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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The ice nucleation ability of one of the most abundant types of fungal spores found in the atmosphere" *by* R. Iannone et al.

Anonymous Referee #2

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This is a well written manuscript on a topic of contemporary interest. The authors have conducted a thorough investigation of the ice nucleation efficacy of an abundant biological atmospheric aerosol, fungal spores. It is noteworthy that both ice formation in the atmosphere and the specific effect of biological aerosol are topics of keen interest in the field at the moment. As such this paper should be published in ACP with minor edits.

I do have 3 points that I would like the authors to consider in their revised manuscript.

1. I echo Prof. DeMott's "general specific comment" regarding the abstract: "The first sentence struck me as a little too strong for the current status of understanding of bi-

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ological ice nuclei as a whole. I believe that it is safe to say, at best, that biological particles are a potentially important class of ice nuclei. I think this deserves qualification because the level of quantification of their importance at present, except by inference, is quite poor." Indeed, I do not know of a comprehensive study that shows biological particles to be of high abundance either in the atmosphere in general or in ice forming particles specifically. There are several recent publications on this topic (correctly referenced here) but, to repeat the above term, all appear to "infer" as opposed to "show". Since this publication largely details a "negative result" (these abundant biological particles don't appear active participants in ice formation) I think this result needs to be made more clear and not only the abstract but the paper in general needs to make it clear that biological material as ice nucleators is not a fate accompli.

2. Following up on this point the Introduction seems to suggest biological material is the only possible ice nucleator above -15 deg C. I was surprised that publications that have seen mineral dust form ice clouds in this range were not included. Specifically absent is Sassen et al., Saharan dust storms and indirect aerosol effects on clouds: CRYSTAL-FACE results, GRL 2003 (which found mineral dust acting to form ice at -5 deg C) and references therein.

3. I found several parts of the paragraph starting "In a recent study by Pratt et al. (2009)..." on page 24633 to be confusing and in need of a rewrite. (1) After reading this reference I think I understand that only ice nucleating particles from 140 – 700 nanometers were considered and these from ice crystals only greater than 7 micrometers (an upper limit was not given in that paper which appears an omission). A CFDC flow chamber with a 1.2 micron limit was mentioned in that paper but it did not appear this was involved in the attempted identification of biological ice nucleators using a mass spec (MS) instrument. I believe the authors need to check their wording: I don't think the 1.2 micron cut size was important and I think the MS instrument looked at particles smaller (not larger) than 700 nanometers. (2) Also after reading this publication I was rather surprised it only considered something like 40 total particles (some 10

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10, C11896–C11898, 2011

identified as biological) collected over some 20 minutes on one fall day in one location in the US. I think this paucity of data should be mentioned here since the authors spend such a large part of their Atmospheric Implications section discussing it.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24621, 2010.

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10, C11896–C11898, 2011