

Interactive comment on “The De-Icing Comparison Experiment (D-ICE): A study of broadband radiometric measurements under icing conditions in the Arctic” by Christopher J. Cox et al.

Anonymous Referee #3

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This is a review of Cox et al., "The De-Icing Comparison Experiment (D-ICE): A study of broadband radiometric measurements under icing conditions in the Arctic." The authors present a study of the effects of the accumulation of various types of ice (snow, frost or rime) on radiometer domes and of the performance of distinct mitigation systems designed to remove or prevent ice accumulation via ventilation and/or heating. The topic is appropriate AMT.

The study is well-organized and the presentation is clear and well-written. The results are likely to be of significant value to the radiometric measurement community. They will be of use in shaping the selection and design of instruments for future field projects

C1

and in quantifying uncertainties in measurements from instruments currently in use. I am suggesting only a few minor revisions to help with clarity.

Lines 26-27: It's not clear what "mitigating 77%" and "90+% effective" mean, given the limited details available in the abstract. Could these be expressed more concretely here?

Lines 34-36: Could you clarify here whether this is for both shortwave and longwave fluxes?

Line 100: Is there a need here to explain briefly what is meant by "global" downwelling shortwave flux?

Line 170-171: What is meant by "rime or frost was observed to be present in the vicinity of the D-ICE systems"? This and the associated paragraph are a bit unclear. In particular, what is meant by "sublimation period" and by "duration of the presence of ice"? Does this mean ice on the radiometer domes, or ice evident elsewhere?

Lines 285-286: Note that in ARM parlance, "NSA" encompasses both BRW and OLI. Are the included NSA radiometers at BRW?

Line 300: No relationship was observed between "the number of radiometers included in estimated uncertainty" and what?

Line 352: This goes back to my question about "sublimation period" for Lines 170-171. As far as I can determine, this is the first use of the term "deposition period." It would be helpful to clearly define this and "sublimation period" earlier in the paper.

Line 422 and elsewhere: Ditto my earlier comment re. "NSA" vs. "BRW" vs. "OLI".

Line 425: So is t_{icing} the same as the length of the "deposition period"? Maybe try to standardize a bit (e.g., "icing period" instead of "deposition period").

Line 476: "When outside of the ventilator", this means when the *fan* is operated outside of a ventilator?

C2

Lines 499-508: It would be interesting to see the results of a similar experiment but with the flow direction of the fan reversed. There would be no fan waste heat warming the air flowing over the dome and no adiabatic compression effects near the dome.

Line 529: Should this be "specific volume *at* the total pressure"?

Line 560-561: Maybe be more specific than "amount of ice", since this could be confused with mass of deposited ice.

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