

4.096 Cloud Condensation Nuclei Properties of Pollen Grains.

Early Career Scientist

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Abstract:

Atmospheric aerosol particles are known to have a direct effect on climate through scattering and absorbing incoming solar and planetary radiation. They also indirectly affect climate by acting as cloud condensation nuclei (CCN) and modifying cloud forcing and hydrological cycle. The least understood components include the primary biogenic aerosols (PBAs), such as pollen grains, which represent a significant fraction of the total aerosol component in the atmosphere. A number of prior studies have shown that PBAs have high ability to act as CCN and ice nuclei [1]. At the present time, pollen is not considered as one of the key parameters in climatic models due to the large size and short lifetime in the atmosphere. However, under high humidity pollen grains can rupture to form submicron subpollen particles (SPP) that as well can serve as CCN. A rather significant part of subpollen particles arising from fragmentation of the initial particles is not included in the latest climatic models: that leads to significant inaccuracy in estimations.

In this study the CCN ability of 3 different types of SPP typical for boreal forest biom in the size range 20-300 nm was analyzed. The CCN concentration of the size-selected particles and cloud condensation nuclei parameters in the water vapor supersaturation range of 0.1-1.1% were determined for birch (*Betula pendula*), pine (*Pinus silvestris*) and rape (*Brassica napus*) samples. Also the parameter κ which characterizes the chemical composition effect on the hygroscopicity of CCN-active particles has been determined.

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References

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