File Revision Date:

April 11, 2023

Data Set Description:

PI: Isamu Morino
National Institute for Environmental Studies (NIES), Tsukuba, Japan

Co-I: Isao Murata
Graduate School of Environmental Studies, Tohoku University, Sendai, Japan

Instrument: Infrared Fourier Transform Spectrometer (FTIR)

Site(s): National Institute for Environmental Studies (NIES), Tsukuba, Japan
36.05 N, 140.12E, 31m a.s.l.

Measurement Quantities: Column Density [molec/cm^2]: O_3, HNO_3, HCl, HF, CO, N_2O, CH_4, HCN, C_2H_6, $ClONO_2$, HCHO, OCS, NH_3, C_2H_2, NO_2

Volume mixing ratios [vmr]: O_3, HNO_3, HCl, HF, CO, N_2O, CH_4, HCN, C_2H_6, HCHO, OCS, NH_3, C_2H_2, NO_2

Contact Information:

Name: Isamu Morino

Address: Earth System Division, National Institute for Environmental Studies (NIES), Tsukuba, 305-8506, Japan

Phone: +81-29-850-2515

FAX: +81-29-850-2219

Email: morino@nies.go.jp

Reference Articles:

Hannigan, J. W., Ortega, I., Shams, S. B., Blumenstock, T., Campbell, J.E., Conway, S., et al. (2022). Global atmospheric OCS trend analysis from 22 NDACC stations. Journal of Geophysical Research: Atmospheres, 127, e2021JD035764. https://doi.org/10.1029/2021JD035764

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E. Mahieu, M. P. Chipperfield, J. Notholt, T. Reddmann, J. Anderson, P. F. Bernath, T. Blumenstock, M. T. Coffey, S. Dhomse, W. Feng, B. Franco, L. Froidevaux, D. W. T. Griffith, J. Hannigan, F. Hase, R. Hossaini, N. B. Jones, I. Morino, I. Murata, H. Nakajima, M. Palm, C. Paton-Walsh, J. M. Russell III, M. Schneider, C. Servais, D. Smale, and K. A. Walker, Recent Northern Hemisphere stratospheric HCl increase due to atmospheric circulation changes, Nature, 515, 104–107, doi:10.1038/nature13857 (2014).

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Batchelor, R. L., Blatherwick, R. D., Blumenstock, Th., Coffey, M. T., Demoulin, P., Fast, H., Feng, W., Goldman, A., Griffith, D. W. T., Hamann, K., Hannigan, J. W., Hase, F., Jones, N. B., Kagawa, A., Kaiser, I., Kasai, Y., Kirner, O., Kouker, W., Lindenmaier, R., Mahieu, E., Mittermeier, R. L., Monge-Sanz, B., Morino, I., Murata, I., Nakajima, H., Palm, M., Paton-Walsh, C., Raffalski, U., Reddmann, Th., Rettinger, M., Rinsland, C. P., Rozanov, E., Schneider, M., Senten, C., Servais, C., Sinnhuber, B.-M., Smale, D., Strong, K., Sussmann, R., Taylor, J. R., Vanhaelewyn, G., Warneke, T., Whaley, C., Wiehle, M., and Wood, S. W.: Observed and simulated time evolution of HCl, $ClONO_2$, and HF total column abundances, Atmos. Chem. Phys., 12, 3527-3556, doi:10.5194/acp-12-3527-2012, 2012.

Instrument Description:

A commercial Bruker IFS 125HR has been operated in Tsukuba since April 2010. The instrument is equipped with MCT and InSb detectors for NDACC measurements as well as InGaAs and Si detectors for TCCON ones. The nominal ranges covered with transmission > 50% are 846 - 1350, 1860 - 2100, 2020 - 2570, 2400 - 3100, 3070 - 3800, and 4065 - 4290 cm^{-1}, based on a standard set of NDACC/IRWG filters.

Algorithm Description:

Since May 2023, all data in the NDACC archive has been processed with the SFIT4 version 0.9.4.4 and will be reprocessed with the SFIT4 version 1.0.18 according to the NDACC/IRWG standard retrieval guidelines (www.acd.ucar.edu/irwg). In addition, the uncertainty estimates which are from retrievals with SFIT4, are included in the HDF archived data files along with the best estimate of the water vapor profile at the time of the measurement, the mixing ratio profile and the air mass profile.

Expected Precision/Accuracy of Instrument:

Current best estimates are given in the HDF files and are calculated for each retrieved profile.

Instrument History:

The measurements with a commercial Bruker IFS 120HR in the observation room of the Climate Change Research Hall at NIES and original solar tracker started in May 2001. This was used mainly for near infrared measurements (TCCON) but NDACC measurements

with filters #1 - #3 were also performed. The 120HR was replaced by 125HR in April 2010 and NDACC measurements with filters #1 - # 4 started. The measurements with filter #5 and #6 started in January 2014. Total columns and vertical profiles of the standard NDACC 10 species as well as HCHO, OCS, NH_3, C_2H_2, and NO_2 using SFIT4 are archived since 2014. The results for some species are also archived since 2010.

DOI:

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