

Interactive comment on “Exploring wintertime regional haze in Northeast China: role of coal and biomass burning” by Jian Zhang et al.

Anonymous Referee #2

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General comment

This manuscript by Zhang et al reports morphology, size, composition, aging process, and sources of aerosol particles from regional hazes in Northeast China, where is heavily polluted and thus globally important area. They classified the haze period into haze-I and II and showed differences in the particle compositions. They focus on individual-particle techniques such as TEM, nano-SIMS, and AFM. The result will be important to understand the haze events in the area and possibly the areas located downwind. The results will contribute to the understanding of aerosol particles in the area or other heavily polluted regions. On the other hand, in the discussion, I would argue another possibility for the particle source in the Haze-I, in addition to the possible local source that the authors discuss in this manuscript. The 24-hour back-trajectories

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in Fig-S4 show possible contributions from the Beijing area during the Haze-I (heavy) period. The air mass with Beijing pollutants seems to be brought by a low-pressure system on November 4-5 (Fig. S3). Then the air mass changed to Northwest with biomass burning pollutants. If this hypothesis is reasonable, the discussion that the changes in particle composition were due to regional atmospheric chemical reactions (line 427-429) needs to be revised. I suggest to consider the possibility and revised the discussion if needed.

Specific comments

Line 32 and 36 (S-OM and K-OM): Spell out.

Line 43-45: grammatically something wrong.

Line 245: Define DT and NT.

Line 364-367: Please see my general comment. It seems to me that the composition change is mainly due to the air mass change rather than a process of secondary sulfate and nitrate formations.

Line 391-392: Please indicate spherical OM and domelike OM in the figure 6 c-d. I found these OM particles in the clean day in figure 6b but not in figure 6 c-d.

Line 405-410 (figure 7 and S4): Are the back trajectories in Fig. 7 and S4 the same? The Fig. 7 suggests local source but the S4 shows long-range transportation (possibly from Beijing area?). Figure S2 also suggests broader regional pollution events on November 4 rather than a local event. Please also see my general comment.

Line 427-429 and line 570-572: This statement also needs to be reconsidered if my general comment is reasonable.

Line 486: This section includes not only Atmospheric implications but also broader discussion such as health issues. Please reconsider the title.

Line 503-526: I do not see spherical and domelike OM particles in Figure 6c-f when

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biomass-burning or coal burning were the dominant sources. Please indicate which particles are spherical and domelike OM particles. When were the particles in Fig 3 collected? The figure shows spherical and domelike OM particles without sampling periods.

Figure 5: Please indicate the Y-axis label on the left.

Table S1: please indicate the error range (or standard deviation).

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