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Measurements of ice particles in the UTLS during SCOUT and AMMA

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In-situ measurements of ice crystal size distributions were performed within the tropical troposphere and lower stratosphere. To achieve measurements over a broad size range a combination of a Cloud Imaging Probe (CIP) and a Forward Scattering Spectrometer Probe (FSSP-100), installed on the Russian high altitude research aircraft M55 Geophysica, was used. While the FSSP obtains ice particle size distributions in the size range of 2-47μm, also single particle information along with particle shapes are provided by the CIP as it delivers 2-dimensional shadow images of particles in the size range of 25-1600μm. The data were acquired during the SCOUT-O_3 campaign in Darwin, Australia in 2005 and during AMMA, Ouagadougou, Burkina Faso in 2006.

In focus of both campaigns were measurements connected to convective systems. The objective of the SCOUT campaign was to characterise the outflow of the Hector convective system over the Tiwi Islands (north of Darwin). Whereas measurements of MCS close up and MCS outflow were performed during AMMA. Comparisons of these data will be shown in the presentation.

Amongst measurements of ice particle size distributions vertical distributions of effective radius and IWC will be presented. A decrease of effective radius of the ice cloud particles in the tropical troposphere has been found in altitudes of about 10km up to the tropopause. In six cases during SCOUT ice clouds have been observed in the stratosphere, up to 1.4km above the local tropopause. These encounters were a result of overshooting convection from the outflow of the Hector storm system.