Response to Andrew Leung for AMT-2020-515.

Dear Dr. Leung, thank you for your interest in our work and valuable comments on the paper. On behalf of the co-authors, I am providing responses to your comments below. The line, page and figure numbers in {…} brackets correspond to the "latexdiff" version of the manuscript.

There is very few research conducted in High Arctic, due to the high cost of travel, short field season and being difficult to access. This particular paper seeks to improve the measurement technologies in this area. I have some comments for this preprint.

In line 43, I understand the need to express units in SI units. However, it's preferable to express the inversion lapse rate in metre or 100 metres. Same for lapse rates in lines 48 and 50. The authors already express lapse rate in metre on lines 275 and 276

Done. The units in the manuscript have been updated. The lapse rate values have been given using both C/100 m and C/km dimensions.

In line 179, CYEU should be written as CYEU. C-YEU would be an aircraft registration number, not an airport designation code

Done.

In line 185, the Eureka Climate station name should be spelled out in full at least in the first instance, not abbreviated as "Eureka C"

Done.

From line 185 to 188, when the manuscript is referring to Nav Canada's Eureka A station, it is unclear if the authors are referring to the data from the automatic platform (which runs 24/7) or the staffed platform (which runs 22 hours a day during their study period, with no staff present for 04:00 and 05:00 UTC observations). Both the automatic station share the same instruments (e.g. temperature, wind, pressure) but staffed site also provide hourly weather conditions and visibility, and 6-hr precip amounts. If authors used the staffed site, then the statement "both stations provide hourly weather reports" is not accurate. The manuscript should clarify which platform they used in their study.

Lines {259-270}

To characterize meteorological conditions at the sites we have used data on temperature, RH, wind, pressure from the Eureka A and Eureka Climate (Eureka C) automatic platforms as well as data on hourly weather conditions and visibility provided by ECCC staff at Eureka Weather Station. The manuscript has been updated with proper clarification.

In lines 208 to 209, do you have the source for the ice surveys? These information should be available on Canadian Ice Service website

Lines {298, 626}

Done. The paragraphs have been rearranged and a reference to the Canadian Ice Service website has been included.

Just a thought, since the authors built insulation to protect the battery against extreme cold as stated in line 225, was the battery temperature measured or tracked during the flight?

Lines {200-201, 209-211}.

Done. The stock batteries of both DJI M100 and DJI M210 RTK drones are equipped with internal temperature sensors, which continuously monitor battery core temperatures during the flight. The temperature readings are displayed on the screen of the drone's remote controller and stored in the log files onboard the drone together with other telemetry data.

The paragraphs describing drone's specification and battery enclosure have been populated with information about the internal battery temperature sensors.

It would be ideal to clarify in line 236 that the pilot is the drone pilot

Done.

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Figures {3, 4 and 7} have been updated to include all required information accordingly.

The imageries of Eureka provided by NASA and available at https://worldview.earthdata.nasa.gov/, unfortunately, have resolution, unacceptable for our applications.

USGS maps available at https://earthexplorer.usgs.gov/ have resolution comparable to Google Earth imageries, but they are "not for purchase or for download" and "to be used as a guide for reference and search purposes only" according to USGS statement.

In Figures 3 and 4, it is unclear to me what those alphabets on the map pins represent. For example, I see two pins labelled as “E”. Their meanings were not explained in figure captions.

Done. The manuscript, Figures {3, 4 and 7} and their captions have been updated to provide details on the meaning of the pins, way-points, drone flight trajectories and the locations of various facilities in Eureka.