Ref. 1: In the beginning of 2009, two satellites focused on CO2 observations will be launched: the Orbiting Carbon Observatory (OCO) [Clapp et al., 2004] and the Greenhouse gases Observing SATellite (GOSAT) [Hamazaki et al., 2005].

Ref. 2: We developed an algorithm to retrieve CO2 vertical profiles from spectra at 700-800 cm^{-1} (CO2 15-µm band) of Band 4 of the GOSAT/THERMAL Infrared Spectral Radiometer for Carbon Dioxide (TANSO-FTS).

Ref. 3: We examined the accuracy and precision of CO2 measurements retrieved by the developed algorithm based on maximum a posteriori (MAP) method, through GOSAT/ TANSO-FTS measurements.

Ref. 4: The radiance spectra calculated at each measurement location ("true spectra") and the pseudo-measurement spectra ("pseudo-measurement spectra"")

Ref. 5: We used the NICAM CO2 15x15o grid for the a priori CO2 profiles. We also used the NICAM CO2 15ox15o grid for the co-located point calculated in order of CO2 information content below 55 hPa.

Ref. 6: In the retrieval, we adopted NN syndrome (SNN) for all 110 layers (black circles), above 55 hPa (black open circles), and online 600 hPa (black asterisk), as was a diagonal matrix.

Ref. 7: Accuracy of the pseudo-measurement spectra was about 280 K.

Ref. 8: The radiance spectrum calculated at each measurement location ("true spectra") and the pseudo-measurement spectra ("pseudo-measurement spectra")

Ref. 9: To consider random and bias errors in retrieved values, when there was no uncertainty in the temperatures (+/-2 K), water vapor (+/-30%), and ozone (+/-5%) concentrations.

Ref. 10: The reciprocals are for all 110 layers (black circles), above 55 hPa (black open circles), and online 600 hPa (black asterisk), as was a diagonal matrix.

Ref. 11: The "full grids", the atmosphere from 1100 to 0.1 hPa into 110 layers for the calculation of a radiance spectrum and Jacobian matrices.

Ref. 12: We retrieved the grids determined based on averaged vertical kernel functions (A).

Ref. 13: The "full grids", the atmosphere from 1100 to 0.1 hPa into 110 layers for the calculation of a radiance spectrum and Jacobian matrices.

Ref. 14: We retrieved the grids determined based on averaged vertical kernel functions (A).

Ref. 15: The "full grids", the atmosphere from 1100 to 0.1 hPa into 110 layers for the calculation of a radiance spectrum and Jacobian matrices.

Ref. 16: We retrieved the grids determined based on averaged vertical kernel functions (A).

Ref. 17: We retrieved the grids determined based on averaged vertical kernel functions (A).

Ref. 18: The "full grids", the atmosphere from 1100 to 0.1 hPa into 110 layers for the calculation of a radiance spectrum and Jacobian matrices.