

Bias corrections for calculating whole-atmosphere monthly mean CO<sub>2</sub> and CH<sub>4</sub> concentrations  
derived from GOSAT observational data (November 2023)

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The whole-atmosphere monthly mean CO<sub>2</sub> and CH<sub>4</sub> concentrations based on GOSAT observations are calculated from GOSAT FTS SWIR Level 2 products, which are column-averaged dry air mole fractions of CO<sub>2</sub> (XCO<sub>2</sub>) and CH<sub>4</sub> (XCH<sub>4</sub>). In the calculation, the biases found in these products need to be corrected.

Bias values determined by comparison with TCCON (Total Carbon Column Observing Network) data obtained at the corresponding sites around the world were applied to bias-uncorrected GOSAT FTS SWIR Level 2 products (V02.90 until May 2020, V02.91 after June 2020) to calculate the whole-atmosphere monthly mean CO<sub>2</sub> and CH<sub>4</sub> concentrations. Starting with the November 2023 release (April 2009 to September 2023), however, bias-corrected GOSAT FTS SWIR Level 2 products (V03.05) are used, and bias corrections are no longer conducted in the calculation of the whole-atmosphere monthly mean CO<sub>2</sub> and CH<sub>4</sub> concentrations.

For V03.05 details, please refer to the Release Notes:

CO<sub>2</sub>: [https://data2.gosat.nies.go.jp/doc/documents/ReleaseNote\\_FTSSWIRL2\\_BiasCorrCO2\\_V03.05\\_GU\\_en.pdf](https://data2.gosat.nies.go.jp/doc/documents/ReleaseNote_FTSSWIRL2_BiasCorrCO2_V03.05_GU_en.pdf)

CH<sub>4</sub>: [https://data2.gosat.nies.go.jp/doc/documents/ReleaseNote\\_FTSSWIRL2\\_BiasCorrCH4\\_V03.05\\_GU\\_en.pdf](https://data2.gosat.nies.go.jp/doc/documents/ReleaseNote_FTSSWIRL2_BiasCorrCH4_V03.05_GU_en.pdf)

The difference between the whole-atmosphere monthly mean CO<sub>2</sub> and CH<sub>4</sub> concentrations using V03.05 (version V03.05) and V02.90/V02.91 (version V02.90/V02.91) for the period from April 2009 to March 2023 was also examined. The obtained results are as follows:

version V03.05 – version V02.90/V02.91 = (CO<sub>2</sub>) 0.3 ± 0.3 ppm, (CH<sub>4</sub>) 1.3 ± 2.1 ppb