Atmos. Chem. Phys. Discuss., 14, C408–C409, 2014
www.atmos-chem-phys-discuss.net/14/C408/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of cloud processing on CCN activation behaviour in the Thuringian Forest, Germany during HCCT-2010" *by* S. Henning et al.

Anonymous Referee #1

Received and published: 11 March 2014

Henning et al. present the results of measurements of particle activation properties up and downwind of Mt Schmucke in Germany. Comparison of orographic cloud events and periods of no cloud has allowed the authors to demonstrate a significant increase in aerosol particle hygroscopicity as a result of cloud processing. I find this study interesting, significant enough for publication, and the main conclusion is supported by rigorous statistical analyses. I therefore encourage publication, but have a couple of comments I would like to see addressed.

The authors present two different methods for estimating the error in kappa, and each is based on different estimates of the uncertainty in set supersaturation. The first uses

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the accuracy in SS derived from repeated calibrations: presumably these were done as part of a separate study (Gysel and Stratmann, 2013), in which case what are the results of the calibration for the present study? The second method describes the error in SS as Gaussian with certain values of standard deviation, and applies Monte Carlo simulations. Could the authors explain where this assumption, and these values of standard deviation, comes from? It is not clear to me why the second approach is better than the first as the first uses an experimentally derived uncertainty in SS, and I would like the authors to please clarify this. As the authors point out, however, the main conclusion has already been tested by rigorous statistical methods, and the choice of error on kappa does not seem to affect this.

In section 3.3, the authors state: "This estimate is supported by measurements results from other groups during HCCT-2010, who focussed on the chemical and isotopic signature of the particle population". Can the authors please elaborate on this and provide a reference (if available). Is this the "personal communications" referenced later in this section? The conclusions of this section are supported by these results, so it would be useful, if possible, to provide some numbers / figures. I appreciate the data belong to other research groups, so their inclusion may not be feasible, but I would like at least to see some better referencing, and an elaboration of what these results are.

Minor corrections:

Page 1620, lines 24-26: "were achieved" appears twice in this sentence.

Page 1623, line 12: Remove either "the" or "another".

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 1617, 2014.