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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Vertical profiling of aerosol particles and trace gases over the central Arctic Ocean during summer" *by* P. Kupiszewski et al.

Anonymous Referee #1

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This manuscript describes vertical profiles of aerosol particles, gas-phase tracers of marine biogenic and anthropogenic sources of particles, cloud structure, and meteorological conditions. The results are important for understanding high and low cloud formation and overall radiative forcing over the Arctic. Overall, this paper is well-written and is recommended for publication after consideration of the following comments.

1. Page 10397, Lines 12-15: Sentence is awkwardly worded, please consider rephrasing.

2. Section 2, Methods Section: This section is very long and can easily be reduced by

a factor of 2.

3. Section 2.3: Many details about the uncertainties in back trajectories are discussed. I find this detail to be unnecessary.

4. Figure 4: The trajectories are very difficult to see. Can they be enlarged?

5. Page 10417, Lines 19-23: Many papers by Warneke have shown the prevalence of biomass burning aerosol in the Arctic and should be cited here.

6. Page 10420, Lines 8-13: Were chlorophyll a or other indicators of biological activity higher during this period that would support this hypothesis?

7. Page 10428, Lines 9-13: Is coagulation a feasible method for the observed particle growth?

8. Page 10428, Lines 24-26: It is not clear to me how particles resulting from evaporating cloud droplets would spontaneously break up into smaller particles.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 10395, 2013.