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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Commentary on "Homogeneous nucleation of NAD and NAT in liquid stratospheric aerosols: insufficient to explain denitrification" by Knopf et al." *by* A. Tabazadeh

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Part II of comment (4 page limit)

I agree with the second point mentioned by Tabazadeh et al. (2003) that the surface enrichment of HNO_3 molecules of a small droplet is different from that of a large droplet. However, the size effect on surface enrichment occurs only in droplets with radii smaller than 0.1 μm. Above this size surface enrichment reaches its bulk value and remains almost constant (Stuart and Berne, 1999) with increasing droplet

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size. Therefore, a derived surface-based nucleation rate obtained by large droplets corresponds to that derived from droplets with a radius of 0.1 μm.
Tabazadeh et al. (2002a) remarks that Molina et al. (1993) have already performed bulk freezing experiments. Also Koop et al. (1995, 1997) have measured upper limits of nucleation rate coefficients of NAD and NAT in bulk samples. If Tabazadeh et al. (2001) had used these data sets in the case of volume-based nucleation they would have obtained much higher nucleation activation energies of NAD and NAT and, therefore, much lower corresponding homogeneous nucleation rate coefficients under stratospheric conditions.
I want to remark that we are grateful to have received the preprints of Tabazadeh et al. (2002a, 2002b) and Djikaev et al. (2002. But this was after we had submitted our article to ACP. We agree with A. Tabazadeh that pseudo-heterogeneous nucleation is an exciting new way to see nucleation of atmospheric particles and, thus, should be investigated in more detail. However, this does not affect the conclusion of our paper (Knopf et al., 2002).

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