

## ***Interactive comment on “Changes in aerosol properties during spring-summer period in the Arctic troposphere” by A.-C. Engvall et al.***

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This study is nicely presented and very interesting, particularly for its observations and explanations for a sharp seasonal transition between accumulation and Aitken mode aerosol in the Arctic. The suite of measurements offered, along with their interpretation, seem to add considerably to our understanding to aerosol processes in the Arctic.

The authors may be interested in a couple of other studies that perhaps complement this work. In Garrett et al. (2002) we found from aircraft data that bursts of Aitken nuclei were typically found above cloud tops, but only when there were enhanced layers of absolute humidity immediately above the cloud, and when pre-existing condensate surface area was low. The origins of the humid layers were unknown, and unfortunately there were no successful measurements of sulfur gases. However, water vapor

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is a precursor gas for aerosol nucleation, as is high actinic flux, so the picture was consistent with that proposed in the paper by Engvall et al.

We also observed in ground-based measurements a similar seasonality in aerosol modes at Barrow, Alaska, although perhaps not quite as abrupt (Garrett et al., 2004). The accumulation mode aerosol certainly could have been scavenged by cloud. However, the Aitken nuclei observed primarily in summer would not: they had no apparent effect on local cloud properties.

## References

- [ ] Garrett, T. J., Hobbs, P. V., and Radke, L. F.: High aitken nucleus concentrations above cloud tops in the Arctic., *J. Atmos. Sci.*, 59, 779–783, 2002.
- [ ] Garrett, T. J., Zhao, C., Dong., X., Mace, G. G., and Hobbs, P. V.: Effects of varying aerosol regimes on low-level Arctic stratus, *Geophys. Res. Lett.*, 31, 17105, doi: 10.1029/2004GL019928, 2004.

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