

Comment on acp-2022-270

Anonymous Referee #1

Referee comment on "Measurement report: On the contribution of long-distance transport to the secondary aerosol formation and aging" by Haobin Zhong et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-270-RC2>, 2022

This study performed in-situ measurements at a regional receptor site with the height of ~200 m above the ground, which locates in the junction of the North China Plain and Fenwei Basin, to investigate the influences of region-to-region transport on aerosol chemical compositions and secondary formations. The authors compared the characteristics of secondary aerosol species among the four transport sectors, finding that long-distance transport largely enhanced the SIA formation, the OA oxidation and aging. The manuscript is generally well written. I recommend for its publication after addressing the following comments:

- Line 31-32, which aspect the MO-OOA played a dominant role in?
- Line 78-79, "we performed a two-months observation", but only one month data points were shown in Figure 1. Please confirm that.
- Line 100, SMPS is the abbreviation of scanning mobility particles sizer, and differential mobility analyzer should be abbreviated as DMA. In addition, the results of SMPS measurements are not given in the manuscript, please clarify it.
- Line 147, "m/z from 1~120" should be from 12~120 $\frac{m}{z}$.
- Line 224, valve?
- Line 219-221, the authors wanted to illustrate the high fraction of sulphate in the BTH transport sector was caused by high concentrations of SO₂ and sulphate in the BTH region, however, the citing reference here can not sufficiently support this conclusion. The more information should be given to prove the higher concentration level of SO₂ and sulphate in the BTH region than other sectors.
- Line 239-241, some recent studies on evolutions of aerosol physicochemical properties during the transport processes, suggesting the mass loss of semi-volatile aerosol species driven by the evaporation process when aerosols are exposed to a cleaner environment, such as "Atmos. Chem. Phys., <https://doi.org/10.5194/acp-21-14749-2021>". It would be suitable to explain the decreased nitrate fraction in the BTH transport pathway.
- Line 265-268. Is the statement here means the LO-OOA at this site were mainly contributed by biogenic VOCs oxidation? Please provide more information to clarify it.