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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hygroscopic properties of newly formed ultrafine particles at an urban site surrounded by a deciduous forest in northern Japan during the summer of 2011" *by* J. Jung and K. Kawamura

Anonymous Referee #2

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GENERAL COMMENTS:

Jung & Kawamura present results from a hygroscopicity TDMA measuring ultrafine particles in an urban setting in Sapporo, Japan. The focus of the paper is to characterize particles during NPF events, and the authors find that the measured hygroscopicities are in line with particle growth occurring mainly by organic condensation. While the results do merit publication, there are several improvements required for the paper to be publication-ready.

The main problem is that the language is not at an appropriate level, which is clear right from the first sentence of the abstract. This is problematic for the paper's scientific output, as it in some places leaves the reader unable to understand exactly what is meant, and in some leads to apparent claims like that in the abstract stating that wind direction controls hygroscopic properties of particles, which is certainly not the case. In my opinion, the authors should make the effort to have the entire paper proof-read by someone with expertise in atmospheric sciences, as the problems are not always purely grammatical. I found the general structure of the paper to be adequate.

SPECIFIC COMMENTS:

There were too many grammatical issues that I felt needed correction, so I did not make an attempt to list them all here. I hope the authors can fix them by having the paper proof-read by an expert. Other detailed comments are found below.

g(RH) is defined on page 8262 in Eq. (1), and there it is also mentioned that lognormal modes were fit to the data and mode peak diameters are used in this study. However, it seems to me that the measured "full" growth distributions are used throughout the paper, and the fits are not used except in section 3.4.

Figure captions should provide more details. For example, how are the error/uncertainty bars in Fig. 3, 6 and 7 calculated? What do the vertical lines in Fig. 5 depict? Similar details should be included in all figure captions.

Page 8261, line 12: Enriched compared to what? Or do the authors just mean "abundant"?

8262, 12-14: What does this sentence mean? Both DMAs will have transfer functions, but what transfer function between the DMAs are the authors talking about?

8262, 24: Presumably wind direction was also measured as it is discussed. What about the NO and ozone measurements?

8264, 4: "With and without a timegap" is not clear. Please explain.

8265, 4: How is this g(85)_total defined? I doubt the "_" is necessary here.

8265, 20-21: Then this should show a correlation with increased particle number in each size bin. Is this the case? Otherwise, some other explanation is needed. Perhaps less volatile condensable vapors are emitted that can condense on existing particles? The larger question is why this effect is not seen during non-npf days? Is it due to different airmasses leading to npf vs non-npf days, or are npf days typically sunny days where vertical mixing is more efficient in the mornings?

8268, 3 & Table 1: "Grown Aitken mode nucleated particles" is not a good term. The authors can define that nucleated particles that have grown to Aitken mode sizes are studied, and then just refer to the Aitken mode particles.

8268, 26: "Aitken".

8269, 20: The authors should look over how many times "accounting for the Kelvin effect" is mentioned in the paper. It is enough to define it once and then use the Equiv. g(RH).

8270, 10-12 (and earlier): Such a conclusion is not correct. The observed g(RH) at the station is perturbed by the wind direction, by bringing different air masses to the station. The actual growth of the particles will depend on other factors, and is thereby something that cannot be captured solely by the data obtained at this station.

8271, 15-16: "In contrast, similar figures were obtained for g(85 %)_more in both periods as shown in Fig. 7." What is the importance of this parameter. As I understand it, it is the average growth factor of particles with growth factors larger than 1.25, which sounds like a relatively artificial number. If there is scientific information in this number, the authors should explain it.

Fig. 1. I am happy to see a map of the surrounding area, but I still have no idea where the measurement site is located. There are two red boxes added, but neither is described. More details are needed here.

Fig. 2. Panel (a) should be referenced and discussed first.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 8257, 2014.