

## ***Interactive comment on* “Evaluation of the accuracy of analysis tools for atmospheric new particle formation” by H. Korhonen et al.**

### **Anonymous Referee #1**

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### General

The paper investigates the accuracy of analysis tools for atmospheric new particle formation. One state-of-the-art model has been used and the most relevant parameters have been varied to evaluate the variability of the results. In particular those parameters describing the early steps of nucleation and growth such as  $J_{1.5}$  and  $J_3$  were investigated using well characterized cases of new particle formation.

In general, the paper is well written, the language is clear and understandable. But for non-modelers it is sometimes hard to follow, the paper contains a lot of theory and equations. In the results-section the terminology should be modified slightly to a

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more demonstrative one to connect the modeled results with measured ones. Maybe some of the defined symbols such as the different  $\Delta t$  could be introduced using a contour plot of a new particle formation event. This would be much more illustrative and improve the clarity. In general, I was missing some relation to measurements, e.g. comparison of uncertainties and so on. The main goal of these analysis tools is the analysis of measurements, thus also this evaluation should be connected to measurements.

### Comments

From the title I expected that different models developed during the last years were compared here. But as far as I understood, the paper is based on one model varying the different parameters only. From the title this is a bit disappointing and it promises too much. If there are really different tools included it needs to be explained. However, it would be a really good idea to estimate the effect of different models on the analysis of nucleation events. Do other groups use similar algorithms or are they completely different? It is probably not possible to include other models into this study within a reasonable time but a comment about the expected variation between different models would be nice. Do they all use similar mechanisms? This could be mentioned here. And a real comparison of different model could be the topic of another study.

Here, the model was applied to modeled NPF events, i.e. the nucleation and growth processes were triggered by those processes included into the model. What's about real cases in the atmosphere? There is usually a variety of precursor gases available and I personally think that in many cases we have no clue what's going on there. Is there a parametrization covering these uncertainties in the model?

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Page26296, line 23ff.

The authors say that  $N_{3-6}$  is directly obtained from measurements in contrast to  $J_{1.5}$  which was calculated using several assumptions. Is this statement related to this study only or is it generally true? I understand that for simulated new particle formation events  $N_{3-6}$  should fit nicely to the predicted values, but is this true for measured cases?

Finally, what do we learn from this study? How large are the uncertainties compared to other errors, such as those from measurements? Can you give a list of recommendations which settings should be used preferably in such a model? Some recommendations are between the lines, but it would be nice to put them together.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 26279, 2010.

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