

Validation of GOSAT SWIR xCH₄ using TCCON and Airborne Measurements

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As methane (CH₄) is one of the most important Short-Lived Climate Pollutants (SLCPs), global monitoring of atmospheric CH₄ with enough accuracy is expected to estimate its sources and sinks. For measurements of global distribution of CO₂ and CH₄ concentration from space, the Greenhouse gases Observing SATellite (GOSAT) was launched in 2009, and has continued measurements up to the present. However, cloud interferes satellite observation. To understand CH₄ emission from a cloudy region, the selection of an adequate criterion of cloud screening, and validation of data quality are necessary.

In this study, we validate the GOSAT CH₄ products of the column-averaged dry-air mole fractions (xCH₄) derived from Short-Wavelength InfraRed (SWIR) radiation by comparing them with data of Total Carbon Column Observing Network (TCCON). Yoshida et al. (AMT, 2013) had already carried out the validation for the NIES product, but we extended the period and involved more TCCON sites; Yoshida et al. (2013) used data observed at the 13 TCCON sites from June, 2009 to December, 2012 and we used data at the 17 TCCON sites from June, 2009 to August, 2013. We found that the average difference between TCCON and GOSAT for the whole period is -6.0 ± 16.1 ppbv.

We also examined the appropriate cloud screening for xCH₄ product from RemoTeC-MACC. The product was obtained by using the "proxy method" by which we can obtain more data under cloudy conditions. In this study, we also tried to compare GOSAT data with aircraft measurements over Siberia and other areas.

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