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Very short lived halogenated organic gases in the tropical upper troposphere and lower stratosphere

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We report measurements of halogenated very short lived substances (VSLS) in the tropical upper troposphere/lower stratosphere (UTLS) over Northeastern Brazil (5°04'S, 42°52'W) in June 2005 in air samples collected with the University of Frankfurt "BONBON" balloon-borne whole air sampler. These include measurements of CH3I, CHBr3, CHCl3, CCl2CCl2, CH2Br2 and mixed bromochloromethanes. Most of these species exhibited a very marked decline in concentration over a small altitude range; i.e. about 15 - 17 km, becoming mostly less than detection limit about 18 km. Of particular interest was the occurrence of small but measurable concentrations of methyl iodide (about 0.2 ppt (I)), which has a photolytic lifetime of a few days, whereas bromoform, with a longer atmospheric lifetime, was almost entirely absent. Of the short-lived brominated gases, dibromomethane was the most abundant at 1.1 ppt (Br) at 15 km, followed by CH2BrCl at less than 0.1 ppt (Br). Chloroform declined from 5.5 ppt (Cl) at 15 km to 0.15 ppt (Cl) above 18 km. In addition we report measurements of various halons, CFCs, and chlorinated solvents, also made by negative ion chemical ionization mass spectrometry.