

## 4.042 Validation of GOSAT cloud determination by Himawari-8 data.

Early Career Scientist

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Abstract:

The Greenhouse Gases Observing Satellite (GOSAT), which was launched on 23 January, 2009, is equipped with the Thermal and Near Infrared Sensor for Carbon Observation (TANSO)-Fourier Transform Spectrometer (FTS) for greenhouse gas monitoring and the TANSO-Cloud and Aerosol Imager (CAI) for cloud and aerosol detection. The retrieval processing of TANSO-FTS has been conducted under clear-sky condition, which is judged based on a cloud flag from TANSO-CAI in the daytime and on a TANSO-FTS thermal infrared (TIR) spectrum in the nighttime. Cloud contamination in the field of views (FOVs) of TANSO-FTS could degrade the greenhouse gas retrievals, and therefore the cloud detections should be validated. This study has compared the cloud detections in TANSO-FTS FOVs by TANSO-CAI or TANSO-FTS TIR spectra with cloud detections in coincident FOVs by the Advanced Himawari Imager (AHI) on board Himawari-8. We have first selected coincident Himawari-8 data obtained within one minute before or after TANSO-FTS observations and then conducted cloud determination tests on the selected Himawari-8 data in the TANSO-FTS FOVs following the cloud detection method applied to the Moderate Resolution Imaging Spectrometer (MODIS). We have applied several different sets of cloud determination tests to Himawari-8 reflectance and brightness temperature data obtained in the daytime or the nighttime over the land or the ocean, separately.

For the three days on 1-3 January in 2016, cloud detections by TANSO-CAI or TANSO-FTS and Himawari-8 agreed to each other by 61-80%. In the daytime over the ocean, the number of TANSO-FTS FOVs judged as clear conditions by Himawari-8 and cloudy conditions by TANSO-CAI was relatively large, which suggests that TANSO-CAI cloud determination tests are "clear conservative". In the daytime over the land, cloud detections by TANSO-FTS TIR spectra possibly missed low clouds judging from the reflectance cloud determination tests by Himawari-8.