

Interactive comment on “Investigation of aged aerosols in size-resolved Asian dust storm particles transported from Beijing, China to Incheon, Korea using low-Z particle EPMA” by H. Geng et al.

Anonymous Referee #2

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Investigation of aged aerosols in size-resolved Asian dust storm particles transported from Beijing, China to Incheon, Korea using low-Z particle EPMA

Geng et al.,

Study on Asian dust storm is an interesting topic in atmospheric science. In this study, the authors particularly focused on aged mineral dust particles in Beijing (continental site) and Incheon (downwind coastal site). The comparisons show the aging process of mineral dust particles with acidic species. Although a number of studies worked

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on the aged mineral dust, the experiment is very significant because they successfully caught the same dust storm in two sampling site which is far away about 1000 km. However, I cared about some conclusions made without strong evidences in this study. Considering significance of the study, I recommend to have one minor revision before it can be published by ACP.

1. The authors give one conclusion that CaCO_3 can react with HNO_3 and produce the $\text{Ca}(\text{NO}_3)_2$. Reaction of the acidic gases and basic particles make sense. However, the author gave Mg-containing aluminosilicates can produced soluble $\text{Mg}(\text{NO}_3)_2$. It is surprising result however more evidence should be provided. The authors didn't made laboratory experiment and found any literature then gave the conclusion. That's not convincing result. The related discussion can occur in the main text, but if the author make it as one important conclusion, the current elemental information were weak. Otherwise, the author need to give more direct evidences (27982).

2. The authors should consistently use the same term or formation, such as NO_x or nitrogen oxides.

3. 27974, 23-25, why is this sentence here? It is not related this study.

4. 27978, 18, between-among, deleted “or reactions”

5. 27978, 21, English grammar have-had?

6. 27979, 15, elemental carbon (EC) is not suitable here. EC, soot, and BC are different terms based different study methods. EC was normally used by thermo method, soot was used to describe one particle containing black carbon and some organics, and BC was used by optical absorption method. Obviously, soot is the best term if the author identify single particle from their morphology.

7. 27980, 9, between-among

8. 27980, 19, why is Ca^{2+} not Ca?

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9.27984, 19-21, why is mean of this sentence here? The author discuss the coagulation of SSA and mineral dust but not chemical reactions.

10.27985, 4-6, VOCs can condense into organics during the transport. the reason could be explain why the organics was higher in Inchon than Beijing.

11.27985, 22-25, Iron could be from different sources. I believe that iron during dust storm should be from the natural sources.

12.27986, 8, Delete "This is surprising".

13.27986, 17-25, I suggest that the author make short because most are not from this study.

14.27987, 6-10, Sources of biomass burning near Beijing or Incheon. The conclusion could be right, but the result is from this study. The citation most focus on biomass burning in other period. I suggest that the author should delete this part because the whole paper focus mineral dust not biomass burning.

15.27988, 14-16, Should the authors add any reference here?

16.27988, 19-24, Is it right? Why does the author give one absolute conclusion. Yes, I see the table 6. The atomic concentration from the SEM should have a big error on N.

17.27989, 1-4, Please reword this sentence.

18.27989, 11-13, I don't understand this sentence.

In table 3, 5. EC include soot and tar ball? Some study show that tar ball is brown carbon.

6. OC, particle types: liquid droplet or irregular, solid particles. The description can also be used for 7. This is not particle type.

8. Why is not KNO₃?

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