4.042 Validation of GOSAT cloud determination by Himawari–8 data.

Early Career Scientist

Presenting Author:
Katsuki Kitamura, Center for Environmental Remote Sensing, Chiba University., k.kitamura@chiba-u.jp

Co-Authors:
Naoko Saitoh, Center for Environmental Remote Sensing, Chiba University.

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.