Towards parameterising atmospheric concentrations of ice-nucleating particles active at moderate supercooling

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Author(s) Mignani, Claudia; Wieder, Jörg; Sprenger, Michael A.; Kanji, Zamin A.; Henneberger, Jan; Alewell, Christine; Conen, Franz
Author(s) at UniBasel Mignani, Claudia ; Alewell, Christine ; Conen, Franz ;
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A small fraction of freezing cloud droplets probably initiates much of the precipitation above continents. Only a minute fraction of aerosol particles, so-called icenucleating particles (INPs), can trigger initial ice formation at -15 degrees C, at which cloud-top temperatures are frequently associated with snowfall. At a mountaintop site in the Swiss Alps, we found that concentrations of INPs active at -15 degrees C can be parameterised by different functions of coarse (> 2 mu m) aerosol particle concentrations, depending on whether an air mass is (a) precipitating, (b) non-precipitating, or (c) carrying a substantial fraction of dust particles while non-precipitating. Consequently, we suggest that a parameterisation at moderate supercooling should consider coarse particles in combination with air mass differentiation.
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