

Temperature and trace gas retrievals for the CRISTA-NF aircraft experiment

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The new remote sensing experiment CRISTA-NF (Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere - New Frontiers) successfully participated in the SCOUT-O3 Tropical Aircraft Campaign in November/December 2005. CRISTA-NF operated aboard the high-altitude research aircraft M-55 Geophysica. Mid-infrared spectra (4-15 micron) were measured in the limb-sounding geometry with quite high spatial resolution (vertical sampling in the order of 250 m). Measurements were carried out during transfer flights between Oberpfaffenhofen (Germany) and Darwin (Australia) as well as during several local flights near Darwin. The presentation summarizes important aspects of Level 2 processing of CRISTA-NF data. The rapid forward model JURASSIC, recently developed in Juelich, and the standard optimal estimation approach are applied to retrieve atmospheric parameters from CRISTA-NF spectral measurements. Target parameters for the retrieval are temperature and trace gas abundances (H₂O, O₃, HNO₃, CFCs) in the upper troposphere and lower stratosphere. Retrieval errors due to instrument errors (e.g. uncertainties of radiometric calibration and line-of-sight pointing) are estimated and influence of a priori on the results is characterized.