IWGGMS-21, 9-12 June 2025, Takamatsu, Japan

Status and upcoming plans of ground-based FTS measurements for evaluating space-based greenhouse gas measurements and carbon cycle studies at the National Institute for Environmental Studies

Isamu Morino[1], Matthias Max Frey[2], Hirofumi Ohyama[1], Voltaire A. Velazco[3], Mahesh Kumar Sha[4], Martine De Mazière[4], Nobuhiko Kuze[5], Astrid Müller[1], Hiroshi Tanimoto[1], Takuma Miyakawa[6], Masahiro Yamaguchi[6], Yugo Kanaya[6], Yoshihiro Nakashima[7], Soshi Shuto[7], Akihiro Hori[1], Kenji Yamaguchi[1]

[1] National Institute for Environmental Studies, Tsukuba, Japan; [2] Karlsruhe Institute of Technology, Karlsruhe, Germany; [3] Deutscher Wetterdienst, Meteorological Observatory Hohenpeissenberg, Hohenpeissenberg, Germany; [4] Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Brussels, Belgium; [5] Faculty of Science and Technology, Sophia University, Chiyoda, Tokyo, Japan; [6] Japan Agency for Marine–Earth Science and Technology, Yokohama, Japan; [7] Faculty of Agriculture, Tokyo University of Agriculture and Technology, Fuchu, Japan

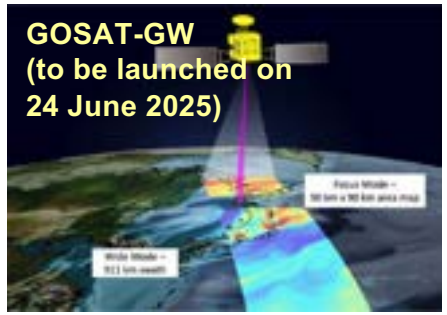
Isamu Morino (morino@nies.go.jp)

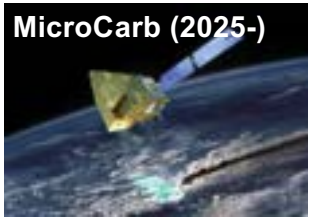
History of ground-based FTS measurements by NIES

- **Until now, TCCON (NDACC) sites: established in East/South-East Asia**
- **Present, COCCON sites: towards operational network in the Kanto area, Japan**
- **Future, TCCON, COCCON, and NDACC sites: will be established in India**

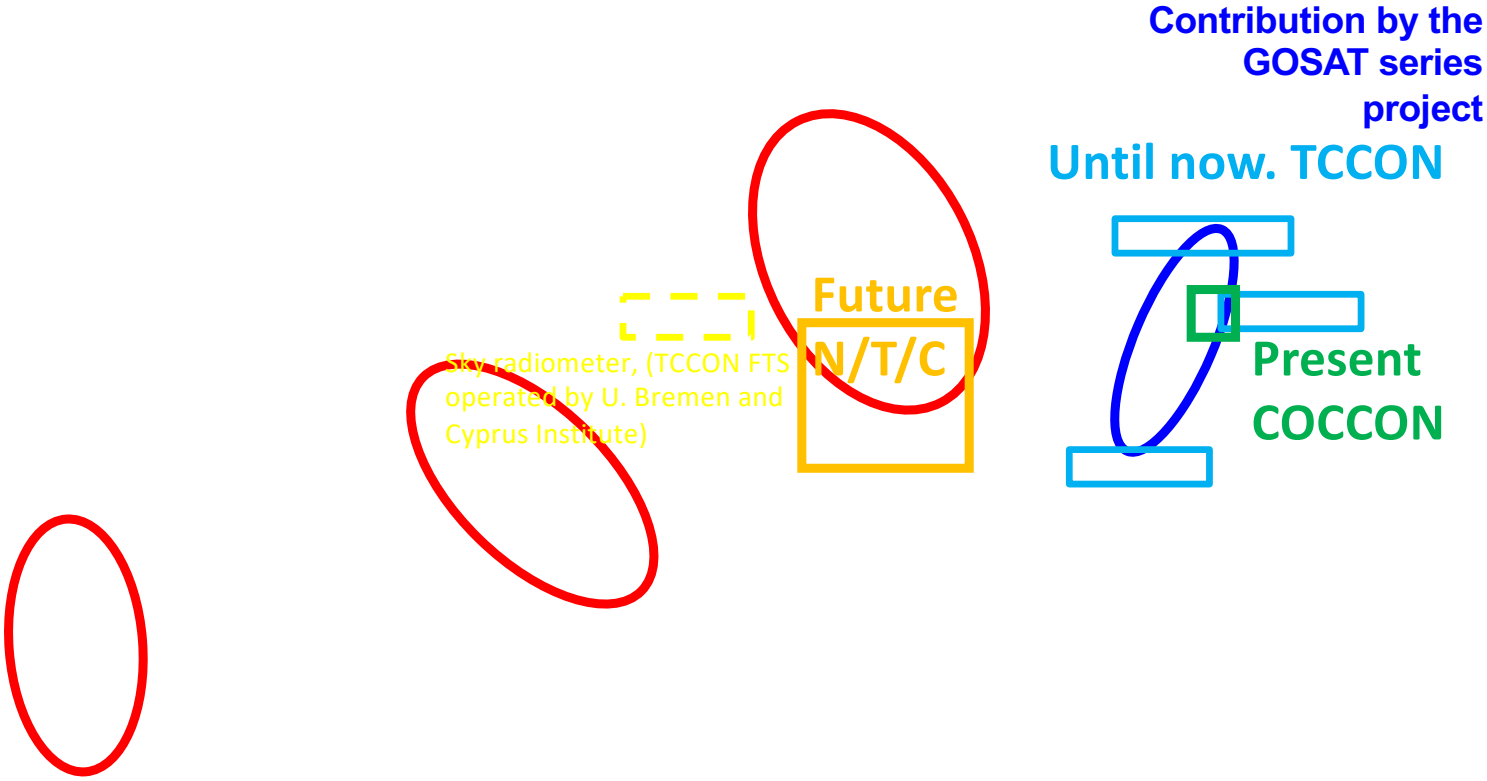
Purpose of using the greenhouse gas data from ground-based FTSs

- Validation studies of satellite and model data
- Carbon cycle studies



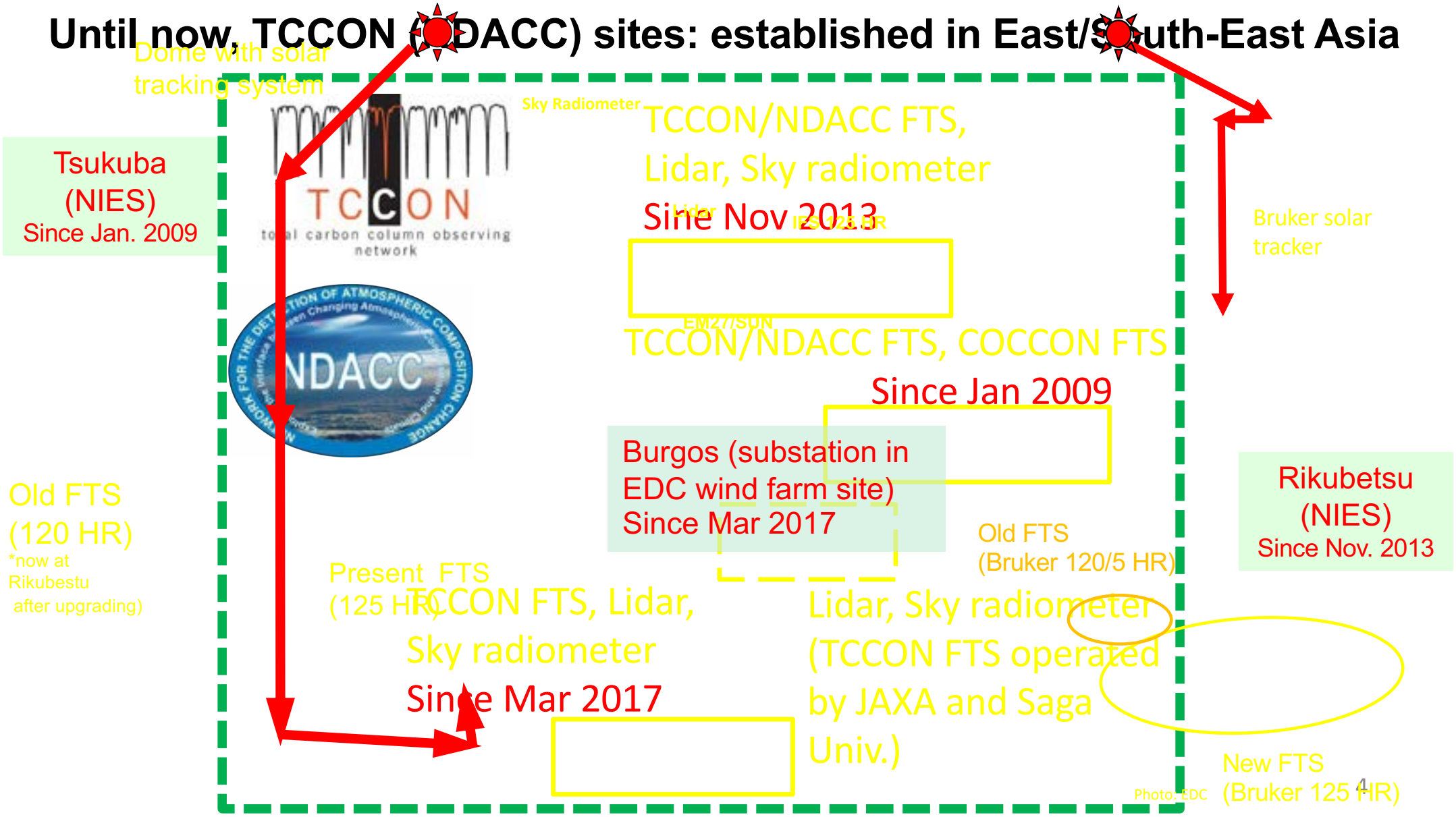


TCCON map and NIES contribution to ground-based observations



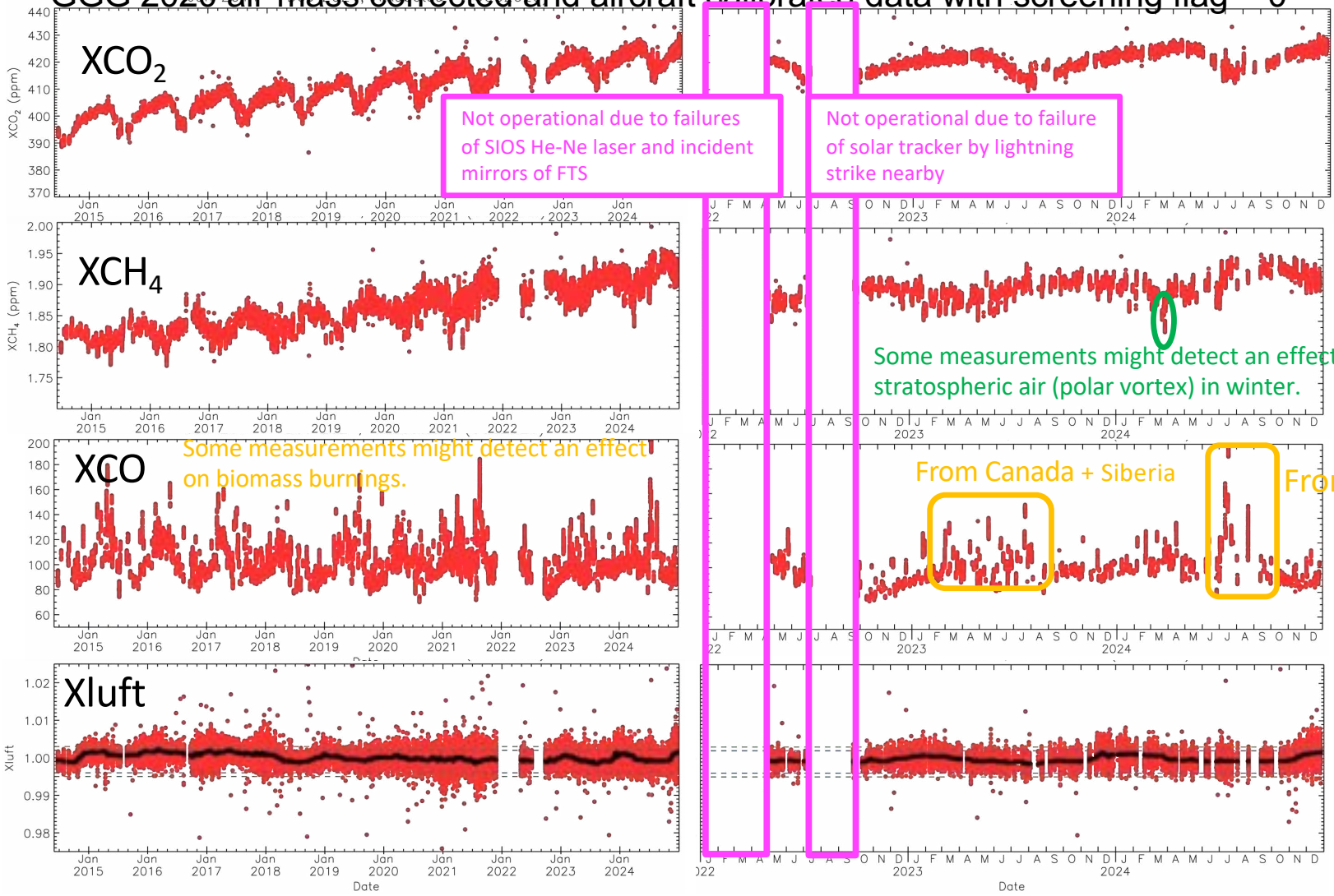
https://tccondata.org

Until now, TCCON (NDACC) sites: established in East/South-East Asia



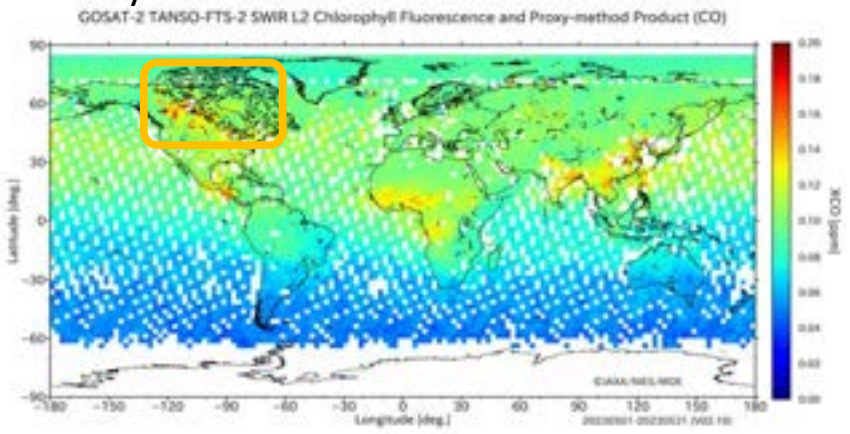
TCCON measurements with Rikubetsu FTS (120/5 HR)

GGG 2020 air-mass corrected and aircraft calibrated data with screening flag = 0

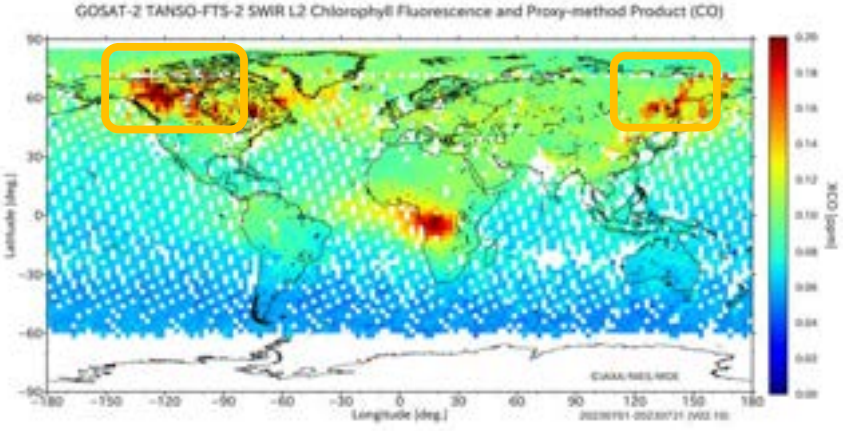


Global maps of GOSAT-2 SWIR L2 Proxy XCO

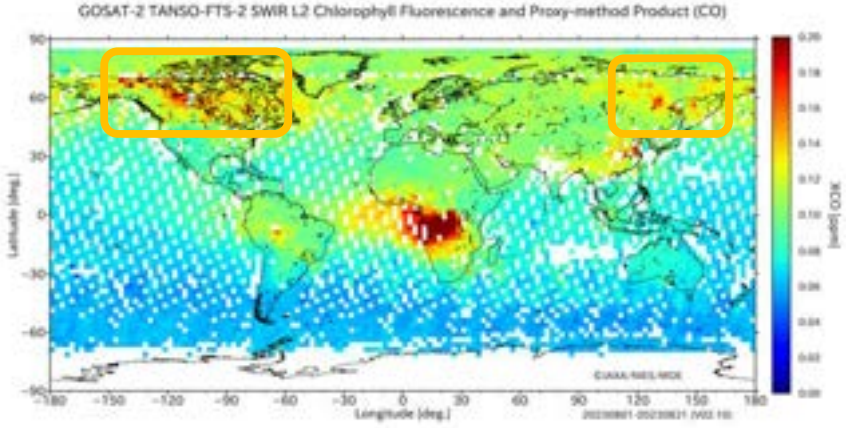
May 2023



Jul 2023



Aug 2023



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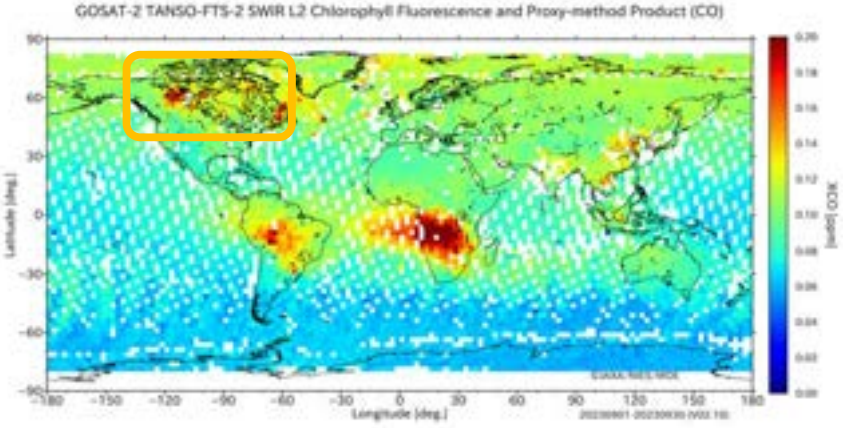
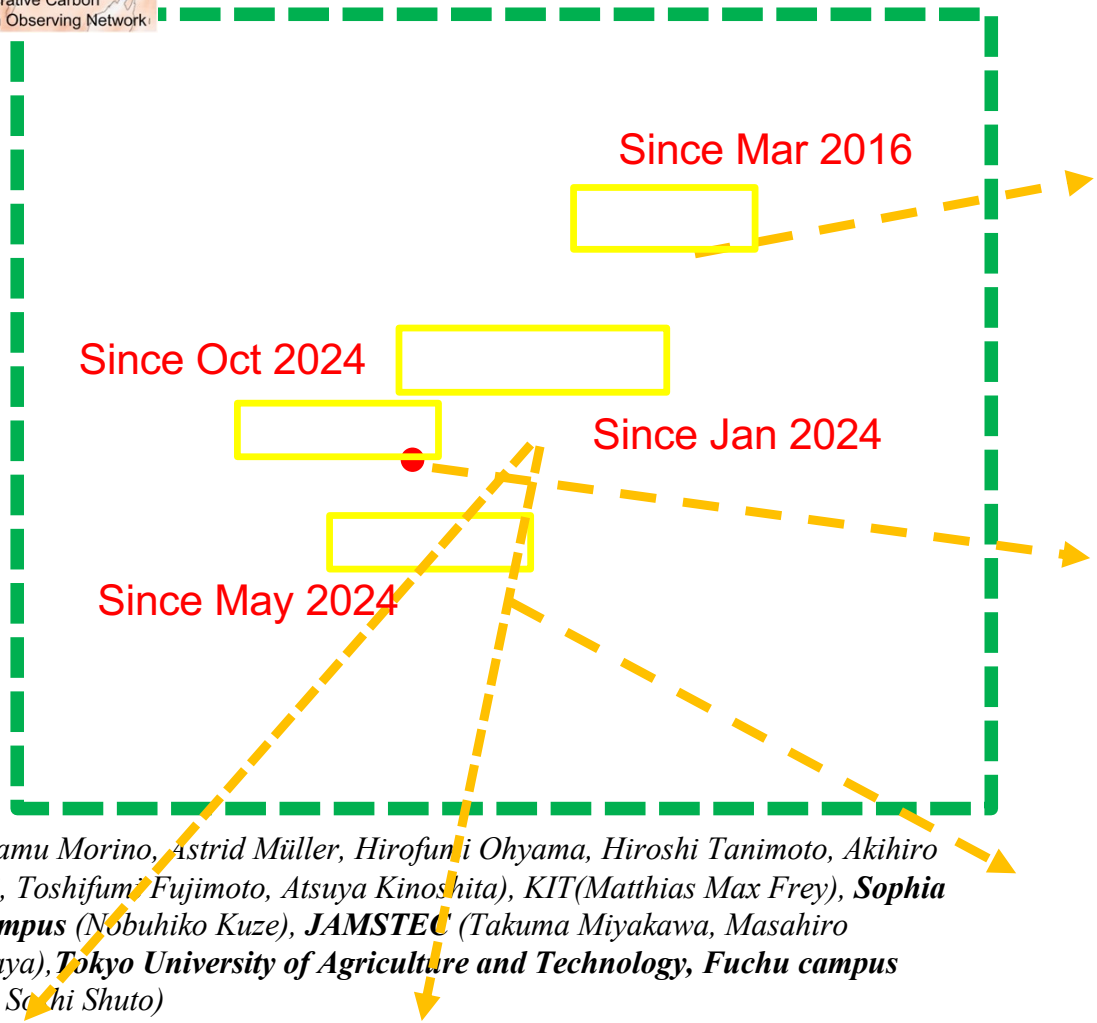


Present, COCCON sites: towards operational network in the Kanto area, Japan

JPN: Japan Pandora Network



NIES, Tsukuba

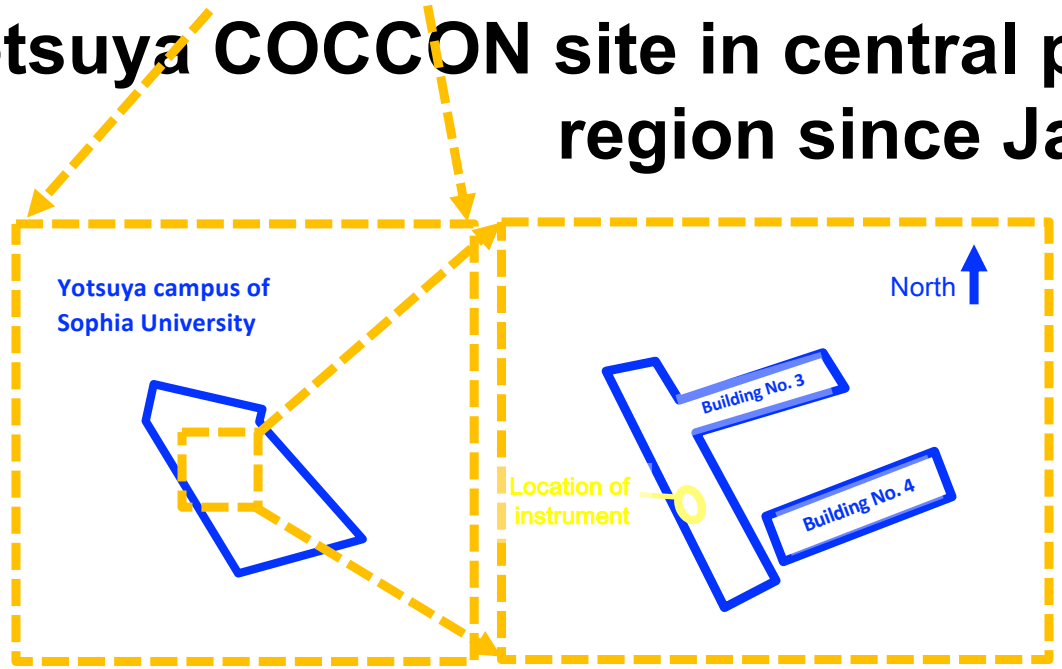
EM27/SUN installed in the simple shelter

Tokyo University of Agriculture and Technology, Fuchu

JAMSTEC, Yokosuka

Contributor: ***NIES*** *(Isamu Morino, Astrid Müller, Hirofumi Ohyama, Hiroshi Tanimoto, Akihiro Hori, Kenji Yamaguchi, Toshifumi Fujimoto, Atsuya Kinoshita), KIT(Matthias Max Frey),* ***Sophia University, Yotsuya campus*** *(Nobuhiko Kuze),* ***JAMSTEC*** *(Takuma Miyakawa, Masahiro Yamaguchi, Yugo Kanaya),* ***Tokyo University of Agriculture and Technology, Fuchu campus*** *(Yoshihiro Nakashima, Soshi Shuto)*

Yotsuya COCCON site in central part of Tokyo metropolitan region since Jan 2024



Pandora

Web camera

EM27/SUN installed in the simple shelter

Development of a simple shelter for EM27/SUN

- Aluminum shipping box with a hatch
- Remote control opening and closing hatch system with a rain sensor
- Heater, cooler, and an exhaust fan
- Portable weather logger (temperature, humidity and pressure)
- Web camera
- Portable Wi-Fi
- Portable battery as UPS installed in the battery box

Simple shelter

Battery box

Indoor temp., humid., pressure from portable weather station

Image from web camera (hatch: open)

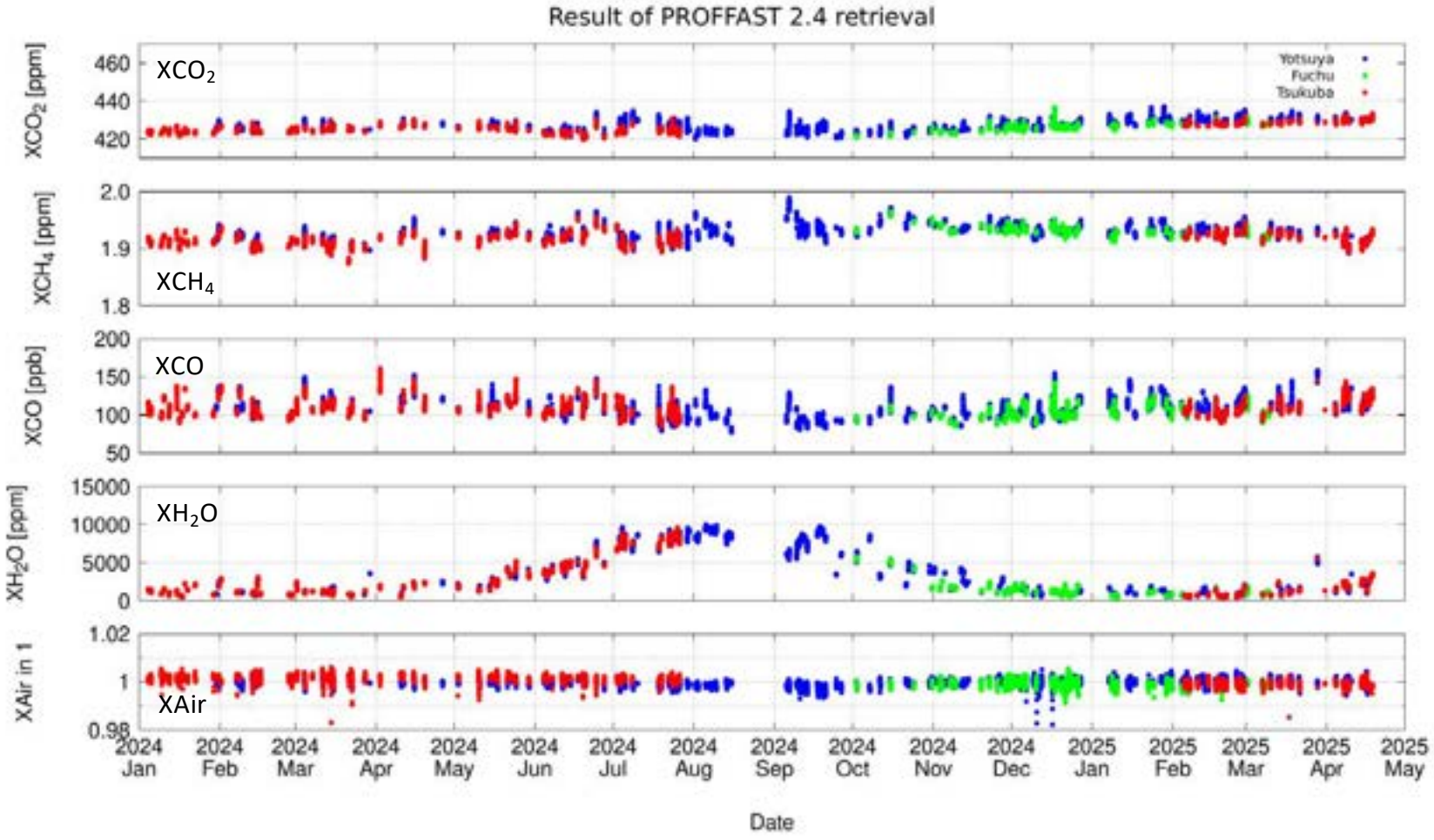
OPUS software screen during solar measurement

Camtracker image

EM27/SUN

Tsukuba, Yotsuya, Fuchu COCCON time series from Jan 2024

Processed with PROFFAST 2.4, Yotsuya (SN 139): blue, Fuchu (SN 148): green, Tsukuba (SN 063): red



No records at Tsukuba between Jul 2024 and Jan 2025 due to solar tracker repair.

Future, TCCON, COCCON, and NDACC sites: will be established in India

Rann of Kachchh

IISER-Kolkata

Now Vertex 70 FTS at IISER-Kolkata are operated by BIRA and IISER-Kolkata for COCCON and NDACC type of measurements of some species.

PRL-Ahmedabad

Roof of the building at PRL

Roof of the building at IISER-Bhopal

We have started the new ground-based FTS measurement project focusing on India with the aim to have the first measurements starting in 2026 as one of the GOSAT-GW validation activities.

Nainital lake