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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol Surface Area Concentration: a Governing Factor for New Particle Formation in Beijing" *by* Runlong Cai et al.

Anonymous Referee #1

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This is a solid scientific analysis on factors influencing atmospheric NPF in Beijing. It is a pity that the analyzed data set is rather short, since the obtained results would probably be much more robust for a larger set of observed cases. On the other hand, it is understandable that comprehensive atmospheric observations do not usually cover long time periods. I have a number of minor comments to consider before recommending acceptance of this paper for publication in ACP.

Lines 50-55. The discussion here is a bit confusing. I suppose that it is meant to say that the observed values of AFuchs and Gamma lie is certain ranges.

Line 129: The parameter discussed here is usually called a sticking probability, not a coagulation efficiency.

Line 158.: I think "participate in" is a wrong wording here. Please modify.

Lines 216-217: The authors should explicitly define what is divided by what here.

Line 219: the project name should be EUCAARI

Lines 243-247: This part of the text is unclear and requires modification. First, it should be Figure 7, not 10. Second, the figure does not reveal governing factor determining the occurrence of NPF, but rather the area defined by two parameters affecting the NPF frequency in different locations. Third, by looking at figure I cannot agree that Afuchs lies in a narrow range in Hyytiala (not much narrower than in Beijing).

Lines 265-266: I thing this holds most of the atmospheric environments, being not specific to Beijing. I am not sure this statement is worth keeping here.

Line 270: The authors should be more specific in what they mean by the failure of Lgamma. I guess they mean that based on the values of Lgamma, no NPF event would have been expected to occur.

Line 311: This should be Figure 11, not 10.

The paper requires grammatical corrections. I recommend the authors to carefully check out the language with a native English speaker before submitting the revised version. Below is a list of some of the grammatical issues I notice when reading the paper:

L12: The analysis

L 20: A positive. . .

L 22: concentrations on NPF days were not . . .than those. . . varied

L 24: A good correlation

L 25: . . . to initial nucleation

L 32-34: concentrations. . .are formed. . .NPF events. . . .field observations. . .nuclei

sizes

L 41: of a NPF event

L72: . . .distributions have not. . .China, except for..

L79: The data analysis

L 80: The correlation

L 107: . . .observation compared with the previous

L 111: The PM2.5

L 123: A possibility

L 125: when an aerosol

L 133: The condensation sink

L 135: Since the condensation

L 143 and 145: change ; into ,

L 147: where GR is . . .

L 171: A total of 26 . . .day was

L 173: A day was

L 174 days were

L 181: predicted the occurrence of NPF. . .value of this parameter.

L 196: A positive. . .between the estimated

L 206: the correlation

L 207-216: several articles are missing from the text on these lines

L 227: is reasonable

L 241: environments

L 282: remained at a relatively

L 288: the sulfuric acid

L 295: on the particle size. . .while the particle mass

L 297: particle ranging from. . .were the major

L 301: the particle. . .the number

L 302: was a good

L 303: level was. . .of the influence

L 319: The new particle. . .

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