



Ice nucleating particles at the Mt. Kenya GAW Station

Yannic Maier (1), Lisa Schneider (1), Erik S. Thomson (2), Jan B.C. Pettersson (2), Samuel Gaita (2), Martin Ebert (3), Martin Steinbacher (4), Michael Gatari (5), Jann Schrod (1), Daniel Weber (1), Joachim Curtius (1), and Heinz G. Bingemer (1)

(1) Goethe Universität Frankfurt am Main, inst. für Atmosphäre und Umwelt, Frankfurt am Main, Germany (bingemer@iau.uni-frankfurt.de), (2) Atmospheric Science, Department of Chemistry and Molecular Biology, University of Gothenburg, Gothenburg, Sweden, (3) Institute for Applied Geosciences, Technical University of Darmstadt, Darmstadt, Germany, (4) Empa, Swiss Federal Laboratories for Materials Science and Technology, Duebendorf, Switzerland, (5) Institute of Nuclear Science & Technology, University of Nairobi, Nairobi, Kenya

The number concentration and composition of ice nucleating particles (INP) at Mt. Kenya Global Atmosphere Watch (GAW) Station ($0^{\circ} 9' S$, $37^{\circ} 19' O$, 3678 m a.s.l.) were measured during August and September 2015. With the ITCZ being located some 1900 km north of the station predominantly southern hemispheric air was sampled during the campaign. 50 aerosol samples were collected by electrostatic precipitation of particles onto silicon wafer substrates. The number of INP active in the deposition and condensation modes between $-20^{\circ}C$ and $-30^{\circ}C$ was measured in the laboratory by the isothermal static diffusion chamber FRIDGE. The chemical composition of individual INP on the substrate was investigated by electron microscopy and EDX analysis of particles at the sites where the growth of ice was observed in the FRIDGE measurements.

Very regular daytime anabatic and nighttime katabatic winds characterize the circulation at Mt. Kenya. The diurnal patterns of specific humidity, carbon monoxide, ozone and of aerosol particles (AP) of $0.3-20 \mu m$ diameter clearly display the rise of boundary layer air to the station during the day and the subsidence of clean air from the free middle troposphere during the night. The concentrations of INP (at $-30^{\circ}C$) and of AP were significantly higher during daytime (at 11 a.m.) than at night (2 a.m.). However, the fraction of AP that were activated as INP and the INP active site density were significantly larger in the nighttime samples than for those samples collected during the day.

Electron microscopy analysis of individual INP identified aluminosilicates, C-rich particles, and mixtures of aluminosilicates with carbon or carbonates as the major components. The majority of INP were from 1 to $5 \mu m$ diameter.