



Determination of suspendable ice nuclei from various pollen species

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Heterogeneous ice nucleation is an important process in cloud glaciation. On the one hand, ice clouds increase the albedo (Mishchenko et al. 1996), leading to a cooling effect, and on the other hand tend to a faster precipitation (Lohmann 2002) and therefore reduce the total cloud albedo, which has a direct influence on the climate and weather. However, many processes involved are still not entirely understood and only poorly described which makes it difficult to forecast these effects for climate modelling. Therefore detailed laboratory studies are inherently necessary.

Only recently, Pummer et al. (2012) have shown that pollen emitted from trees originating from the Northern timberline carry active ice nuclei, which are suspendable macromolecules. So far little is known about the structures and functionalities of these molecules. Here we present several analytical strategies we use to separate the responsible species (via solid phase extraction with different columns like C18 and PH) and solve the structure including different forms of mass spectrometry (MS) like the intact cell MS and matrix assisted laser desorption/ionization (MALDI) MS, which give access to the molecules in question. For identification, the surface molecules are compared with those washed out from pores and from pollen that burst due to osmotic pressure.

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