Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2018-394-RC2, 2018

Atmospheric Chemistry and Physics Discussions

Interactive comment on "CCN activity of six pollenkitts and the influence of their surface activity" *by* Nønne L. Prisle et al.

Anonymous Referee #2

Received and published: 6 July 2018

The paper deals with laboratory measurements of hygroscopicity and CCN activity of particles obtained by the aerosolization of a biological material – the pollenkitt – which is found in nature as coating of pollen grains. The results provide convincing evidence of surface tension effects on the CCN activation of submicrometric particles obtained by pollenkitt. The experimental data, interpreted on the basis of Koehler theory analysis, indicate that the partitioning of surface-active organic substances of pollenkitt reduce but not cancel the surface tension depression in activating cloud droplets. I found no errors in the methodology. My main concern is instead about the actual impact of these results: is that simply that pollenkitt aerosols are proved to be good CCN? Or that the interactions between organic compounds of pollenkitt with water have implications for the allergenicity of pollen? Or again is the emphasis on the fact that it was possible

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Discussion paper

to observe surface tension effects in CCN nucleation studies using the Koehler theory analysis, contrary to the first studies introducing the partitioning model? Depending on the actual focus of the paper, the Authors should provide a more systematic comparison with the literature. If the fragmentation of pollen grains is actually a source of pollenkitt aerosols in the atmosphere, as suggested by the work of Steiner et al. (2015), in what kind of environments this process can actually provide a significant contribution to CCN concentrations? Is this study relevant for representing CCN formation in the pre-industrial atmosphere? Or in certain pristine regions in the tropics, like the Amazon basin, where new particle formation does not occur and the generation of new submicron particles can be regulated by primary biological emissions (Poehlker et al. Science, 337, 10.1126/science.1223264, 2012)? In summary, the impacts of the present study should be more clearly stated by providing an appropriate context.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2018-394, 2018.