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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interactions of bromine, chlorine, and iodine photochemistry during ozone depletions in Barrow, Alaska" *by* C. R. Thompson et al.

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It is believed that PSCs are formed by freezing aqueous aerosol drops which contain acids up to 30 wt %. Since ice is highly intolerant to impurities, after freezing mixed-phase particles are formed: an ice core enveloped with a freeze-concentrated solution (FCS). Since the rate of heterogeneous reactions depends on the surface phase state of PSC particles, there will be difference whether solid pure ice or mixed-phase PSC particles are considered in model(s). If the current models cannot take into account this important physical process (phase separation during freezing), it would be a good thing to mention it in introduction of the paper. Also it would be a good thing to give

some reasoning why it is not considered in the model used by the authors. About mixed-phase PSC particles the authors can find in a paper Bogdan, A., Molina, M. J., Tenhu, H., Mayer, E. & Loerting, T. 2010."Formation of mixed-phase particles during the freezing of polar stratospheric ice clouds" Nature Chem., 2, 197-201.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 28685, 2014.