

**General Comments:**

Based on the observational dataset of 12 wintertime heavy haze events in Beijing and its surroundings over 2013-2016, this manuscript explored the feedback effects of boundary-layer factors on explosive growth of PM<sub>2.5</sub> during the different stages, including transport, cumulative and convergent explosive growth, presenting some interesting results about meteorological feedback on PM explosive growth during heavy haze pollution, which could improve our understanding on air quality change and fall within the scope of ACP. I suggest the minor revisions before it is published as follows:

**Specific comments:**

1. Airflow from the south of Beijing can transports not only water vapor and pollutants, and also warm air mass to Beijing. Considering the maximum transport layer at ca. 500m, the southerly wind transport could also contribute warm air to the development of temperature inversion. Please discuss this potential contribution to anomalous inversion and PM<sub>2.5</sub> accumulation during TS and CS.
2. Lines 167- 168: the statement: “with the Tai-hang Mountains and the Yan Mountains limiting the invasion of northerly cold air and leading northeast movement of southerly winds” is unreasonable for the boundary-layer analysis in heavy haze events in Beijing. I suggest change it with “with the Tai-hang Mountains and the Yan Mountains strengthening the southwest wind belt and leading the convergence of pollutant transport in Beijing”.
3. Lines 152-153: Please check English grammar.
4. Line 185: Please modify “ The ground exceeds long-wave radiation”
5. Lines 314-315: please delete one repeated “different stages”.