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Atmospheric Measurement Techniques Discussions

Interactive comment on "Measurements of atmospheric aerosol vertical distributions above Svalbard, Norway using unmanned aerial systems (UAS)" *by* T. S. Bates et al.

Anonymous Referee #2

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The AMTD article "Measurements of atmospheric aerosol vertical distributions above Svalbard, Norway using unmanned aerial systems (UAS)" by Bates et al presents brief description of the UAV-based platform for aerosol research and its deployment in the Arctic environment. The UAVs represent rather new and unexplored field in airborne atmospheric and climate science and scope of the article fits well the AMT journal. Structure of the text, language and figure quality is good.

General comments

The major reservation and comment I have is towards very brief and incomplete nature

of the manuscript.

The UAV itself is well described, but when it comes to more important part, the performance and quality of aerosol data, it is incomplete. Why MCPC was calibrated with 60 nm particles? The Arctic Haze is usually formed by particles in accumulation mode. In conditions not dominated by aged pollution the aerosol number is controlled by Aitken mode aerosol often < 60 nm. Was the agreement between MCPC and electrometer (8%) independent on concentration? What kind of electrometer was used? Is there any reference to testing and performance of the MCPC?

How the changes in RH are handled in case of ABS measurements? All filter based absorption methods are known to suffer from this issue. What is the overall error of the ABS measurements? The apparent absorption due to light scattering by particles is only estimated based on literature values. Rest is missing completely. How will all features from intercomparison and airborne measurements look if the appropriate measurement error will be taken into account? Is 60 sec integration time in such case sufficiently long?

Data presentation and analysis. If there is 38 hours of data available, why only one single vertical profile accompanied by quick attempt for data analysis is included? It makes the article look more like a press release and not a scientific paper.

In introduction and results/discussion part authors should include references and discussion with respect to previous studies done in the Arctic using airborne platforms during POLARCAT and ASTAR campaigns for example. There is quite large number of articles available from these campaigns delivering nearly the same information and often more comprehensive information about aerosol properties and layering in the Arctic.

With respect to comments above I cannot recommend presented manuscript for publication in AMT in current form. It is lacking proper depth of the data analysis and/or instrumental techniques description and testing.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 2483, 2013.