

**Review of**  
**“Multiplatform analysis of upper air haze visibility in downtown**  
**Beijing”**

**General Comments**

This paper presents a comparison between the surface PM<sub>2.5</sub> mass concentration and upper-air visibility (i.e., visibility at 0.1, 0.3, and 0.5 km) during two winter haze episodes that occurred in the northwest part of downtown Beijing. While use of the term “visibility” for altitudes above the surface may be somewhat misleading, the essence of the study is concerned with a very important but rarely studied issue, namely, the vertical variation of aerosol loading, especially the consistency between ground-level and upper-level measurements monitored by a suite of instruments including the lidar, Cimel sunphotometers, PM<sub>2.5</sub> particle samplers, etc. Such analyses are useful towards understanding the source of air pollution and its transport, as well as uncertainties in using ground-based measurements to represent column values or vice versa. The study is generally rigorous and sound. In light of these merits, I recommend publication if the following comments are properly addressed.

### **Specific comments:**

1. Change the title to “Comparison of Air Quality at Different Altitudes from Multi-Platform Measurements in Beijing”.
2. In the abstract, please clarify the altitudes of the upper-air levels under study, the exact research period, and what the haze parameters refer to.
3. None of the AOD observation stations belong to the AERONET whose data is processed and quality-controlled by the NASA AERONET team. The instruments deployed at these stations are the same as AERONET, namely, French-made Cimel sunphotometers. However, the operational mode and retrieval algorithms are not the same as those from the AERONET because different institutions in China are involved.
4. Page 3: The term “data type” is incorrect. Use the term “variables” instead. State the periods of all datasets used here.
5. Page 3: “AOT is classified as vertical haze parameter” is rather misleading because AOT is a column-integrated quantity, i.e., the total loading of aerosols.
6. A description of the algorithm used to retrieve AOD from Raman-Mie lidar signals is needed.
7. The conclusion that “the spatial transport of pollutants has a significant effect on haze parameters” is made. It is unclear how

this conclusion was reached based on the analysis presented.

8. Can you explain why the correlations between surface  $PM_{2.5}$  and visibilities at 0.3 km and 0.5 km are much stronger than the correlation between surface  $PM_{2.5}$  and visibility at 0.1 km?