

Interactive comment on “Quantification of atmospheric nucleation and growth process as a single source of aerosol particles in a city” by Imre Salma et al.

Anonymous Referee #1

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This manuscript evaluates the relative importance of new particle formation (NPF) events as a single source in terms of its contribution to atmospheric particle number concentrations. This evaluation is based atmospheric particle number size distribution measurements in the city center and near-city background of Budapest for 5 years, using a Nucleation strength factor, NSF. The conclusions of this manuscript are interesting but not surprising. I would like to recommend publication of this manuscript in Atmospheric Chemistry and Physics after the following concerns are addressed.

1. Two NSF factor have been used in the manuscript. The mixed usage of the two factors always confused me. I would like to suggest the authors to clearly state which

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factor they are referring to whenever possible, e.g., NSF_{Fall} days in Line 134-136. Also, is NSF_{nuc} days larger than NSF_{Fall} days? Looks to me that $(N_{6-100}/N_{100-1000})_{nuc}$ days is larger than $(N_{6-100}/N_{100-1000})_{all}$ days by definition, isn't it? I would like to see more discussion on the relationship between the two factors.

2. In table 2, wouldn't I get $(N_{6-100}/N_{100-1000})_{nuc}$ days from the numbers listed? For example, $(N_{6-100}/N_{100-1000})_{nuc}$ days can be obtained $(1.72/1.03 = ((N_{6-100})_{nuc}/(N_{6-100})_{non-nuc}) / ((N_{100-1000})_{nuc}/(N_{100-1000})_{non-nuc})) = ((N_{6-100})_{nuc}/(N_{100-1000})_{nuc}) / ((N_{6-100})_{non-nuc}/(N_{100-1000})_{non-nuc}) = (N_{6-100}/N_{100-1000})_{nuc}$ days. However, my number is different from those listed in Table 3. What is the problem?

3. (Line 156-158), put "Data coverage for summer and autumn ... for the mean ratios" as a footnote of Table 2.

4. (Line 159-160) the lower background particle concentration on nucleation days in winter came from real measurements, right?

5. (Line 173) rephrase "its consideration in the averaging is justified".

6. Clearly mark the vertical coordinates (NSF_{nuc} days or NSF_{Fall} days) in Figures 1 & 4, and also include NSF_{nuc} days or NSF_{Fall} days in the body instead of the title of Tables 3 & 4.

7. In table 2, what caused the behavior of N₆₋₁₀₀ on NPF days? Especially, the peak at night. Also, please expand to discuss why N₆₋₁₀₀ is significantly larger between 6-9 am on non-nucleation days? Does this mean that nucleation was hindered by the high concentrations of preexisting particles?

8. (Line 272) lower solar radiation in winter is understandable, but less biogenic precursor gases are not justified. Is there any evidence that NPF in Budapest requires biogenic vapors?

9. (Line 277-279) rephrase "this observation raises the question...for calculating the

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NSF”.

10. Regarding the health effects (Line 385-387), I would like to suggest the authors to be more conservative. The relative short lifetime is one aspect, but the toxicity per particle is another aspect. The authors just can't evaluate the health effects of nanoparticles generated by NPF.

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