Atmos. Chem. Phys. Discuss., 3, S103–S104, 2003
www.atmos-chem-phys.org/acpd/3/S103/

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

P. Jungwirth

pavel.jungwirth@jh-inst.cas.cz

Received and published: 4 March 2003

I want to add few comments concerning the plausibility of extrapolating results obtained for milimeter size droplets by Knopf et al. to (sub)micrometer size atmospheric particles.

1. Cloud physicists agree that surface curvature ceases to be an issue around a 1 micron diameter. This is the point where droplet growth by condensation is no more effective since the reduction in surface energy vanishes.

2. Berne & Stuart (J. Phys. Chem. A 103 (1999) 10300) extrapolated that propensity of

chloride anions for the interface of aqueous clusters reaches its bulk (extended surface) value somewhere between 10 and 100 nm. So, probably ionic surface propensities are not significantly influenced by the droplet size for radii above 0.1 microns.

3. What A. Tabazadeh claims on p. 828 of the commentary, namely that for droplets in experiments by Knopf et al. 0.0005% of impurities would completely contaminate the surface would be true only for a host species that 100% resides at the interface. But even very surface active species such as benzene have solubilities in water around 0.01% so the number in the commentary seems to be unrealistically small. For a surfactant with 0.01% solubility and droplet size around 1 mm contamination of 0.0005% would actually lead to a virtually clean surface.

In summary, I share the concern of A. Tabazadeh about the connection between experiments of Knopf et al. and atmospheric reality, however, based on the above arguments I am convinced that the criticism of A. Tabazadeh is exaggerated and the measurements are atmospherically very relevant.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 827, 2003.

ACPD

3, S103–S104, 2003

Interactive Comment