

## Responses to Editor's Comments on Manuscript acp-2017-467

### (Aerosol Surface Area Concentration: a Governing Factor for New Particle Formation in Beijing)

We appreciate the comments and suggestions from the editor. They were addressed here and revisions of the manuscript were made accordingly.

#### **Comment:**

*Concerning the comment 19 by ref 2, I think it would be worth adding the value of CS corresponding to the given  $A_{Fuchs}$  threshold value of  $200 \text{ } \mu\text{m}^2/\text{cm}^3$  on line 235 (for example, adding “CS=  $NN \text{ s}^{-1}$ ” into parenthesis there; note the preferred unit of  $\text{s}^{-1}$ , not  $\text{cm}^{-2}\text{s}^{-1}$  in current literature). This is because most other papers report values of CS, not those of  $A_{Fuchs}$ , these days. When discussing further the  $A_{Fuchs}$  (or CS) threshold observed here, it might be beneficial to add couple of sentences on whether such threshold has been observed anywhere else (e.g. Salma et al 2016, ACP page 8715-28 found such threshold in Budapest, Hungary, but at a particle loading of  $CS = 0.02 \text{ s}^{-1}$ ).*

**Response:** We added “(the corresponding condensation sink is  $0.027 \text{ s}^{-1}$ )” in line 235 and “A similar threshold (the condensation sink of  $0.02 \text{ s}^{-1}$ ) was found in Budapest, Hungary (Salma et al., 2017)” in lines 239-240.

#### *Comments:*

*diurnal sulfuric acid -- > the diurnal sulfuric acid concentration, sulfuric acid concentration -- > the sulfuric acid concentration,*

*sulfuric acid -- > sulfuric acid concentration (lines 50, 54, 64, 70, 84, 154, 287, 321)*

*Abstract, sections 2, 4 and 5: Please check out the format of presenting dates in ACP.*

*line 19: environments, such as in Boulder and Hyytiälä, the daily-maximum...*

*line 25: 2.56, whereas the variabilities of  $A_{Fuchs}$  in...*

*line 77: a good correlation*

*line 97: please specify the size. ... 10  $\mu\text{m}$  in particle aerodynamic diameter. ???*

*line 100: The particle density...*

*lines 120-130: I think this paragraphs would benefit from 1-3 references.*

*line 157: are -- > represent*

*line 178: the sub-3 nm...*

*line 183: This sentence is unclear, please modify.*

*line 185: ...were assumed to be...*

*line 194, The following...*

*lines 205-206: However, this exponent is ... from the exponents no greater....., indicating that activation or...*

*Line 215: what is the meaning of “ $p=1$ ” here?*

*line 223: in measured sulfuric acid concentrations...*

*line 233: NPF days, whereas...*

*line 243: delete “the” before R2*

*line 265: Fig. 8), indicating high coagulation losses...*

*line 267: rather than were grown into larger sizes, such that...*

*line 287: led to...particles were*

Response: We appreciated detailed editing from the editor that helps to improve this manuscript. We have made the suggested changes. In addition, we read the manuscript again to correct grammar errors.