Geophysical Research Abstracts, Vol. 9, 00633, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00633

Water vapour above overshooting continental convective systems from balloon observations during SCOUT-AMMA.

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The possible impact of meso-scale convective systems (MCS) on water vapor in the lower stratosphere has been explored by a series of six backscatter / ozone / H2O soundings in August 2006 from Niamey (13N, 2E) in West Africa using the backscatter instrument of the University of Wyoming, an ECC ozone cell and a FLASH Lyman alpha hygrometer, all flown on the same balloon. All profiles downwind or next to MCS show saturation, sometimes sursaturation, (5-6 ppm H2O) and cirrus clouds at the tropopause at 16-16.5 km around -78°C, surmounted by a broad minimum of 4.2 ppm at 20 km with highly variable H2O layers superimposed and then almost constant mixing ratio (5.5-6 ppm) from 22 to 31 km. The frequent moist layers between the tropopause and 20 km suggest that water could penetrate the stratosphere up to at least 450 K potential temperature levels. The locations of the MCS potentially responsible for water injection upwind are explored from satellite pictures combined with backward trajectories.