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Interactive comment on "Volume nucleation rates for homogeneous freezing in supercooled water microdroplets: results from a combined experimental and modelling approach" *by* M. E. Earle et al.

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I would like to point out that the equations used in this manuscript for droplet growth (Equations 6 and 7) do not seem to take heat transfer into account. This will bias the estimates of the condensation coefficient to low values. The importance of including heat transfer to obtain accurate estimates of the condensation coefficient has been pointed out before (e.g. Wagner, 1982; Mozurkewich, 1986). The bias in the condensation coefficient can be significant even when the temperature difference between the droplets and the gas is small.

Fortunately, it should be straightforward for the authors to redo their calculations with the coupled heat and mass transfer equations. Approximate solutions are available from a number of sources, including Wagner (1982). Care should be taken to avoid dependence of the result on growth through the transition flow regime where the droplet diameter is comparable to the mean free path. The mass transfer equations are considerably more complicated in that regime (Qu et al., 2001).

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Qu, X., E. J. Davis, and B. D. Swanson (2001), Non-isothermal droplet evaporation and condensation in the near-continuum regime, J. Aerosol Sci., 32, 1315–1339.

Wagner, P. E. (1982), In Aerosol Microphysics 11: Chemical Phvsics of Microparticles (W. H. Marlow, eds.), Springer-Verlag, Berlin. pp. 129-178.

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