017, constrained by the source data availability during the time of dataset creation, which includes Stage IV precipitation data and GridRad (3-D Gridded NEXRAD WSR-88D Radar Data). Although a newer version of GridRad is extended to 2021, it only begins in 2008. We consider the 14-year period is sufficiently long for robust analysis.

4. In Figure 2 and 3, are those days are only precipitation days or all days in each season?

In both figures, the upper panels (a-d) are mean of all hours in each season, while the lower panels are anomalies for the hours only with convective precipitation in the study area.

5. In Figure 4 and 5, provide latitude values along y-axis for a, f, & k subplots, and longitude values along x-axis for q, r, s, & t subplots.

Modified as based on reviewer's suggestion.

6. How have you calculated pre-front, front, and post-front? Is it based on days or hours? Is it depending on any meteorological conditions?

The hourly input vectors (*u*, *v*, and *q*) are clustered into four groups using the SOM technique. The hours assigned to the same SOM type are averaged to produce the four LSMPs, namely pre-front, front, post-front, and anticyclone. In addition to the variables used for SOM clustering, we utilized vertical velocity and surface temperature to help interpret the dynamical processes associated with each LSMP.

7. In Figure 6 and 7, it is better to remove wind vector text near to color bar, as it is confusing. What is the difference between red and black wind vectors?

The "wind vector" text has been removed. We have denoted vectors statistically significant at the 5% level with purple, as determined by the student's t-test (please refer to the caption of Figure 6 for details).