

Interactive comment on “Agricultural harvesting emissions of ice nucleating particles” by Kaitlyn J. Suski et al.

Anonymous Referee #1

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The manuscript presents an investigation of airborne ice nucleating particles (INP) close to harvest operations for different crops at two sites in Kansas and Wyoming. The authors employed a variety of instruments, including modifications of them, to shed light on the characteristics of INP likely aerosolised by the operations (e.g. fluorescence, heat resistance, elemental composition, etc.). The lack of a consistently employed experimental protocol limits the scope for direct comparison between crops and makes for a slightly confusing reading experience. In this sense, I appreciated the ‘Conclusions’ section as a helpful summary of the most important findings.

My only major concern regarding the science is the lack of control measurements before the harvesting operations of sorghum, wheat and corn. The current interpretation of the data implicitly assumes that INP observed during harvest operations were

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aerosolised by the operations. However, Figure 2 suggests a relevant contribution of INP and fluorescent particles were already present before the soybean harvest. Soybeans were harvested in the middle of October 2014, one day before sorghum. Hence the background of INP before sorghum harvest might have been similar to the pre-soybean harvest. However, wheat was harvested end of June and beginning of July in 2015, and corn in September 2015 at a different location from all the other crops. Harvest operations “usually lasted 2-4 hours” (page 2, lines 31-32). I assume the instruments had been installed before that. Why were no pre-harvest and/or post harvest measurements done, at least with the CFDC? As I understand, its lower limit of detection with the concentrator in place is close to 0.002 INP/L for an integrated sampling period of 10 min.

minor issues

page 8, line 1: perhaps change “be contributing” to “have contributed”

page 12, line 26: change “rust-infected the wheat” to “the rust-infected wheat”

Figure S2: The black lines connecting rain hat, aerosol concentrator, and CFDC would benefit from arrow ends indicating flow direction. Also, why are they entering the CFDC at different points and are joint inside it? Did they not connect to a common inlet of the CFDC? Perhaps add to the drawing also the ice particle collector at the outlet side of the CFDC.

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