

Interactive comment on “Instrumentational operation and analytical methodology for the reconciliation of aerosol water uptake under sub- and supersaturated conditions” by N. Good et al.

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GENERAL COMMENT The manuscript presents a concise description of the calibration procedure for a hygroscopicity tandem differential mobility analyser combined with a cloud condensation nuclei counter. This instrument package is used in the field for determining hygroscopic growth factors and CCN activity of atmospheric aerosol particles. Both particle properties are highly relevant for the investigation of the aerosol indirect effects on climate.

The manuscript gives a clear overview over the entire calibration procedure including the description of the applied key instruments DMA and CCN counter. The added

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value of the paper is the compilation of required information in a single document which so far is distributed over various publications and sources. Therefore the manuscript addresses relevant scientific questions within the scope of AMT. It is well structured and written and makes a significant contribution to the field of atmospheric aerosol research. Publication in AMT is recommended with minor revisions; see the following specific comments.

SPECIFIC COMMENTS

1. The operation of a DMA is briefly described in Section 3.1 with particular emphasis on the correction for multiply charged particles which is described with more detail in Section 5. The authors describe in Section 4.1 that they have calibrated the DMA over the entire size range from 4 nm to 600 nm by a combination of nebulising latex spheres and using an electrospray generator. However, in Figure 3 only results from the latex spheres calibration are shown. Please add data points from the electrospray generator. Additionally, units should be added to the titles of x- and y-axes. Furthermore, since the diameter measured by the DMA for each latex standard was obtained by a fitting procedure it appears appropriate adding error bars to Figure 3.

2. In the section on the calibration of the CCN counter, also the calibration of the OPC is described. For the sake of clarity the position of the OPC and its role in the CCN counter operation should be described briefly. Otherwise the reader has no clear idea what the OPC is used for and to what extend errors in the OPC calibration propagate into the overall error of the measurements.

3. The authors describe in detail the calibration of the different parts of the instrument package. What is missing is the assessment of the uncertainties associated with each calibration step and the overall uncertainty in relevant properties resulting from the combination of the different steps. It is recommended to point out the improvement in uncertainties for the different aerosol properties which is achieved with this new calibration procedure. Such a section would help to assess the gained progress in

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determining hygroscopic growth factors, critical supersaturations for CCN activation, and CCN activated fractions of the investigated aerosol.

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