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Chamber experiments to investigate the release of fungal IN into the atmosphere

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Biological aerosol particles are ubiquitous in the atmosphere. Several types of microorganisms like bacteria, fungi and lichen have been identified as sources of biological ice nuclei (IN). They are a potentially strong source of atmospheric IN, as some of them are able to catalyze ice formation at relatively warm subfreezing temperatures. Common plant-associated bacteria are the best-known biological IN but recently ice nucleation activity in a variety of fungal species such as *Mortierella alpina*, *Isaria farinosa*, *Acremonium implicatum* was found. These fungal species are widely spread throughout the world and are present in soil and air. Their IN seem to be proteins, which are not anchored in the fungal cell wall. To which extent these small, cell-free IN are emitted directly into the atmosphere remains unexplored just as other processes, which probably indirectly release fungal IN e.g. absorbed onto soil dust particles.

To analyze the release of fungal IN into the air, we designed a chamber, whose main principle is based on the emission of particles into a closed gas compartment and the subsequent collection of these particles in water. The concentration of the collected IN in the water is determined by droplet freezing assays. For a proof of principles, fungal washing water containing cell-free IN was atomized by an aerosol generator and the produced gas stream was lead through a water trap filled with pure water.

Preliminary results show a successful proof of principles. The chamber design is capable of collecting aerosolic IN produced by an aerosol generator with fungal washing water.

In ongoing experiments, alive or dead fungal cultures are placed into the chamber and a gentle, particle free air stream is directed over the fungi surface. This gas stream is also lead through water to collect particles, which might be emitted either actively or passively by the fungi. Further experiments will be e.g. conducted under different relative humidities. Results obtained from the analysis of various fungal species as well as soil dust fungi mixtures will be revealed.