File Revision Date:
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Data Set Description:

PI: Justus Notholt, Thorsten Warneke and Mathias Palm
Instrument: Bruker IFS 125 HR
Site(s): Bremen, Germany, Spitsbergen (53.107 N, 8.854 E, 27 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:

J. Notholt, G. Toon, N. Jones, D. Griffith, T. Warneke, Spectral line finding program for atmospheric remote sensing using full radiation transfer, J. Quant. Spectros. & Rad. Trans., 2005.

Instrument Description:

Commercial interferometer, IFS125 HR from Bruker GmbH, Karlsruhe Germany.
max. possible optical path difference: 360 cm
total spectral region used: 300 nm to 15 um.
Internal parallel beam diameter: 6 cm
Active solar tracker to focus the sun light on the entrance aperture.
LN-cooled MCt- and InSb-detectors for the IR, Si- and GaP-diodes and photomultipliers for UV/Vis.
KBr-, CaF2- and quarzglass-beamsplitters.

Algorithm Description:

The retrieval of the column abundances is performed by the GFIT algorithm, which used temperature profiles from sondes daily launched at nearby stations (Emden), and an initial set of vmr profiles derived from MkIV balloon measurements (G. Toon, JPL), which were then stretched/compressed to account for variability of the tropopause height and subsidence.

The concentration profiles are derived using SFIT2/SFIT4, based on the optimal estimation method.

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:

- First measurements in August 2000 using the Bruker 120 HR interferometer.started in March 1992.
  (max. possible optical path difference: 360 cm)
- Since April 2004: IFS125 HR from Bruker GmbH