Name of research institute or organization:

## University of Manchester, School of Earth, Atmospheric and Environmental Sciences

Title of project:

CLACE -4

Project leader and team:

Professor T.W. Choularton, Dr. K.N. Bower, Dr. H. Coe, Dr. M.W. Gallagher, Dr. P. Connolly, Dr. M.J. Flynn

Project description:

Measurement of cloud and aerosol properties at the Sphinx laboratory on the summit of the Jungfraujoch mountain top ridge. Externally, measurements were made of the cloud microphysics, including the cloud liquid water content, ice water content, ice crystal habit and size distribution, droplet size distribution in mixed phase clouds, together with measurements of high frequency windspeed and direction and of the atmospheric visibility. In addition, internally within the laboratory (by sampling on the PSI switching inlet system) the size resolved chemical composition of the non-refractory fraction of the atmospheric aerosol, from both the cloud residual and cloud interstitial particles was measured by means of an Aerodyne Aerosol Mass Spectrometer (AMS).

It was found that mixed phase cloud was common at the site. On some occasions this was locally mixed, with cloud droplets and ice crystals co-existing in the same volume of cloud. This tended to occur in young clouds formed by local ascent. In older clouds it was often found that cloud which was on average mixed phase consisted of neighboring regions that were totally ice and regions that were predominantly supercooled liquid water. The boundary between these regions was often very sharp. These findings have important implications for the way in which mixed phase clouds are treated in global climate models. The aerosol measurements contributed to the joint work which has lead to the conclusion that the ice crystal residues consisted predominantly of refractory material and that dust aerosol were the dominant ice nuclei. This is despite the dominance of sulphate and organic aerosol particles in both the number concentration and mass loading.

Key words:

Mixed phase clouds, ice crystals, aerosol composition, aerosol mass spectrometry

Collatorating partners/networks:

PSI, IFT

Scientific publications and public outreach 2005:

Conference Papers

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