

Dear Dr Stoy,

We would like to acknowledge the suggestions from Professor Hinrich Grothe in response to our revised manuscript entitled '*High Interspecific Variability in Ice Nucleation Activity Indicates Pollen Ice Nucleators are Incidental*' submitted to *Biogeosciences*. We appreciate the important distinctions highlighted by Prof. Grothe and his thorough review of our study. In response to these points, we have removed the specific use of "polysaccharides" when referring to the ice nucleating macromolecules, added statements acknowledging that proteins are present in pollen solutions and highlighted that their further study would help to shed light on the role they play in the ice nucleation activity. The specific changes made to the manuscript are outlined below.

**Line 20** "The results suggest that a polysaccharide present in pollen is produced by plants for a purpose unrelated to ice nucleation and has an incidental ability to nucleate ice." is replaced with "The results suggest that these macromolecules are produced by plants for a purpose unrelated to ice nucleation and have an incidental ability to nucleate ice."

**Line 55** "Both the chemical nature and biological function of these INMs remains unclear, although it seems very likely that they are polysaccharides (Dreischmeier et al., 2017)" is replaced with: "Both the chemical nature and biological function of these INMs remain unclear. Growing evidence suggests that polysaccharides are not exclusively responsible for pollens' ability to nucleate ice. Burkart et al. (2021) and Wieland et al. (2024) present evidence that proteins in *Betula pendula* pollen solution play a role in its IN activity."

**Line 280** "polysaccharides" is replaced with "soluble material".

**Line 296** "It must also be noted that proteins are present in pollen solutions (Pummer et al., 2013; Burkart et al., 2021) and associated absorption signals may be masked by stronger polysaccharide absorbances. Further investigation of the structure and variation of proteinaceous material across species' pollen would be of value to disentangle the role of protein and polysaccharide constituents in the measured IN activity." is added.

**Line 446, Line 448 and Line 457** "polysaccharides" is replaced by "INMs".

**Line 459** "...large polysaccharides or polysaccharide aggregates..." is replaced by "... large molecules or molecular aggregates...".

**Line 462 and Line 464** "polysaccharide" is replaced by "macromolecule".

We thank the reviewers and the editorial team for facilitating an engaging discussion and improvements to our manuscript and we hope that these changes adequately address the suggestions made.

Yours sincerely,

Nina Kinney and Tom Whale

