**General comments**

The manuscript intends to identify the characteristics of the atmospheric boundary layer structures and their evaluation that are associated with a persistent fog-haze event occurrence in Northeast China. The smoggy atmospheric boundary layer is an interesting topic for both meteorology and air quality studies, and deserves further studies. However, the manuscript is more like a report with general description rather than a research paper, especially the scientific questions of the study are not clear and the study did not provide enough interesting or new results. A deep scientific analysis is lacking. English writing needs significant improvement. I recommend major revisions to address the following comments.

**Specific comments**

1. It is not clear to me what are the scientific questions or objectives of this study. The manuscript provides general descriptions of spatial and temporal variations in several important parameters during the event rather than deep analyses of the reasons causing such changes. The finding and conclusions obtained from the study are not new. Most of them are known even without this study.
2. The study investigated the event for the period from December 16 to December 22. However, the time series shows that the event started from late night of Dec. 18 or early morning on Dec. 19th in Shengyang, and then continued on the following two to three days (Figure 2). It is the same for other three cities. The authors should focus on the period of December 19-21 rather than the whole period of December 16-21.
3. While the authors pointed out the importance of meteorological conditions to the air pollutant concentrations in different cities or regions, anthropogenic emissions could be another important factor causing the regional differences of air pollutants. However, the authors didn’t include the impact of anthropogenic emissions on PM2.5 and PM10 during their discussion.
4. This is a typical case with alternative occurrence of fog and haze. It will be interesting if the authors add some comparisons of the characteristics of the atmospheric boundary layer between fog and haze occurrence days.
5. When the authors present spatial variations in winds and temperature (e.g., see Sections 3.2.1-3.2.3), it would be helpful to link PM2.5 and PM10 with the changes of meteorological variables in the atmospheric boundary layer. I cannot see this linkage in the current submission.
6. Lines 39-41: The ECMWF results (i.e., the prevailing southerly winds) are inconsistent with the back trajectory model (HYSPLIT) results (see Fig.8).
7. Figure 1: two panels can be combined.
8. Several terminology abbreviations are not standard. They include Wind speed (U) and local time (LT).
9. L160-161: are you sure that the resolutions of ECMWF are 0.125° × 0.125°?
10. Lines 187-189: I don’t think the ABLH is defined correctly.
11. L201, HYSPLT has been defined already.
12. L233-235: The sentence needs to be rewritten. In fact, there are many sentences like this. Please do careful check throughout the manuscript.
13. L246-250: SY, AS, FS, BX are not defined in Table 1. In addition, I do not think that Table 1 is necessary since it does not provide enough useful information for the discussion.
14. Figure 3: What data are used for the plotting? This information should be included in the figure caption. Labels of both X- and Y-axis and text size inside the figure are too small.
15. Lines 273-293: The authors divided the event into five periods. How this period definition can be linked with the periods defined in Table 1? For instance, seven periods were defined for the event observed in Shengyang. It is very confused to readers.
16. Again, for the Section 3.2.4, the authors should focus on how the changes of PBLH or ABLH affect the surface PM concentrations rather than the comparison between two different measurements.
17. What is the ending time of these back trajectory analyses which are presented in Section 3.3 and Figure 8?
18. Abstract and conclusions need to be rewritten with more precise language or sentences.
19. The manuscript is not well written. I am going to list all the sentence structure issues and grammar errors here since there are quite lot in the paper. The manuscript needs significant improvement.