

## ***Interactive comment on “Contrasting sources and processes of particulate species in haze days with low and high relative humidity in winter time Beijing” by Ru-Jin Huang et al.***

### **Anonymous Referee #2**

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This manuscript presents the comparisons of PM<sub>1</sub> species and organic aerosol (OA) sources/processes during winter in Beijing for clean and pollution periods, with a particular focus on the effect of relative humidity (RH) on secondary aerosol formation. The comparisons were made through mass concentration, mass fraction, and growth rate. It is found that OA dominated the PM<sub>1</sub> mass under both low-RH and high-RH pollution conditions. However, sulfate was found to increase during high-RH pollution periods and nitrate increased during low-RH pollution periods. Oxygenated OA (OOA) showed higher growth rate during low-RH pollution period than during high-RH pollution period. These results provide insights into the relative importance of photochemical oxidation vs. aqueous-phase processes for secondary aerosol formation under different meteo-

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rological conditions. It is a useful addition to the literature for understanding the haze formation in Beijing. The manuscript is well written, and results are discussed logically. I recommend publication in ACP after a few minor points are addressed.

(1) In section 2.2.3, organics was not considered in the ALWC calculation using the ISORROPIA-II model. Please provide an explanation.

(2) Page 6, line 203-205, the authors divided the pollution period into low-RH pollution days (RH <50%) and high-RH pollution days (RH >50%). What is the criterion for this definition of low- and high-RH?

(3) Page 8, line 303, change “OOA is correlated well with nitrate (R<sup>2</sup>=0.89). and the diurnal cycle . . . . .” to “OOA is correlated well with nitrate (R<sup>2</sup>=0.89), and the diurnal cycle . . . . .”.

(4) Page 9, line 330-334. “. . . . .We observed a much larger contribution from nitrate during low-RH pollution periods than during high-RH pollution periods. . . . .” This is not well supported as both the mass concentration and fraction of nitrate are similar. Please check it carefully.

(5) In Table 1 and throughout the manuscript, the authors should pay attention to the significant digits which denotes precision of measurements.

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