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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The summer aerosol in the Central Arctic 1991–2008: did it change or not?" *by* J. Heintzenberg and C. Leck

Anonymous Referee #1

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I am slightly confused what the aim of this manuscript is. The authors present data from four summer Arctic campaigns in 1991, 1996, 2001 and 2008, and conclude that the observed aerosol properties in the pack ice region do not show clear trends over the 17-year period. However, even if "trends" were observed, it would be very difficult to attribute them to any changes in the Arctic environment rather than to normal meteorological variation - there simply isn't enough data (no data at all available from other years; each campaign lasted only 1-1.5 months and did not always cover the same months).

While the manuscript presents some interesting ideas (e.g., the hypothesis that the location of the Hoppel minimum could be determined by the limited CCN concentration), overall it doesn't contain much new science. The four campaigns have been described

in detail in earlier papers and a very similar analysis of the aerosol size distribution for three out of the four campaigns was published by the same authors 6 years ago (Heintzenberg et al., 2006, Tellus). Although some new analysis of the size distribution is presented here, it is unclear what added value it brings to our understanding of the summer Arctic pack ice aerosol.

On top of this, the manuscript is not very well written. There are problems with the description of the methodology (e.g., three contradicting size ranges for DHO analysis are given on pages 894 and 906, and in figure 9), the structure of the manuscript (e.g., comparisons of travel times over ice as well as fog occurrences for the four expeditions are presented under "Meteorological conditions during ASCOS-08) and the general use of English and punctuation.

For these reasons I cannot recommend the publication of the current version of the manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 887, 2012.