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Interactive comment on “Deposition freezing on mineral dust particles: a case against classical nucleation theory with the assumption of a single contact angle” by M. J. Wheeler and A. K. Bertram

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Wheeler and Bertram present an interesting study concerning the deposition ice nucleation on kaolinite and illite. The measurement results were fitted using different kinds of parametrizations. I have several specific and general comments which I suggest to be addressed by the authors:

First of all, in the deposition mode water vapour deposits directly on the IN surface forming ice without the intermediate metastable liquid state. That means no liquid water is available which could freeze. Therefore I would suggest calling this process ‘deposition nucleation’ instead of ‘deposition freezing’.

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Page 21174, line 5: Here, Niedermeier et al. (2010) is cited wrongly. In this paper, two parameterizations were used to fit the data. The first based on stochastic view on nucleation similar to the single-alpha model and the second based on the singular hypothesis according to Connolly et al. (2009). Therefore I would suggest moving the citation to line 12. In our recent paper (Niedermeier et al., 2011) a multi component stochastic model is introduced which is related to the active site model of Marcolli et al. (2007).

Pages 21176-21177, chapter 2.3 and 3.1: Do I understand correctly that an individual sample consists of 1 to 1000 particles and the onset supersaturation is obtained for each single sample separately? In general, how is the onset defined? This question is especially important for cases where the sample consists only of a few particles. Were the measurements repeated for a specific sample or were samples just used once? Some more explanation would be helpful.

Page 21179, Eq. (5): I suggest discussing the assumptions underlying Eq. 5 in more detail. In case available, a reference could be helpful, too.

Page 21180, line 8: Here it is stated that the measurements were made at 242.5K. However Fig. 1 indicates that the superaturation increases as the temperature decreases. Some explanation why a constant temperature was/could be used for calculation would be helpful.

Page 21185, line 15: Why is constant temperature a reasonable approximation (see comment above)?

Page 21185, line 21: Here experiment temperature is given as 240K which differs from that used above (242.5K). An explanation would be useful here.

References

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