

Interactive comment on “Aerosols indirectly warm the Arctic” by T. Mauritsen et al.

Anonymous Referee #2

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The authors present observations, taken at the ice-covered Arctic ocean, of a situation during cloudy conditions when CCN concentrations dropped to very low levels (below 1 per cc) and the cloud became optically very thin. They also perform simplified radiative transfer calculations to show that the infrared warming effect of the cloud increases more than the shortwave cooling effect when CCN concentrations are increased from 0.1 per cc to 100 per cc at arctic conditions. This is a nice manuscript that presents a rather surprising finding. I recommend publication, and have just a couple minor comments.

1. It would be nice to see in Fig. 3 b) the datapoints from the second CCN instrument taken at 0.7% supersaturation. When the cloud drop number concentrations drop very low, one would expect the supersaturation in the cloud to increase, and quite small particles to be able to act as CCN.

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2. The title of the paper sounds to me a bit too general, as if the authors were claiming that the total indirect aerosol effect over the Arctic was warming. Even if it was, this paper does not show it. The calculations in section 3.2 are rather qualitative and don't even try to quantify the total effect (a climate model would be needed). I would urge the authors to modify the title somewhat.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 16775, 2010.