The Significance and Measurement of Ice Nucleating Particles (INPs) in the Atmosphere

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Understanding the role of ice nucleating particles (INPs) in cloud formation in the troposphere is an essential feature for predicting future climate, but is not well researched or understood. Heterogeneous ice crystal formation in clouds can happen when cloud droplets containing INPs act as surfaces for ice crystal generation and growth. INPs impact cloud properties such as lifetime and whiteness and in turn affect climate. INPs include mineral dusts, biological materials, carbonaceous combustion aerosols, and volcanic ash. We apply a new experimental technique instrument used to quantify the concentration of ice nucleation is called the microlitre Nucleation by Immersed Particle Instrument (μL-NIPI) in which droplets of microliter volume containing ice-nucleating material are cooled down at a controlled rate and their freezing temperatures recorded. Valuable data has already been obtained. The result shows that when the temperature decreases the concentrations of INPs increases and meteorological conditions such as wind speed, temperature and relative humidity as well as the trajectories of the air masses affected the INPs concentrations. Higher concentrations were observed on days when the winds were stronger.