

Recent status of GOSAT calibration and validation activities in 2022

3-P08

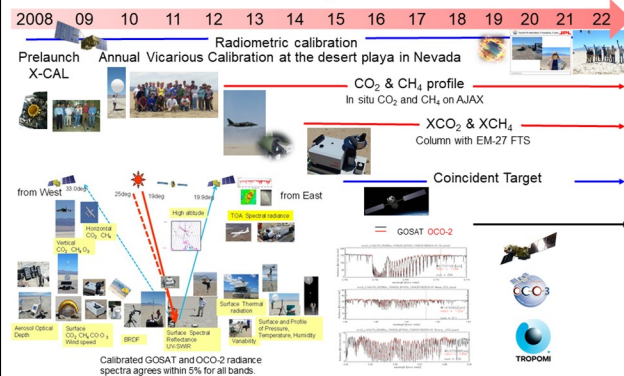
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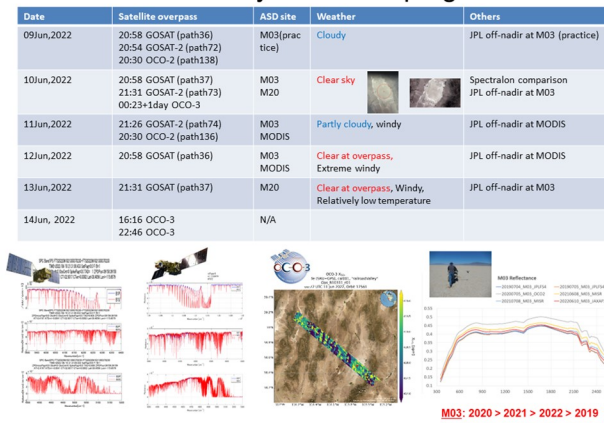
GOSAT team has conducted vicarious calibration campaign at the Railroad Valley every June - July since 2009 in collaboration with NASA OCO team to ensure the radiometric accuracy. We have also deployed a portable EM27/SUN to measure XCO₂ and XCH₄ for validation since 2014. JAXA has released a website for the Vicarious Calibration Portal for Space-borne GHGs Sensors to archive the vicarious calibration techniques and datasets as part of the CEOS activity. GOSAT team will visit to join the Railroad Valley for the OCO-TROPOMI-GOSAT joint calibration campaign in June 2022 after the last visit of 2019. JAXA is operating the Saga TCCON station over 10 years since 2011 for GOSAT validation. The Saga station is also targeted by OCO-2, OCO-3, GOSAT-2 planned operation, and observed by TROPOMI swaths. The Saga TCCON data was public released by newly GGG2020 processing in April. This presentation shows our activities of vicarious calibration at Railroad Valley and the Saga TCCON station.

Vicarious Calibration at Railroad Valley

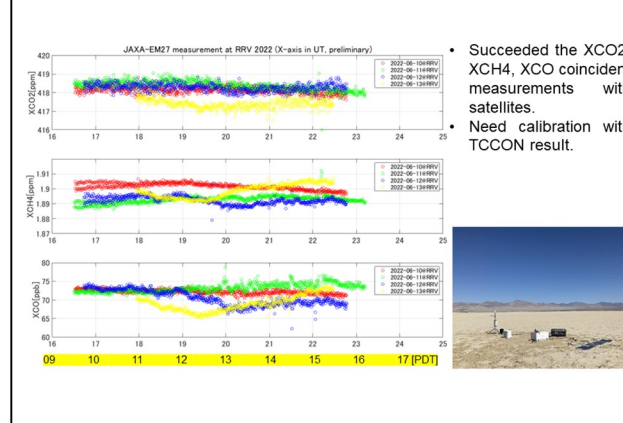
The GOSAT-1/2 and the other GHG missions, NASA OCO-2/3 and ESA TROPOMI are collaborated in calibration activities to improve GHG observation accuracy. The OCO-GOSAT joint campaign at Railroad Valley in summer 2022 has been conducted for the first time in 3 years after COVID-19 restrictions.



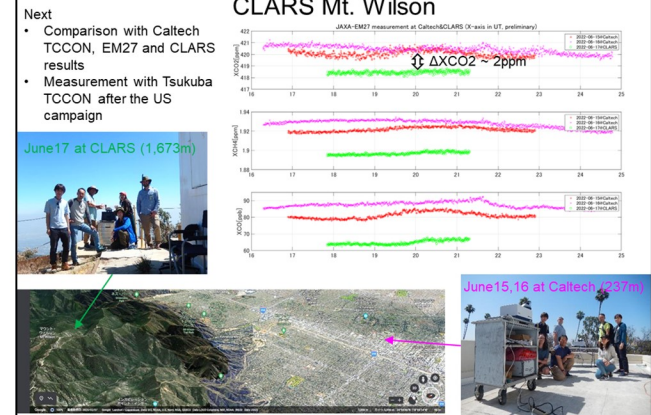
Railroad Valley Joint Campaign 2022



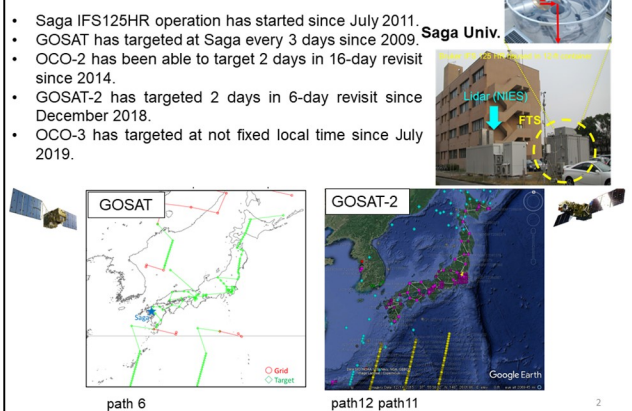
EM-27/Sun Measurement at RRV 2022



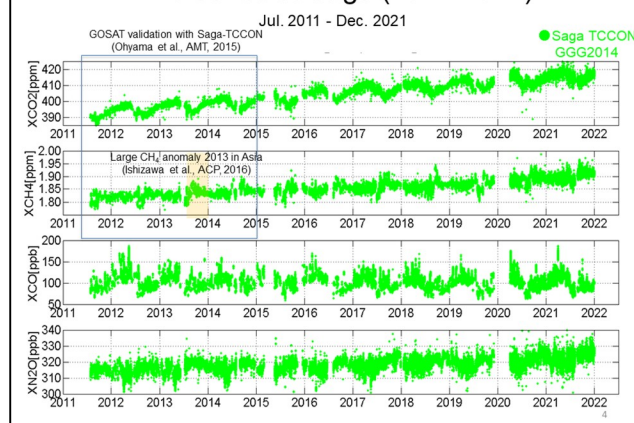
EM-27/Sun Measurement at Caltech Pasadena & CLARS Mt. Wilson



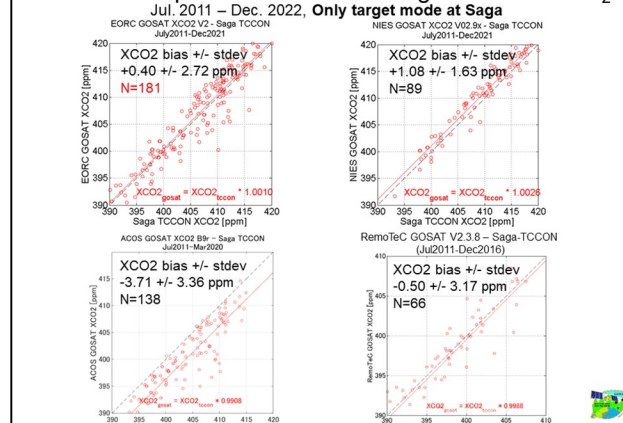
Saga station



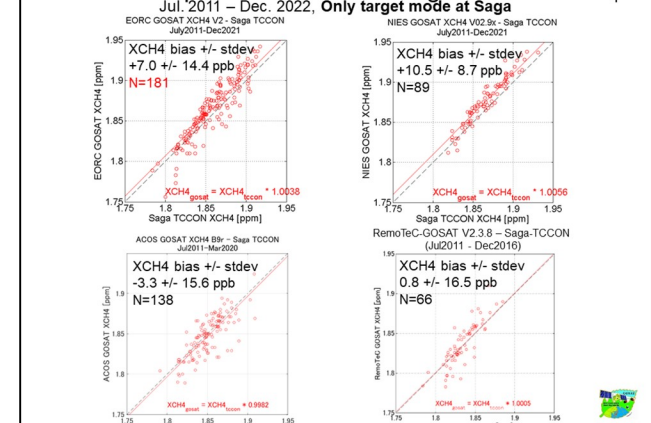
Time series at Saga (2011-2021)



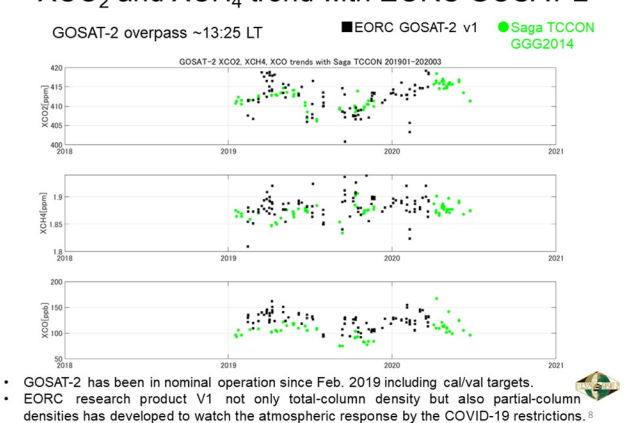
Correlation plot of GOSAT and Saga-TCCON XCO₂



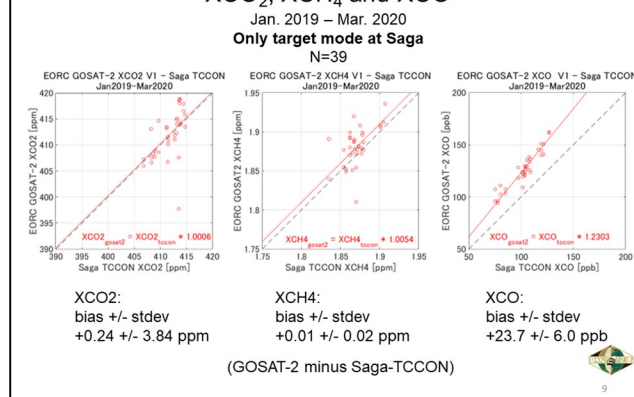
Correlation plot of GOSAT and Saga-TCCON XCH₄



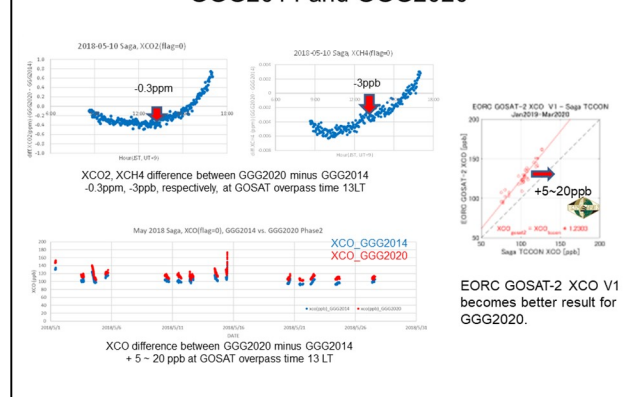
XCO₂ and XCH₄ trend with EORC GOSAT-2



Correlation plot of GOSAT-2 and Saga-TCCON XCO₂, XCH₄ and XCO



Saga-TCCON difference between GGG2014 and GGG2020



Summary

- JAXA's Bruker IFS-125HR and Solar Tracker A547N were installed at Saga University, Japan on June 1, 2011.
- GOSAT targets at Saga every 3 days. GOSAT-2 targets 2 days in 6-day revisit. OCO-2 has target capabilities of 2 days in 16-day revisit. OCO-3 has started to target from ISS orbit.
- Valid data: July 28, 2011~ (released up to June 2021)
- Aircraft measurements for the FTS calibration were performed in January 2012 and 2013. Agreements within 0.1%.
- Spectra with enough signal-to-noise ratio can be obtained with the protection glass after the installation at Saga.
- HCI and HBr cell spectra are taken periodically.
- After May 2015 simultaneously HCI cell (Caltech #29) spectra has been taken with direct solar spectra.
- GGG2020 including Saga-TCCON 2022 was released on April 26, 2022.
- GOSAT-2 XCO result become better for GGG2020 than GGG2014.
- The HCI gas cell #29 has been only measured regularly since 2020 due to visit restriction.
- Solar tracker mirrors are scheduled to replace in the summer of 2022.