We would like to thank Cindy Morris for her review and positive assessment of our manuscript, and we appreciate her comments and criticism, which are very helpful for improving the manuscript. The comments and our answers are listed below. The referee's comments are marked with blue letters, the responses of the authors are written in green.

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 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 in-formation 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

Author's response:

Indeed, it is important to discuss possible pathways of INMs from the tree into the atmosphere more specific.

Therefore, we changed the incomplete sentence in line 312 "*Highlighting the possible pathways of INMs to be transported into the atmosphere during rainfall."* and added our assumptions more clearly:

'*The exact pathway of INMs being transported from the trees into the atmosphere during rainfall is still not elucidated. One natural assumption would be that INMs are washed off the tree's surface and deposit on the ground surface (i.e. leaf litter or soil). Through strong winds at the ground level, INMs could be aerosolized through abrasive dislodgment and transported further. Another pathway would be that the aqueous INM extracts on the ground form a liquid film and get aerosolized during the mechanical impact of following rain droplets, similar to the bioaerosol generation mechanism suggested by Joung et al. (2017); Wang et al. (2016); Kim et al. (2020). Thereafter, splash induced aerosol can be transported further during turbulent wind events and convection.'*

SPECIFIC COMMENTS:

All specific comments concern spelling:

Line 35: replace "re-garding by "of"

Line 186: replace "leave" by "leaf"

Line 240: replace "indispensibly"by "indispensable"

Table 1 title: replace "Information of" by "Information for"

Figure 6 legend: replace "All rain samples collected are" by "All rain samples collected were"

Author's response:

We thank the referee for her remarks and changed the spelling accordingly in the manuscript.

References:

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Kim, S., Wu, Z., Esmaili, E., Dombroskie, J. J., and Jung, S.: How a raindrop gets shattered on biological surfaces, Proceedings of the National Academy of Sciences of the United States of America, 117, 13901-13907, https://doi.org/10.1073/pnas.2002924117 2020.

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