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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Consequences of dynamic and timing properties of new aerosol particle formation and consecutive growth events" *by* Imre Salma and Zoltán Németh

Anonymous Referee #4

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The manuscript presents a data set of particle size distribution by 5 years DMPS measurements at Budapest city center and 1 year measurement upwind of the city. Analysis of new particle formation is presented by particle formation rate J6 and growth rate GR10 as well as starting time and duration time interval. Factors affecting NPF are explored by relating to gas-phase H2SO4 proxy, condensation sink (CS), meteorological data, and concentrations of SO2, O3, NOx and CO. Despite there is no measurement for sub-6 nm particle and potential precursors for NPF, it is still an interesting data set could potentially contribute to a better understanding towards urban aerosols and constrain the atmospheric model. However, more detailed explore into the data would still be needed apart from performing correlation test between single parameters and

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conclude there is no correlation.

Specific comments:

Page8, line 256: the mean new-to-old rate ratios of J6 were 1.23 for city center and 1.20 for near-city background. I would expect that traffic emission causes overestimation of formation rates because it is a source of nanoparticles. Please specify why correcting traffic emission in formation rates calculation gives higher J6.

Section 4.2: Discussion on NPF events frequency should include conditions of NPF days as well as non-NPF days. Properties discussed in the section are only based on events days. This could be misleading because non-events day conditions are not discussed. Line 484 conclude gas-phase H2SO4 are unlikely to be the limiting factor of NPF occurrence in Carpathian Basin including Budapest from the misalignment between the monthly occurrence frequency and the other properties. To make this statement solid, H2SO4 proxy for events days and non-events days is needed.

Page18, line548: Direct compare the numbers of J and GR or saying something contribute equally to the formation of particle and to their growth don't make sense because they are different physical variables. Correlation between J and GR are expected but comparison of the regression line with J6=GR10 doesn't give any useful information.

Page20: Lacking correlation with single parameters to J/GR doesn't tell too much as NPF is controlled by multiple parameters. With the size of the data set, authors could perform analysis on subsets of the data with certain constrains like temperature or H2SO4 proxy.

Page 20, line 625 to 636 and figure 4: GR/H2SO4 proxy =b*(1/H2SO4 proxy)+a is equivalent to a*H2SO4 proxy+b=GR. A negative 'a' means the higher H2SO4, the lower the GR. This is contradictory to the interpretation of increasing gas-phase H2SO4 related to larger contribution of other vapors to particle growth. Another concern would be special care should be taken when combine H2SO4 proxy at sub-urban site and

urban site as the VOCs and NOx condition could be totally different but not taken into consideration.

Page 24, line 739: To make the full potential of the data set, more detailed studies on the contribution of NPF to regional particle concentration could be performed.

Spelling:

Line 113: mean see level-> mean sea level

Line 751: cloud -> CLOUD

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