



Time-Resolved Profiling of Stratospheric Radical Species by Balloon-Borne Skylight Limb Observations

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A balloon-borne spectrometer performing skylight observations in limb geometry was deployed for the first time at low latitudes in North-Eastern Brazil (5° S, 43° W) in June 2005. Absorption spectra of UV/vis absorbing trace gases were measured from different balloon platforms (LPMA/DOAS, MIPAS, LPMA/IASI) in the upper troposphere and lower stratosphere. The instrument provides time-resolved profile information of atmospheric trace-gas species such as O_3 , NO_2 , HONO, BrO, OCIO, IO, and OIO by limb-scanning through the atmosphere in cycles of typically 15 minutes duration. The measured spectra are analysed applying the differential optical absorption spectroscopy (DOAS) method. When combined with 3D radiative-transfer modeling and an optimal estimation inversion technique, stratospheric concentration profiles of the targeted trace-gases can be inferred for each limb scan [Weidner *et al.*, 2005].

This presentation will concentrate on measured profiles of O_3 , NO_2 and HONO, the latter being measured for the first time in the free tropical troposphere and tropical tropopause layer (TTL). Maximum mixing ratio up to 250 ppt were observed in an height of 15 km. Using simultaneously measured O_3 and NO_2 and meteorological data, measured HONO can best be explained by lightning produced NO_X and HO_X ,

which as a side product may produced the detected HONO within the thunderstorm cloud and in the outflow the convective system.