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Ground-based solar absorption measurements of CH_4, CO, C_2H_6, C_2H_2 and HCN in the tropics

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The composition of the tropical atmosphere and its change is of significant importance for global climate. Currently large uncertainties in the budgets of many trace gases in the tropics exist, mainly due to a lack of measurements in the tropics. Important climate research issues related to the tropics include: the entry of troposheric air into the stratosphere, interhemispheric transport; emissions from plants (e.g. methane) and emissions from biomass burning. Especially plant emissions of CH_4 have recently received attention, after satellite measurements suggested that plants represent a hithero unkown source of methane contributing up to 30% of the global methane emissions.

We have performed solar absorption Fourier Transform InfraRed measurements at Paramaribo, Suriname (5.83˚N, 55.17˚W) during four consecutive dry seasons, starting in autumn 2004. Currently these are the only remote sensing measurements performed in the inner-tropics over a longer time period. In the case of methane these measurements represent the only tropical ground-based remote sensing data of sufficient precision to validate satellite retrievals of CH_4. Here we present first results on methane (CH_4) and trace gases related to biomass burning, namely carbonmonoxide (CO), hydrogen cyanide (HCN), acetylene (C_2H_2) and ethane (C_2H_6). Methane retrievals are compared with model simulations, satellite retrievals from SCIAMACHY and in situ data from surface flask samples. In addition we investigate the pollution

from biomass burning using CO, C_2H_6, C_2H_2 and HCN. Backward-trajectories and global fire maps were used to identify the origin of the polluted air masses. Correlations between the different gases are analysed and compared to literature data.