

Interactive comment on “The role of organic aerosols in homogeneous ice formation” by B. Kärcher and T. Koop

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General comment:

We agree with the referee that the distinction between the effects of organics on the hygroscopicity and the accommodation coefficient α is not very clear in the ACPD version. In the revised version, we include two new sections discussing these points separately, and provide more information on (i) why we believe that malonic acid is a good surrogate for the water uptake behavior of organic aerosols and (ii) why we treat α as a parameter in our simulations.

Specific comments:

1. The direct effect of changes in pressure (below 1 atm) on melting and homogeneous

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freezing points in liquid aerosol particles is negligible for our study. However, a slight dependence is introduced in the growth laws for ice particles through the molecular diffusivity, and growth and freezing occur simultaneously. This is clarified in the revision.

2. The reviewer is correct: the reduced freezing is caused by reduced water uptake, which in turn has two interdependent causes for low- α particles, they are less diluted (lower a_w , higher W) and they have smaller volumes. We add a point to this after line 10.

3. Of course, W is inversely related to particle volume, this will be corrected here and in Figure 1.

4. The assumed SUL/MAL concentration is 100 cm^{-3} , this will be explicitly noted in the text and figure caption.

5. The PALMS instrument does not distinguish between soluble or non-soluble certain organic species. Our choice SUL/MAL is certainly consistent with these data, but there exist other possibilities as well. This will be mentioned on p.6732, lines 8–14.

6. Yes, this reduction in the value of the accommodation coefficient is the same as discussed in the paper. We will add a sentence in the revised version to make this point more clear.

All technical corrections are considered in the revision.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6719, 2004.

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