

The manuscript has been improved, but still need further revision to meet the standard of ACP. Some of my concerns were not well addressed.

1. “The number of synoptic patterns (k) is optimized when the ΔECV is at the highest value, which suggests that the performance of classification has been improved substantially and with stability.” The authors presented the explained cluster variances from 4 types to 15 types. How about 2 or 3 types? The results can have a higher increment of the ECV? The highest value of ΔECV is no guarantee of reliable classifications. More in-depth analysis and discussions on the 4-type classification results may be added, as well as its uncertainties and limitations. A specific synoptic pattern can be caused by the seasonal movement of WPSH or the quick pass of a typhoon, which can lead to different atmospheric processes (e.g. precipitation, LLJ, large-scale subsidence) and pollution levels.
2. The detailed descriptions of typhoon-case (Fig. R1 and R2) can be added in the revised manuscript to help readers to understand the sharp movement of WPSH.
3. The ERA5 data were used in this study, but not described in the manuscript. Why not classify the 500-hPa fields of ERA-5, and then carefully analyzed the PBL and precipitation based on the hourly ERA-5 data. How about the consistencies/differences between the ERA-5 data and NCEP data.
4. How many sounding profiles at 08, 14 and 20 BJT were used in this study for each studied city? How to use 08 and 20 LT soundings to estimate the afternoon BLH? Please clarify. In summer, the relationships between BLH and concurring/compound pollution in East China are quite complicated due to the transport of precursors (<https://doi.org/10.1016/j.envpol.2020.115775>). More in-depth analysis/discussion on the PBL-pollution linkage and transport of precursors in East China must be added.
5. Please carefully check the cited papers, some were not properly. For example, the BLH estimation method was actually from the study of Seidel et al. (2012, <https://doi.org/10.1029/2012JD018143>).