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Interactive comment on "Ice Nucleation Activity in the Widespread Soil Fungus Mortierella alpina" *by* J. Fröhlich-Nowoisky et al.

Anonymous Referee #2

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Reported is the discovery of ice nucleating particles (INP) produced by the soil fungus M. alpina. Various analyses were performed to characterise M. alpina and its INP. The results are new, interesting, based on scientifically sound methods and are well presented. The only thing that I am missing is a bit more effort in searching possible evidence for such INP in previous studies.

Given the novelty of reported discoveries, no previous study is likely to be found where M. alpine and INP have been investigated together. However, the characteristics of its INP provide clues for signs to look for. As described in the manuscript, they catalyse ice formation within a narrow temperature range, mostly between -5 and -6 degree C, pass through a 0.1 micron filter, but are larger than 100 kDa, withstand heating to 60 degree C, but are deactivated by heating to 98 degree C. This fits the characteristics

of leaf-derived INP studied by Schnell and Vali (1973). Leaf material from temperate regions carried only around 100 INP active at -6 degree C per, whereas leaves from microthermal regions had INP numbers that where 4 to 5 orders of magnitude larger, suggesting the relevance of INP derived from M. alpina, or other fungi producing the same kind of INP, might be limited to microthermal environments, i.e. the continental climates of Eurasia and North America.

Questions I would like to see addressed in the discussion section are:

a) Is there evidence for M. alpina (or alike) INP in the atmosphere or in precipitation (e.g. INP active between -5 and -6 degree C and passing through a 0.1 micron filter)?

b) If so, is this evidence restricted to microthermal environments?

c) Or, in the absence of other such evidence from soil, atmosphere or precipitation samples, is evidence from environments outside the microthermal regions lacking an indication for M. alpina derived INP?

Schnell, R. C. and Vali, G. 1973. World-wide source of leaf-derived freezing nuclei. Nature 246, 212-213.

Interactive comment on Biogeosciences Discuss., 11, 12697, 2014.