



IAGOS



IAGOS - CARIBIC aerosol measurements



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The Leibniz Institute for Tropospheric Research and the University Lund provide the CARIBIC aerosol instruments

Instrument/Technique	Measured Species
Condensation Particle Counter (3x CPCs)	Integral particle number concentration > 4, 12, and 18 nm
Optical Particle Counter (OPC)	Particle size distribution between 0.1 and 1.0 μm
Particle Impactor Sampler Laboratory elemental analysis using PIXE, PESA, and (EF)TEM	Particulate H, C, N, O, S, K, Fe, Ni, et al., Particle morphology

Instrumentation

- dedicated aerosol inlet system
- three aerosol rack units plus one pump unit



CARIBIC Inlet



CARIBIC CPC Unit



CARIBIC Impactor

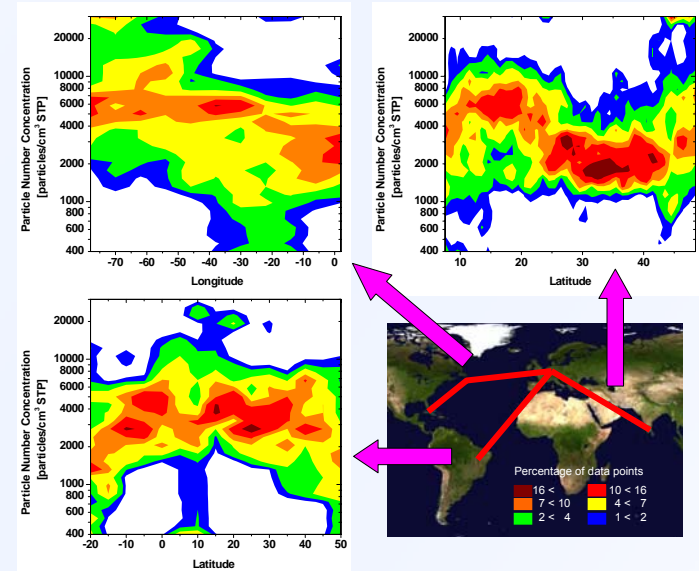


Impactor Nozzles



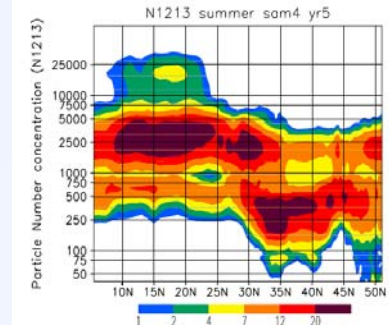
Sample Housing

First UT/LS Particle Probability Distributions



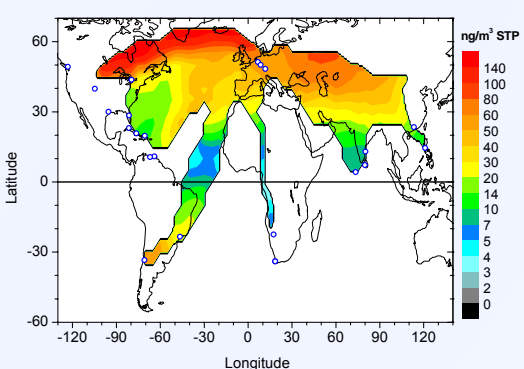
Probability distribution of Aitken mode particle ($d_p > 12 \text{ nm}$) number concentration in 8-12 km altitude in NH summer along three flight routes.

Model Comparison and Validation



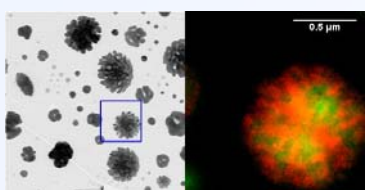
Probability distribution of Aitken mode particle number concentration ($d_p > 12 \text{ nm}$) on the Indian route, calculated with the MAECHAM4/SAM model. (by courtesy of Claudia Timmreck, MPI-HH)

First "Global" Maps for Particles in the UT/LMS



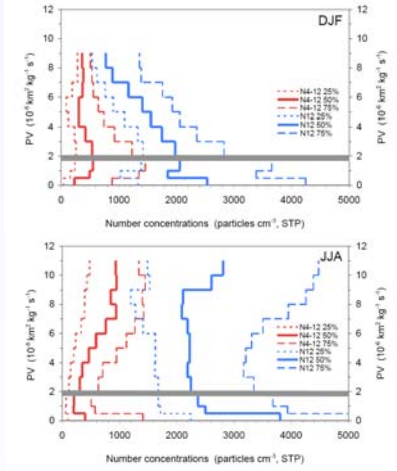
Particulate sulphur concentration in 8-12 km altitude.

Particle Composition and Morphology



Transmission Electron Microscopy (TEM; left) and Energy-Filtered TEM (EFTEM; right), where red and green colors indicate carbonaceous and sulfurous constituents, respectively. Particles were sampled in the lowermost stratosphere at potential vorticity of 6 PVU.

Vertical Profiles



Vertical profiles for nucleation (N_{4-12}) and Aitken mode (N_{12}) particles in the mid-latitude LMS, for winter and summer. Grey bars denote the position of the dynamic tropopause.