

# Site report on Rikubetsu FTS

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## ▪ Operational:

- > Instrument: Bruker IFS120/5 HR
- > The number of measurement days (as of Jun. 01, 2021)
  - 2020: 1, 2, 3, 2, 1, 0, 3, 2, 1, 3, 1, 3: **22 days**
  - 2021: 1, 2, 4, 6, 3, -, -, -, -, -, -: **16 days**
- > Vertical distribution and column amount of 16 species (10 NDACC-standard species + OCS, CCl<sub>4</sub>, HCHO, C<sub>2</sub>H<sub>2</sub>, CH<sub>3</sub>OH, NO<sub>2</sub>) with SFIT4 (v0.944) were **retrieved from the spectra measured until 12/2020.**

## ▪ Archive status:

- > All the retrieved data for 10 NDACC-standard species were **archived at DHF in 05/2021.**

## ▪ Funding status:

- > seems to be stable. The instrument is operated by NIES as part of the GOSAT series validation activities.
- > a JSPS KAKENHI fund for a new research project (3 years: 2021-23) is accepted.

## ▪ Issues since the last online meeting:

- > Dec. 9, 2020: Sky radiometer was re-installed after repairment and intercomparison at MRI and started an operation.
- > Feb. 13, 2020 - Feb. 18, 2021: During the TCCON Measurements spectra with a Si detector with signal Gain Preamp: B were recorded. They might make saturations in spectra and large LSE values.
- > Mar. 26, 2021: Replacement of a laser for the Mie lidar and starting continuous operation.

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## ▪ Activity during COVID19 period and predicted over the next year:

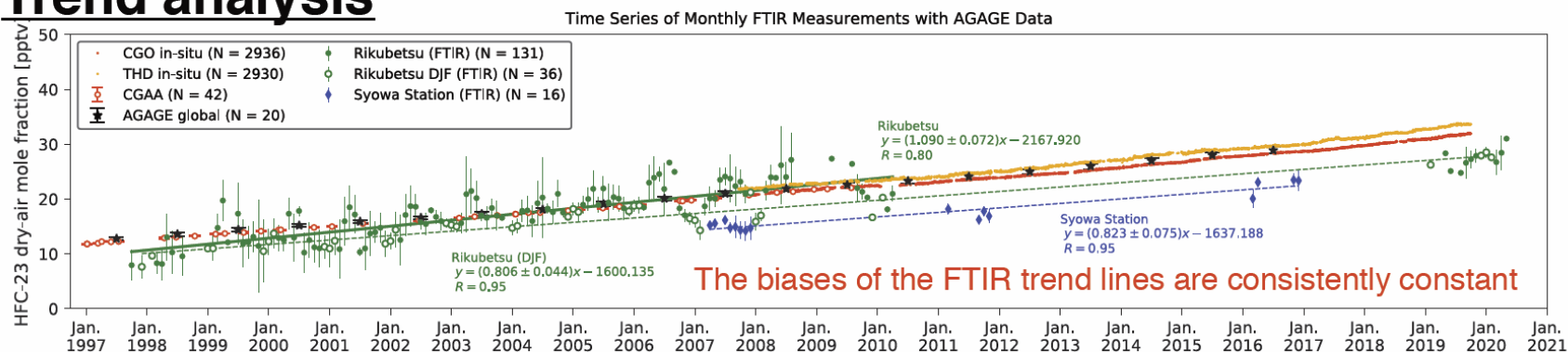
- > NDACC-mode measurements have been made regularly, and are expected to continue in the future.
- > **Postpone the replacement** of the current FTS (120/5 HR) with a new 125 HR FTS  
The new FTS will be installed by the end of FY2021 (Mar. 2022).
- > **Installation of FTIR system** (120HR, previously used in Moshiri) **in Nagoya**  
as one of instruments for a new research project “Studies on the behavior of atmospheric isoprene and long-term variations of its effects on air quality using infrared spectroscopy”  
We will **install it at the end of 2021**, and hope to **start measurements in 2022**.  
Application for one postdoctoral fellow starting April 2022 will be started soon.

## ▪ Publications:

- (1) C. Vigouroux, et al., “TROPOMI/S5P formaldehyde validation using an extensive network of ground-based FTIR stations”, AMT, 13, 7, 3751- 3767, 2020.
- (2) E. Lutsch, et al., “Detection and attribution of wildfire pollution in the Arctic and northern midlatitudes using a network of Fourier-transform infrared spectrometers and GEOS-Chem”, ACP, 20, 21, 12813- 12851, 2020.
- (3) T. Blumenstock, et al. “Characterization and potential for reducing optical resonances in Fourier transform infrared spectrometers of the Network for the Detection of Atmospheric Composition Change (NDACC)”, AMT, 14, 1239 -1252, 2021.
- (4) M. Takeda, et al., “First ground-based FTIR observations of HFC-23 at Rikubetsu, Japan, and Syowa Station, Antarctica”, AMT under review.
- (5) M. K. Sha, et al., “Validation of methane and carbon monoxide from Sentinel-5 Precursor using TCCON and NDACC-IRWG stations”, AMT under review.

# HFC-23 retrieval and its trend analysis (Takeda et al., AMT submitted)

## Trend analysis



**Table 5: HFC-23 annual changes and standard errors derived from the monthly mean  $X_{\text{HFC-23}}$  at Rikubetsu and Syowa Station, in pptv year<sup>-1</sup>. The annual changes computed from the AGAGE annual global mean dataset, the CGAA air sample dataset, and the AGAGE in-situ measurements at THD and CGO are also listed in this table for the same periods. The brackets in the table indicate the analysis period.**

Annual change [pptv year <sup>-1</sup> ]	1997–2010	1997–2020	2007–2016	2007–2020
Rikubetsu (FTIR)	$1.090 \pm 0.072$	$0.794 \pm 0.043$	—	$0.528 \pm 0.086$
Rikubetsu DJF (FTIR)	$0.817 \pm 0.087$	$0.806 \pm 0.044$	—	$0.894 \pm 0.099$
Syowa Station (FTIR)	—	—	$0.823 \pm 0.075$	—
Annual global mean (12-box model)	$0.820 \pm 0.011$	$0.843 \pm 0.008$ (1997–2016)	$0.878 \pm 0.020$ (2007–2016)	
CGAA	$0.805 \pm 0.006$ (1997–2009)	—	—	—
THD (AGAGE in-situ)	—	—	$0.924 \pm 0.002$	$0.984 \pm 0.002$ (2007–2019)
CGO (AGAGE in-situ)	—	—	$0.874 \pm 0.002$	$0.928 \pm 0.001$ (2007–2019)