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Data Set Description:

PI:	Justus Notholt
Responsible Scientist:	Mathias Palm
Instrument:	Bruker IFS 120-5 HR
Site(s):	Ny-Aalesund, Spitsbergen (78.924 N, 11.939 E, 20 m a.s.l.)

Measurement Quantities: Solar and lunar (during polar night) 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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Instrument Description:

Commercial interferometer, IFS120 HR from Bruker GmbH, Karlsruhe Germany. Electronic upgraded.
max. possible optical path difference: 360 cm
total spectral region used: 300 nm to 15 um.
Internal parallel beam diameter: 6 cm
Active solar/lunar tracker to focus the sun light on the entrance aperture.
LN-cooled MCt-, InSb- and InGAS 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 launched daily in Ny-Aalesund, and 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.

Due to the much lower temperature of the moon compared to the sun the lunar observations have to be corrected to account for the atmospheric self emission.

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 March 1992.
-First lunar observations in December 1992.
-First FTUV/Vis observations in 1994.
-First emission observations in 1994.

-until 1995: Bruker IFS 120M (max. possible optical path difference: 257 cm)
-since then: Bruker 120 HR (max. possible optical path difference: 360 cm)

-2012 update of 120 HR to new electronic
-2015 automated measurements performed except the region 500-2100cm^-1 where operator assistance is still necessary.

Measurements until 1994 were performed by placing the instrument inside a thermostated container in Ny-Aalesund, approx. 10 m above sea level. Since 1994 the instrument is mounted inside the dedicated NDSC-building 200 m apart from the container location, approx. 20 m above sea level.