

Interactive comment on “In-situ cloud ground based measurements in Finnish sub-Arctic: Intercomparison of three cloud spectrometers” by Konstantinos-Matthaios Doulgeris et al.

Darrel Baumgardner (Referee)

darrel.baumgardner@gmail.com

Received and published: 16 March 2020

The study that is discussed in this submission focuses on the performance of three cloud probes that were originally designed for operation on aircraft but an attempt has been made to adapt them to a ground based location where the environment can often be quite harsh with respect to icing conditions. I think that given the multiple issues with how the instruments were operated, this paper is overly lengthy. It could just as easily have been a very short technical note that points out how you should NOT mount and operate instruments on the ground that are designed to be used for aircraft. What is puzzling is why the decision was made to use these instruments rather than the DMT

C1

Fog Monitor that utilizes the same measurement theory but was intentionally designed for ground based measurements. They do not explain why they chose to mount and operate the instruments in the way they did instead of using a wind tunnel set up that would have circumvented the problems that arose.

As a three page note, there would be two principal conclusions: 1) Cloud probes with inlets should always be mounted into the wind and 2) proper deicing is always necessary when conditions dictate it.

As a study comparing three instruments with similar measurement techniques it is not as useful or relevant as the number of other studies where instruments are compared in wind tunnels, such as the study done at Puy-de-Dôme referenced in the current study.

The current study would be much more useful and relevant if it encompassed not only the measurements at their site but discussed why they chose to operate their instruments as they did compared to other sites such as Storm Peak, Elk Mountain, Puy-de-Dôme, Jungfraujoch, and the Zugspitze where similar studies have been done but more successfully. Storm Peak, Elk Mountain and Puy-de-Dôme all use a wind tunnel to introduce cloud air to the instruments so that the sensors are being under conditions more like they were designed for, i.e. aircraft.

I can't recommend this manuscript for publication in its present form as I don't find the results that useful other than as a warning about how not to operate these instruments. A more comprehensive review of ground based measurements with sensors designed for aircraft would be far more useful.

Although I am the chief scientist and founder of Droplet Measurement Technologies, I was not involved with the setting up of the instruments that were involved in this study or the ventilation systems used to introduce cloud air. I have tried to ascertain how this all evolved but the technical staff who were involved are no longer with the company so I have no way of understanding the history of this project. I would recommend that the authors consider a different approach for future studies.

C2

