



Characterization of the ice nucleation activity of an airborne *Penicillium* species

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Microorganisms are ubiquitous both on and above the Earth. Several bacterial and fungal species are the focus of atmospheric studies due to their ability to trigger ice formation at high subzero temperatures. Thus, they have potential to modify cloud albedo, lifetime and precipitation, and ultimately the hydrological cycle. Several fungal strains have already been identified as possessing ice nucleation (IN) activity, and recent studies have shown that IN active fungi are present in the cultivable community of air and soil samples [1, 2]. However, the abundance, diversity, and sources of fungal ice nuclei in the atmosphere are still poorly characterized.

In this study, fungal colonies obtained from air samples were screened for IN activity in the droplet-freezing assay described in Fröhlich-Nowoisky et al., 2015 [2]. Out of 128 tested isolates, two were found to catalyze ice formation at temperatures up to -4°C . By DNA analysis, both isolates were classified as *Penicillium* spp. The freezing activity of both was further characterized after different filtration, heat, and enzymatic treatments in the temperature range from -4°C to -15°C . Preliminary results show that a proteinaceous compound is responsible for the IN activity. Furthermore, ongoing experiments indicate that the activity is associated only with the hyphae.

[1] Huffman, et al. (2013): Atmos. Chem. Phys., 13, 6151–6164.

[2] Fröhlich-Nowoisky et al. (2015): Biogeosciences, 12: 1057–1071.