

File Revision Date:

August 18, 2021

Data Set Description:

PI: Justus Notholt  
Responsible Scientists: Mathias Palm, Torsten Warneke  
Instrument: Bruker IFS 120 M, new electronic  
Site(s): Paramaribo, Suriname (5.8 N, 55.2 W, 20 m a.s.l.)  
Measurement Quantities:

Solar observations of atmospheric trace gases. Total columns of more than 20 trace gases, concentration profiles in up to 3-4 layers for a few trace gases on request.

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Reference Articles:

Petersen, A. K.; Warneke, T.; Lawrence, M. G.; Notholt, J. & Schrems, O. (2008), 'First ground-based FTIR observations of the seasonal variation of carbon monoxide in the tropics', *Geophys. Res. Lett.* 35(3), L03813.

Warneke, T.; Petersen, A. K.; Gerbig, C.; Jordan, A.; Rödenbeck, C.; Rothe, M.; Macatangay, R.; Notholt, J. & Schrems, O. (2010), 'Co-located column and in situ measurements of CO<sub>2</sub> in the tropics compared with model simulations', *Atmos. Chem. Phys.* 10(12), 5593-5599.

Petersen, A. K.; Warneke, T.; Frankenberg, C.; Bergamaschi, P.; Gerbig, C.; Notholt, J.; Buchwitz, M.; Schneising, O. & Schrems, O. (2010), 'First ground-based FTIR observations of methane in the inner tropics over several years', *Atmos. Chem. Phys.* 10(15), 7231-7239.

Instrument Description:

Commercial interferometer, IFS120 M from Bruker GmbH, Karlsruhe Germany.  
max. possible optical path difference: 360 cm  
total spectral region used: 300 nm to 15  $\mu$ m.  
Internal parallel beam diameter: 6 cm  
Active solar/lunar tracker to focus the sun light on the entrance aperture.  
LN-cooled MCT-, InSb- and InGaAs detectors for the IR.

KBr-, and CaF2 Beamsplitters.

Algorithm Description:

The retrieval of the column abundances is performed by the GFIT algorithm an initial set of vmr profiles derived from MkIV balloon measurements (G. Toon, JPL), which were then stretched/compressed above 10 km altitude to account for day-to-day variations in the amount of subsidence.

The concentration profiles are derived using SFIT2/SFIT4, based on the optimal estimation method. The initial set of profiles stems from a dedicated WACCM run made for the NDACC community (J. Hannigan, UCAR).

Expected Precision/Accuracy of Instrument:

The errors tabulated in the main part of the data file, determined from the quality of the spectral fits, represent the 1-sigma measurement precisions. These errors are appropriate for comparing columns measured on different days. For most gases, the main systematic errors arise from uncertainties in the assumed vmr profiles shapes, and from uncertainties in the spectroscopic parameters (of both the target gas and interfering gases).

Instrument History:

- Measurements started in 2004.
- Participation in the STAR campaign 2004.
- until 12.2012: Bruker IFS 120M (AWI 019)
- since then: Bruker 120/5M (AWI 028) (updated with new electronic, housing refurbished.)
  
- since 2014 measurements year round with the help of local support