**Response to RC5**:
This manuscript reports on the molecular-level characterization of primary and secondary constituents in PM2.5 at high-time resolution in Nanjing City, China. Biomass burning (BB) was found to be the most significant contributor to organic carbon (OC). Results are supported by the presented data, and the findings are well contextualized in light of other current source tracking studies. The results are timely and will be of great interest to the readership of Atmospheric Chemistry and Physics.

We appreciate the reviewer's feedback on the manuscript and have carefully reviewed each comment, addressing them individually below while highlighting the changes made in the revised manuscript.

Here are some minor suggestions:
1. Table 1 is too large. Is it possible to move it into the supplementary materials? Maybe the authors could use 1-3 boxplot figures to replace Table 1?
Thanks. Table 1 provides detailed information on various $PM_{2.5}$ components across different haze events. Given its importance, we believe it would be better placed in the main text. Figures 1-4 show the average concentrations of different species during three periods, serving the same purpose as boxplots.

2. Section 2.1: Is there a reason to choose the sampling period from 12/31/2017 to 1/2/2018. This period was the new year holiday but fireworks use was forbidden. Will that impact the conclusion of this paper?
Thank you for your question. The sampling period from 12/31/2017 to 1/2/2018 was chosen to capture data during different haze events for better understanding the haze development in winter in megacities. While fireworks usage was restricted during this period, other sources of pollution were still active. We believe the results remain reliable and valid for the study's conclusions.

3. Nanjing is a megacity in China and the major energy sources are hydropower and power plants. Where did the biomass burning come from? Is it possible to generate a figure, which includes HYSPLIT backward trajectories + FINN fire points?
Although Nanjing relies on various energy sources, biomass burning remains a significant source of pollution especially in the nearby areas. This includes agricultural residue burning, residential wood combustion, and small-scale industrial activities, as Nanjing has many rural areas where biomass fuels are important household energy in stoves for cooking and heating. Besides, long-range transport of air masses could have impacts on local atmospheric compositions as well. Thus, these practices would contribute to atmospheric pollution both in urban and rural areas. It was also reported that domestic biomass burning are highly distributed in Jiangsu (Zhou et al., 2017).
Zhou, Y., Xing, X., Lang, J., Chen, D., Cheng, S., Wei, L., Wei, X., and Liu, C.: A comprehensive biomass burning emission inventory with high spatial and temporal resolution in China,

Atmospheric Chemistry and Physics, 17, 2839–2864, https://doi.org/10.5194/acp-17-2839-2017, 2017.

The HYSPLIT backward trajectories with fire points are added below:

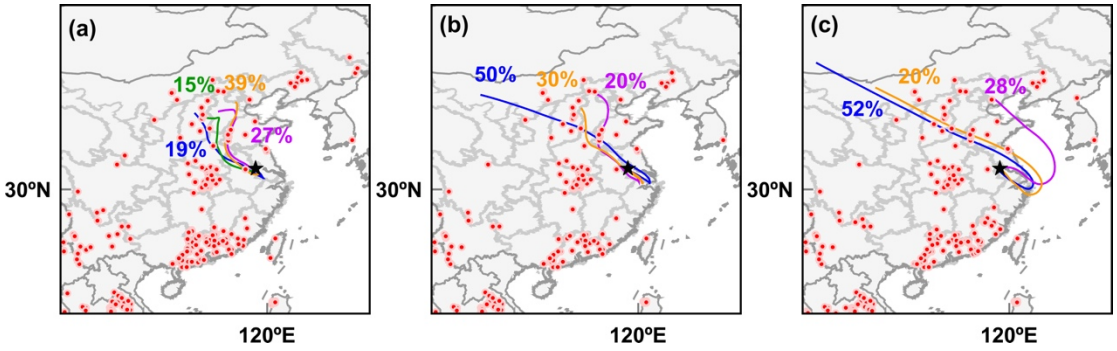


**Figure S1.** Three-day HYSPLIT back trajectories initiated over Nanjing with altitudes below 500 m, along with MODIS fire spots across three episodes with $PM_{2.5}$ concentrations of (a) > 200, (b) 100-200, and (c) < 100 μg $m^{-3}$. The black star indicates the sampling site. MODIS active fire data can be accessed here: https://firms.modaps.eosdis.nasa.gov/download/list.php.

And we also added some description in lines 182-187 in the revised manuscript as below: "MODIS active fire/hotspot products were utilized to evaluate the impact of open biomass burning during the entire sampling period. Based on the backward trajectory analysis, the air masses throughout the sampling period were significantly influenced by biomass burning, as illustrated in Fig. S1. By comparison, the third episode showed a greater influx of clean ocean air masses (Fig. S1c)."