Geophysical Research Abstracts, Vol. 9, 08704, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08704

Inorganic iodine and bromine in the coastal troposphere of northeastern Brazil

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In Dec. 2004/Jan. 2005 and June 2005 the marine boundary layer and upper tropical troposphere of northeastern Brazil was probed for organic bromine and iodine species, and their inorganic products (BrO, IO, and OIO). At the coastal site Alcantara (2,39˚S, 44,38˚W), large concentrations of some of the major short-lived organic gases, VSLS (e.g. CH3Br: 12 – 24 ppt; CHBr3: 0.5 – 9.5 ppt; CH3I: 2 – 12 ppt; CH2BrCl: 0.2 ppt; CHCl2Br: 0- 3 ppt, CHClBr2: 0.2 – 0.8 ppt; CH3SCH3: 1 – 8 ppt) were found in near surface air, which indicates significant emissions of the species from the surrounding marine environment, and possibly/partly by biomass burning. Simultaneous detection of halogen oxides by long-path DOAS measurements in near surface (10 – 30 m height) and low in NOx ($\sim$300 ppt) air indicated typical concentrations for IO and BrO of 0.5 ppt and $<$1 ppt, at daytime and undetectable low concentrations $<$0.25 ppt and $<$1 ppt at nighttime, respectively,

Air collected by the University Frankfurt BONBON whole air sampler has been analyzed for a large suite of halogenated compounds, including some halogenated VSLS. These measurements are used to derive the organic bromine and iodine in the upper tropical troposphere (15 km) over Northeastern Brazil (5˚04'S, 42˚52'W). At the same time, we were probing the tropical UT/LS for inorganic bromine (BrO) and iodine (IO, and OIO) by balloon-borne solar occultation spectrometry. Combining both measurements with photochemical modeling allows us to conclude on the amount of source

(SG) and product gases (PG) to be transported into the tropical stratosphere.

The present paper reports on these findings and discusses the potential of VSLS emitted from the various tropical environments for ozone in the pristine tropical troposphere and UT/LS and for the budgets of stratospheric bromine and iodine.