

***Interactive comment on “Aircraft measurements of carbon dioxide and methane for the calibration of ground-based high-resolution Fourier Transform Spectrometers and a comparison to GOSAT data measured over Tsukuba and Moshiri” by T. Tanaka et al.***

**Anonymous Referee #2**

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General comments: The paper by Tanaka et al. uses airborne CO<sub>2</sub> and CH<sub>4</sub> measurements to calibrate two FTS sites and compare to GOSAT, with a focus on reporting the biases of the FTS and GOSAT measurements. Such a comparison is of general interest for a several scientific disciplines. Overall the paper is well-written and presented and recommended for publication after minor revisions.

Specific comments: P.1845 Line 24 Use of a more recent globally averaged mixing ratio

C211

for CO<sub>2</sub> than the 2005 average would be advantageous when comparing 2009–2010 data reported in this paper. For example, globally averaged greenhouse gas mixing ratio data is reported in the Greenhouse Gas Bulletin of the World Meteorological Organization (<http://www.wmo.int/pages/prog/arep/gaw/ghg/GHGbulletin.html>).

P. 1846 Line 9 Are there any requirements on the monthly average accuracy of the column data from GOSAT?

P.1848 Line 27 What was the duration of the flight spiral descents used to compare to the GOSAT/FTS? And how central to the GOSAT overpass time where the flights? If 16 samples were taken during the spiral descent, what is the vertical resolution of the aircraft flask data?

P.1849 Line 1 What standards were used to report the precisions of CO<sub>2</sub> and CH<sub>4</sub> flask data? Were they the same standards as used for the in-situ calibration? were any corrections applied to the raw data to account for instrument offsets, linearity etc.

P.1849 Line 28 Again, additional information on the calibration statistics in terms of instrument offsets, linearity, and drift would be advantageous to convince the reader of the overall accuracy of the in-situ data which is being used as “truth” to which FTS and GOSAT are later compared.

P.1850 Line 26 Is the location of Kumagaya similar to Tsukba in terms of local influences of vegetation/urban pollution? Would you expect to see similar profiles in the lower troposphere above the two sites? P.1851 Sect. 3 I would make it a little clearer in the text that aircraft data consisted of 3 flights at Tsukba/Kumagaya and one at Moshiri.

P.1852 Sect. 4 Are there any details on the errors associated with priori data? What influence does this have on the calculated column-averaged value and associated errors? P.1853 Line 25 with reference to Table 1 I found the fact that the CO<sub>2</sub> aircraft-FTS difference is lower on Feb 14 the cloudy day than other days interesting, could this be explained?

C212

