

Interactive  
Comment

## ***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. alpina* 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

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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.

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