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 in 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 think 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
L41: of a NPF event
L72: . . .distributions have not . . .China, except for . . .
L79: The data analysis
L80: The correlation
L107: . . .observation compared with the previous
L111: The PM2.5
L123: A possibility
L125: when an aerosol
L133: The condensation sink
L135: Since the condensation
L143 and 145: change ; into ,
L147: where GR is . . .
L171: A total of 26 . . .day was
L173: A day was
L174 days were
L181: predicted the occurrence of NPF . . .value of this parameter.
L196: A positive . . .between the estimated
L206: the correlation
L207-216: several articles are missing from the text on these lines
L227: is reasonable