

## ***Interactive comment on “Saharan dust and ice nuclei over Central Europe” by H. Klein et al.***

### **Anonymous Referee #1**

Received and published: 23 July 2010

This is a well written and interesting article in which Klein and co-workers describe a study in which they correlate natural ice nuclei numbers with mineral dust from a Saharan source. They clearly demonstrate that Saharan mineral dust is a major ice nucleating species at their site in Central Europe.

The subject of this paper is appropriate for ACP and once my comments below are addressed, I recommend it for publication.

1) Abstract. Add in a line on the experimental technique used here. Also, the correlation coefficients for mass and surface area were similar (0.8 and 0.78). Perhaps alter this sentence to ‘A correlation is found between dust surface area and IN concentration’ or something similar.

2) P14994, In 25. Replace ‘good’ with a more descriptive and less subjective word. Perhaps ‘efficient’. There are a number of new lab studies appearing in the literature

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at the moment which could be cited: Niedermeier, D., S. Hartmann, R. A. Shaw, D. Covert, T. F. Mentel, J. Schneider, L. Poulain, P. Reitz, C. Spindler, T. Clauss, A. Kiselev, E. Hallbauer, H. Wex, K. Mildenerger, and F. Stratmann (2010), Heterogeneous freezing of droplets with immersed mineral dust particles – measurements and parameterization, *Atmos. Chem. Phys.*, 10, 3601–3614. And also B. J. Murray, T. W. Wilson, S. L. Broadley, and R. H. Wills, Heterogeneous freezing of water droplets containing kaolinite and montmorillonite particles, *Atmos. Chem. Phys. Discuss.*, 10, 9695–9729, 2010.

3) P14996, In 16. Replace ‘top’ with ‘highest’.

4) P14997, In 9. Replace ‘is’ with ‘was’ or ‘has been’.

5) Section 2.1. More details for the experimental technique are required here. The following details need to be included: i) Number of samples analysed with FRIDGE. ii) Typically how many IN were there per sample? iii) How many particles were there per sample? iv) What were the size of the particles? v) How efficient is the electrostatic precipitator. Is there a dependence on material type? vi) How long were the samples exposed to a particular RH? vii) How was the position correlated between the optical microscope and the ESEM. viii) Was EDX analysis used to obtain the composition? This needs to be stated.

6) Phillips et al. [2008] suggest there is a discrepancy between lab and field measurements whereas Klein et al suggest there is agreement between their natural dust measurements, other natural dust experiments and lab experiments (Field et al). I would like to see a comment on this apparent discrepancy between Phillip’s conclusions and Kelin’s?

7) P15005 In 6. I think Klein et al are referring to the empirical relationship from Phillips et al who was in collaboration with the Colorado people. Phillips is from Hawaii, hence this sentence needs to be corrected.

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8) In calculating the number of IN per surface area, it is not clear to me if the total surface area is of all aerosol or only specifically of the dust.

9) DeMott and co-workers have published a new parameterisation of ice nuclei number based on the number of aerosol which are larger than 0.5  $\mu\text{m}$ . This should be cited and possibly compared to your data. The reference is: DeMott et al. PNAS, 107, p11217, 2010.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 14993, 2010.

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