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Latitudinal and vertical distribution of ethane retrieved from ground-based solar absorption measurements

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Measurements of the global variations of trace gases are important for the understanding of chemical and dynamical processes that control the distribution of these trace gases. Emissions within the tropics, especially from biomass burning, contribute substantially to the global budgets of many important trace gases. Currently large uncertainties in the budgets of many trace gases in the tropics exist, mainly due to a lack of measurements.

Fourier Transform Infrared (FTIR) spectroscopy has been found to be one of the most suitable instruments for the measurements of atmospheric trace gases.

After methane, ethane is the second most abundant organic trace gas in the background troposphere. Because of its role as ozone precursor and its high reactivity, the oxidation of ethane is important for tropospheric chemistry.

Ethane can serve to test predictions of atmospheric chemistry transport models and to check the impact of sources of atmospheric trace gases.

We performed solar absorption FTIR measurements on board the German research vessel Polarstern during five cruises on the Atlantic between 1996 and 2005 and at the tropical site Paramaribo, Suriname (5.8˚N, 55.2˚W) between September 2004 and

November 2007.

Here we present the first tropical volume mixing ratio profiles of ethane and compare our results with model simulations from the MATCH-MPIC model. Additionally, air-borne measurements from balloons and aircrafts, and space-borne measurements from ACE will be used for comparison.

Observations such as these are valuable for evaluating ongoing improvements in global chemistry transport models. The combination of the FTIR-observations with space- and air-borne measurements together with model simulations is used to study the long-range transport of pollutants from the tropics to mid- and high latitudes.