

Interactive comment on “Surfaces of Silver Birch (*Betula pendula*) are Sources of Biological Ice Nuclei: *In-vivo* and *In-situ* Investigations” by Teresa M. Seifried et al.

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In this exploratory work, the authors attempt to assess the amount of ice nucleation active macromolecules that could be released from plants during, for example, a rainfall due to the washing effect of rainwater. This case study focuses on the cold-adapted tree *Betula pendula* (birch) that is known to produce ice-nucleating macromolecules. The long-term goal is to assess the extent of plants' contribution to the bulk of ice nucleation active particles of biological origin in the environment – in leaf litter in particular – and eventually in the atmosphere.

The methods and sampling design are adequate for this exploratory project and they

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permit the authors to make approximations about the amount of ice nucleating particles that could potentially be released and if they are reasonable in comparison to the amounts captured in rainwater under birch trees. Based on the way that the information is presented, it is clear that the authors are not defending this as the last word on the subject, but rather as a first approximation, that opens the door for further investigations.

It is out of character for me to have so few criticisms of a manuscript in this area of research, but I feel that the authors have not over-sold the implications of their work and that the methods are appropriate and well-conducted. Furthermore, the introduction is very interesting and presents pertinent motivation for this work all while informing the reader that we are at the start of a new direction of investigations.

My one criticism concerns the details of the scenario that the authors propose for how these ice-nucleating macro-molecules enter the atmosphere. In line 289 the authors state “... Highlighting the possible pathways of INMs to be transported into the atmosphere during rainfall.” Aside from this not being a complete sentence, this remark does not account for the general trend of downward flux of atmospheric particles during a rainfall. During rainfall the INM released by plants will most probably be washed to the ground and be incorporated into litter. Depending on their hydrophilicity, they might be washed into the soil and percolate into the groundwater, etc. Even if they remain in the litter, there will need to be sufficient turbulence at the ground level to move these INM's into the atmosphere from their situation under the canopy. I am not saying that this is not possible. Rather, I think that the authors need to add some details to their story to suggest a more plausible pathway of how the INM's will get into the atmosphere. This scenario will set the stage for the types of experiments that will need to be conducted in the future to fill in the gaps of knowledge.

SPECIFIC COMMENTS All specific comments concern spelling: Line 35: replace “regarding by “of” Line 186: replace “leave” by “leaf” Line 240: replace “indispensably” by “indispensable” Table 1 title: replace “Information of” by “Information for” Figure 6

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legend: replace “All rain samples collected are” by “All rain samples collected were”

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