

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

C. Morris (Referee)

cindy.morris@avignon.inra.fr

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My review of this work will be complementary to that of Gabor Vali who focused most of his remarks on the ice nucleation activity assay.

Overall, the research presented in this manuscript is very solid. The manuscript is a pleasure to read and it makes an important contribution to our understanding of the biological sources of ice nuclei in the environment. It contributes in particular to the question of the potential sources of the ice nucleation active organic matter that has been found in association with soil dust. Hence, the ecological information that is provided here is very important. The interest of these results could be enhanced if more information were provided about the abundance of *Mortierella alpina* in the soils analyzed here. For example, the data presented in Table 2 represent crude counts.

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This would be more informative if the authors presented estimates of the number of CFU of *Mortierella alpina* per gram of soil - and as a fraction of the total microbial load of the soil. This type of information is important for future estimates of the mass of organic matter contributed by these fungi to organic soil dust.

SPECIFIC COMMENTS

P 4, L 22: To better understand the procedure used, the title of this section should be “Initial screening for ice nucleation activity”. Somewhere in the text the authors should mention that this initial screening introduced a bias relative to the ability of the fungi to grow to sufficient densities in the liquid medium. If the fungal isolate did not produce sufficient mass to yield at least 1 ice nucleus per 50 μ l aliquot tested for INA, then the isolate was discarded as negative – right?

P 5, L 2: Please indicate the full species names of the fusaria used in this work.

P 6, L 25 to P 7, L 5: Here the authors indicate that they calculated the number of IN per mass of fungal mycelium. They did not indicate how the mass of the mycelium was determined (use of a precision balance to simply weight the tubes into which the mycelium was placed?). It would also be interesting for the reader to have an idea of the total mass of mycelia that was recovered for these tests (mg? g?, etc.).

P 7, L 6: It would help the reader if the title of this section indicated that the objective was to determine the mass of the ice nucleation active material. It is confusing because of the mention of mycelial mass in the previous section.

Discussion section: Other points that could be discussed concern propositions for follow-up work to better understand the ecological context of *Mortierella alpina*. Molecular markers could be developed based on the strain collection the authors have established to enlarge the survey beyond the soils studied here so as to map the occurrence of these fungi. Their presence in soil could then be compared with the INA of the associated organic soil dust in the search of correlations to explain the origin of the organic

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INA material in soil dust.

P 13, L 12: The work presented here does not offer any support to this sentence (“The effect of biogenic IN might. . .”). It would be more appropriate to say that the pool of biological and biogenic IN might be larger than currently estimated.

Table 1a: It would be useful if the names of the sampling locations were indicated.

Table 4 and Figure 2: Somewhere in the document, and best in this table and figure, information about the behavior of the reference fungi (*Fusarium* spp.) should be presented.

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