

## ***Interactive comment on “Winter time hygroscopicity and volatility of ambient urban aerosol particles” by Joonas Enroth et al.***

### **Anonymous Referee #2**

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This manuscript by Enroth et al. entitled as ‘Wintertime hygroscopicity and volatility of ambient urban aerosol particles’ reports size-segregated hygroscopicity and volatility measurements of ambient particles at Budapest. The technical quality of the measurement looks reasonably good (at least, comparable to former studies conducted at different places in the world). This manuscript could add one data point to a map for global distributions on physical properties of aerosol particles. I have the following comments.

Major comments: Although authors showed the data, it was not clear to me how the data of the present study could be compared with former studies at other urban areas. If I understand it correctly, the uniqueness and novelty of the study is that the authors have conducted an atmospheric observation at Budapest in winter. So, it would be

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important to compare if the data at Budapest is similar to/different from those in other cities.

Specific comments: Title: the title of the manuscript could be modified so that it contains more detailed information (e.g., adding information about the observation site).

Abstract: The current abstract is too long (more than 450 words). If I remember correctly, this journal does not have any length limit for abstract. However, I believe that the abstract could be shortened by almost 50% if it is described concisely.

HTDMA measurements: The authors state that the RH stability of the measurement was  $90 \pm 2\%$  (standard deviation). This value is not so small, compared with other HTDMA systems (e.g., [Duplissy et al., 2009]). It would be ideal to have a description on how the fluctuation in RH could influence interpretation of observation data.

Application of TDMA<sub>inv</sub> on VTDMA data: I understand that the method was developed mainly for analysis of HTDMA data. Unlike HTDMA, a part of particles passing through DMA1 completely evaporate (i.e., disappear) by heat during thermal desorption process [Kuwata and Kondo, 2008]. I wonder how this type of particles was considered during the data inversion process.

VFR: Although VFR is frequently used for volatility study on bulk aerosol particles, I am not sure if it is commonly used for VTDMA study. Would it be possible to explain why this metric is useful in obtaining a physically meaningful parameter?

P8L4: 'while their coating with succinic acid, sulphuric acid or polyaromatic hydrocarbons (PAHs) influenced the hygroscopic growth in a complex way.' PAHs are not hygroscopic at all. Would it be possible to clarify how they could influence hygroscopic growth?

P9L23: 'Since the rush hours also coincided with the sunrise and sunset in winter' Is there any supporting evidence for this statement?

References Duplissy, J., et al. (2009), Intercomparison study of six HTDMAs: results

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and recommendations, Atmos. Meas. Tech., 2(2), 363-378, doi:10.5194/amt-2-363-2009. Kuwata, M., and Y. Kondo (2008), Dependence of size-resolved CCN spectra on the mixing state of nonvolatile cores observed in Tokyo, J. Geophys. Res., 113(D19), doi:10.1029/2007jd009761.

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