

Interactive comment on “Comment on evidence for surface-initiated homogenous nucleation” by J. E. Kay et al.

J. E. Kay et al.

Received and published: 7 August 2003

We thank Paul DeMott for reading our comment and providing a useful review. Below, we respond to his specific comments:

1) Focus of comment

In his review, PD suggested we focus on the theoretical and thermodynamic issues we raised in our comment. While we have shortened our evaluation of previous laboratory and field evidence relevant to surface-initiated nucleation, we have still included our literature review. We believe the relevance of some experiments and ideas were misrepresented in Tabazadeh et al. (2002a, 2002b).

2) Comparison to atmospheric observations

We appreciate PD's discussion of the many variables that affect atmospheric observations of freezing. We have added a sentence at the beginning of section 4

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acknowledging the difficulty of relating freezing temperatures in atmospheric data to surface-initiated nucleation. Indeed, our comparisons between atmospheric observations and nucleation rates illustrate the difficulty of drawing conclusions about surface-initiated freezing from atmospheric data.

3) **The role of laboratory studies**

We agree with PD: one could investigate surface versus volumetric nucleation theories with existing and new laboratory data. In particular, we note nucleation rates measured as a function of drop size in an air ambient would help illuminate if surface-initiated nucleation occurs in our atmosphere. Experimental setups, such as the referenced Möhler et al. (2003) or Wood et al. (2002), could provide this data.

4) **Typographic/Clarification/ Spelling Corrections** We corrected the freezing temperature for observation 2 (-37°C) in Figure 2. We clarified that DeMott and Rogers (1990) measured a polydisperse population of drops. We have also fixed spelling mistakes.

Reference: Wood, S., Baker, M., and B. Swanson, (2002). Instrument for studies of homogeneous and heterogeneous ice nucleation in free-falling supercooled water droplets. *Review of Scientific Instruments*, 73:11, 3988-3996.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 3, 3361, 2003.

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