



Joint Analytical Chemistry & Atmospheric
Sciences Presentation

Special Analytical Seminar

Monday, October 1 at 10:00 am, room 9341

Cirrus clouds are an important factor in the Earth's climate system. These clouds exert a large radiative forcing due to their extensive global coverage and high altitude despite minimal physical and optical thickness. We measured chemical and physical properties of the aerosols on which cirrus ice crystals formed in situ and in real time using a laser ablation single particle mass spectrometry technique deployed aboard a high altitude NASA research aircraft. Ice residual particles were also collected for off-line laboratory investigation including electron microscopy. Measurements from a number of locations spanning from the mid-latitudes through the tropics and during multiple season indicate that in most cases aerosol composition had a significant impact on the nucleation of the ice phase. One particularly im-

portant driver of the nucleation process was the surface composition of the particles and if they had a structural similarity to water ice. Mineral dust and some metallic particles were highly enhanced in the ice phase when compared to their abundance outside of cloud. Particles such as soot and biological material, previously suggested as ice nuclei, were not found either due to a poor crystalline match or low abundance. Atmospheric implications of these measurements and more advanced future analyses will be discussed.



How Can the Chemical Composition of
Atmospheric Particles Affect Cloud
Formation?

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