Geophysical Research Abstracts
Vol. 13, EGU2011-11053-1, 2011
EGU General Assembly 2011

Ambient measurements of ice nuclei with a new version of the Fast Ice Nuclei CHamber FINCH-HALO

Björn Nillius, Heinz Bingemer, Holger Klein, Joachim Curtius, and Ulrich Bundke
Frankfurt, Institute for Atmospheric and Environmental Sciences, Frankfurt, Germany (nillius@iau.uni-frankfurt.de)

Ambient measurements of ice nuclei with a new version of the Fast Ice Nuclei CHamber FINCH-HALO

Nillius, B., Bingemer, H., Klein, H., Curtius, J. and Bundke, U.

Ice nuclei (IN) initiate the formation of primary ice in tropospheric clouds. In mixed phase clouds the primary ice crystals can grow very fast by the Bergeron-Findeisen process (Findeisen, 1938) at the expense of evaporating water droplets, and form precipitation. Thus, IN are essential for the development of precipitation in mixed phase clouds in the middle latitude. However, the role of IN in the development of clouds is still poorly understood and needs to be studied (Levin and Cotton, 2007).
FINCH-HALO, a new version of the Fast Ice Nuclei CHamber (FINCH) for operation on the High And LOng Range research aircraft (HALO) was developed at the Institute for Atmospheric and Environmental sciences of the University of Frankfurt. IN particles are activated within the chamber at certain ice super-saturation and temperature by mixing only two flows instead of four in the first version of FINCH (Bundke, 2008), an aerosol flow and a cold flow. After activation the particles will grow within a processing chamber. Droplets and ice crystals are detected separately by an optical depolarisation detector. A new cooling unit allows measurements down to a temperature of -55°C.
Parallel measurements of IN number concentration at -18°C and relative humidity with respect to ice of 115% in ambient air at Frankfurt University campus by FINCH-HALO and the static isothermal diffusion chamber FRIDGE (Bundke, 2008) are compared.

References:
Bundke U., B. Nillius, R. Jaenicke, T. Wetter, H. Klein, H. Bingemer, (2008).
The Fast Ice Nucleus Chamber FINCH,
Atmospheric Research, doi:10.1016/j.atmosres.2008.02.008

Findeisen, R., (1938).
Meteorologisch-physikalische Begebenheiten der Vereisung in der Atmosphäre.
Hauptversammlung 1938 der Lilienthal-Gesellschaft.

Levin, Z., W. Cotton, (2007).
Aerosol pollution impact on precipitation: a scientific review.
The WMO/IUGG International Aerosol Precipitation Science Assessment Group (IAPSAG).
World Meteorological Organization, Geneva.

Acknowledgements:
This work was supported by the German Research Foundation, SPP 1294: Atmospheric and Earth system research with the "High Altitude and Long Range Research Aircraft"