

Interactive comment on “Remotely operable compact instruments for measuring atmospheric CO₂ and CH₄ column densities at surface monitoring sites” by N. Kobayashi et al.

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Dear Editor: We have revised our MS according to the referee’s comments. The revisions we have made in the text are marked by red and given in Supplement. Figure 1 is added and Fig. 4 is revised. Sincerely, Masahiro Kawasaki

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/3/C563/2010/amtd-3-C563-2010-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 1615, 2010.

C563

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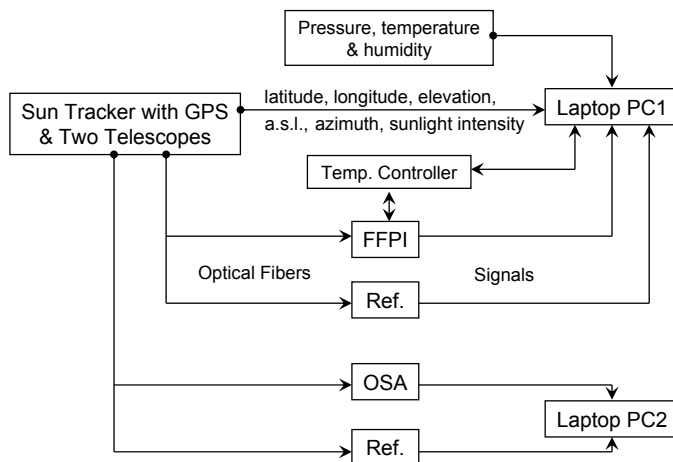


Fig. 1

Fig. 1. Block diagram for data acquisition

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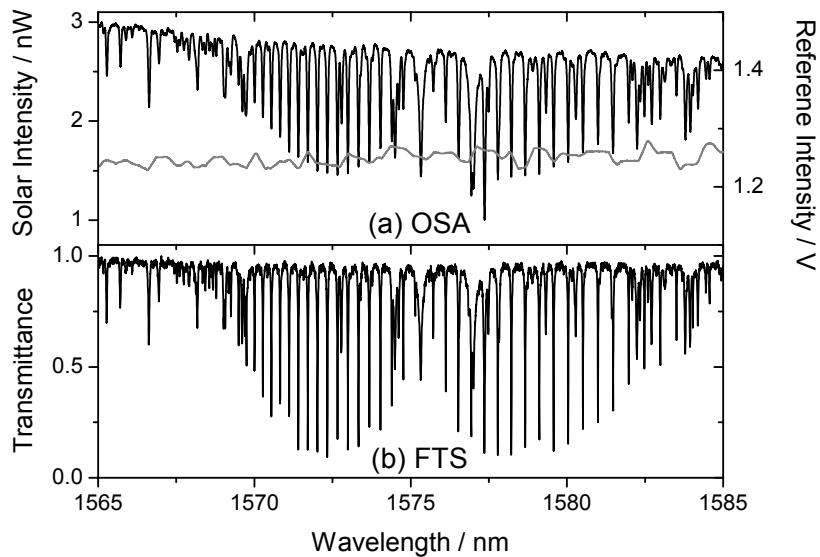


Fig. 2

Fig. 2. CO₂ photoabsorption spectra measured by OSA and FTS on 26 August 2009 at Moshiri in Hokkaido, Japan

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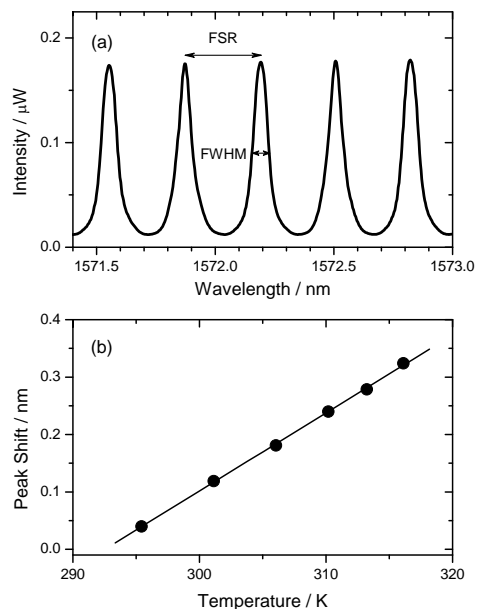


Fig. 3

Fig. 3. (a) Free spectral range ($\text{FSR} = 0.317 \pm 0.002 \text{ nm}$) and full-width at half maximum ($\text{FWHM} = 0.072 \pm 0.002 \text{ nm}$) of FFPI; (b) Spectral shift of the transmission wavelength by temperature. Temperature coefficient

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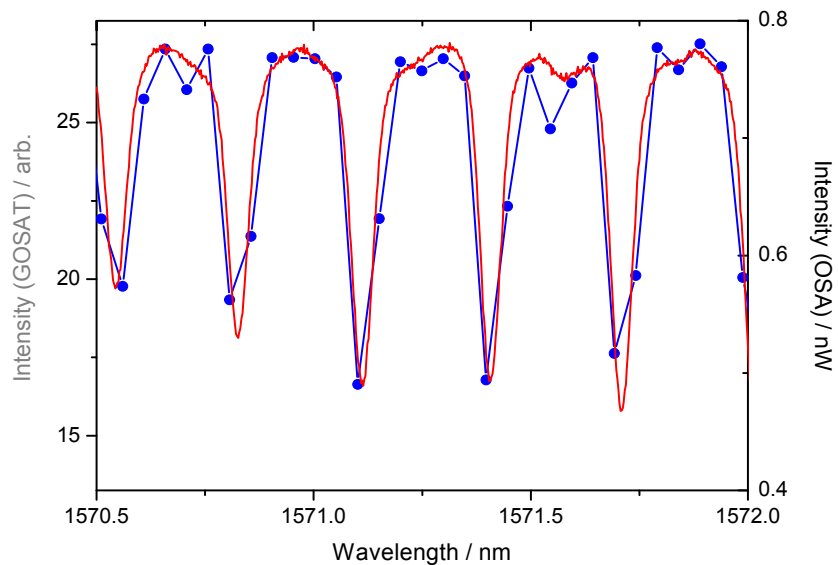


Fig. 4

Fig. 4. Parts of CO₂ photoabsorption spectra measured by OSA and FTS onboard GOSAT. OSA: red curve; GOSAT: blue line with dots

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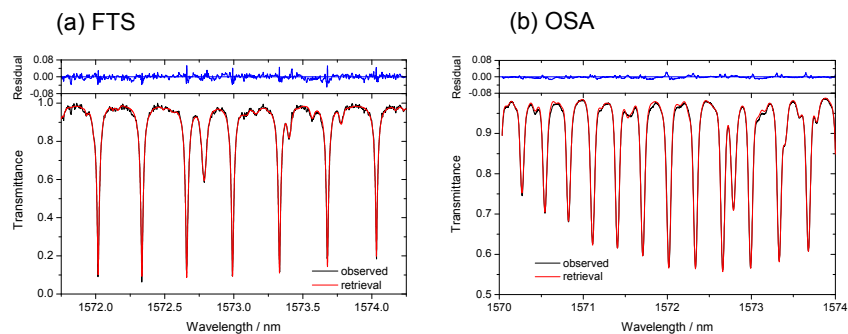


Fig. 5

Fig. 5. Enlarged spectra shown in Fig. 2 for the OSA and the FTS after retrievals given in the Appendix section. Black curves denote the observed spectra and red ones for the retrievals

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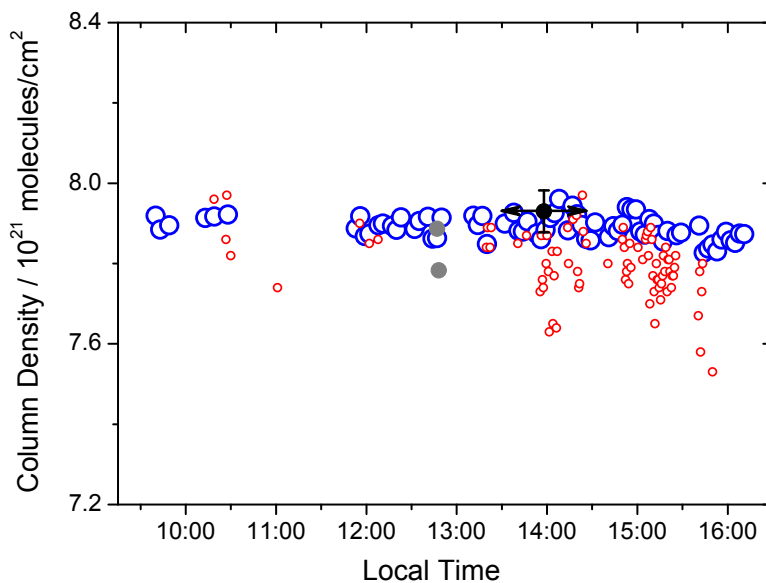
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Fig. 6

Fig. 6. CO₂ column density profile measured by OSA, FTS, balloon and GOSAT. OSA: large open circles; FTS: small open circles; Balloon: arrows; GOSAT: gray solid circles

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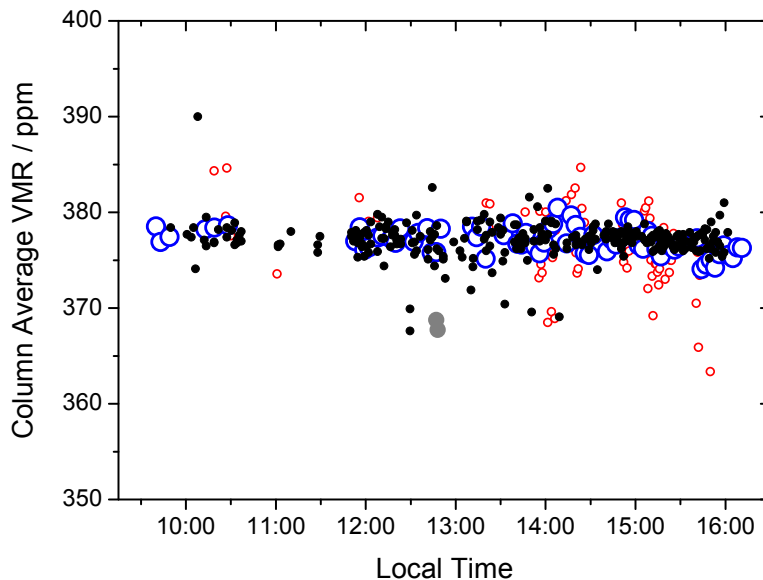


Fig. 7

Fig. 7. Column average concentration profile of CO₂. OSA: large open circles; FTS: small open circles; FTS-GFIT: small solid circles; GOSAT: gray solid circles

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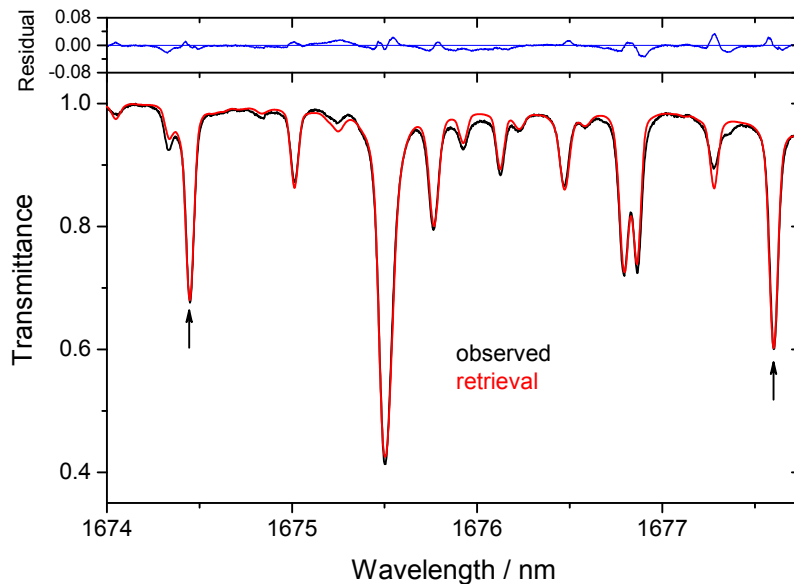


Fig. 8

Fig. 8. CH₄ photoabsorption spectrum for OSA retrieval. Black curve denotes the observed spectrum and red one for the retrieval. The arrows are the photoabsorption lines of CH₄

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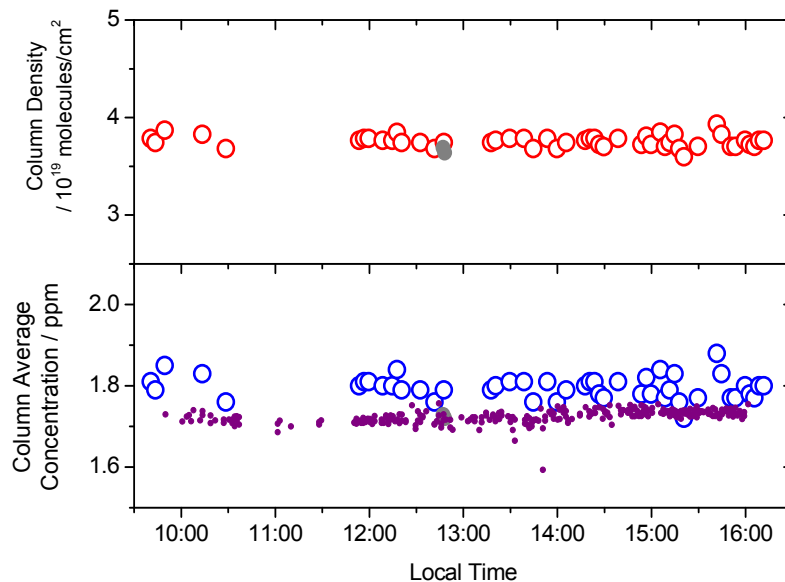


Fig. 9

Fig. 9. Column density and column average concentration profiles. OSA: large open circles; FTS-GFIT: small solid circles; GOSAT: gray solid circles

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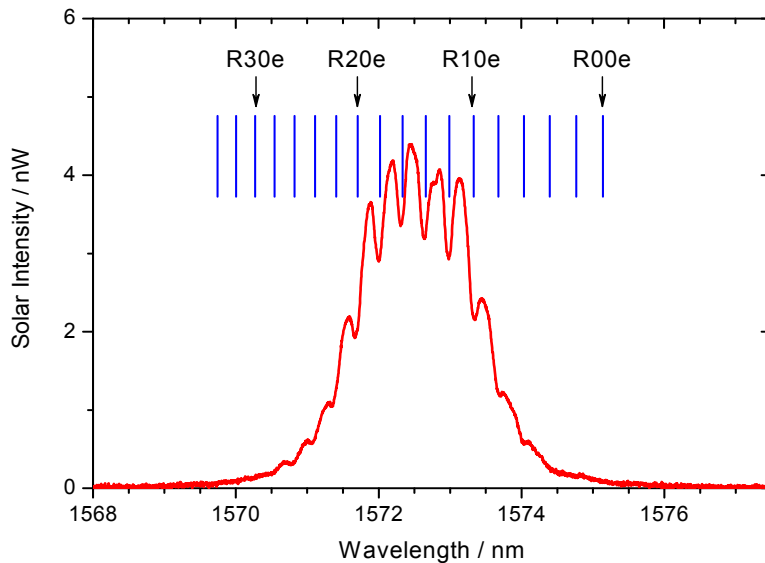


Fig. 10

Fig. 10. Spectral profile of the sunlight through a narrow bandpass filter. Assignments for the R-branch in the CO₂ (30012 ← 00001) transition are shown

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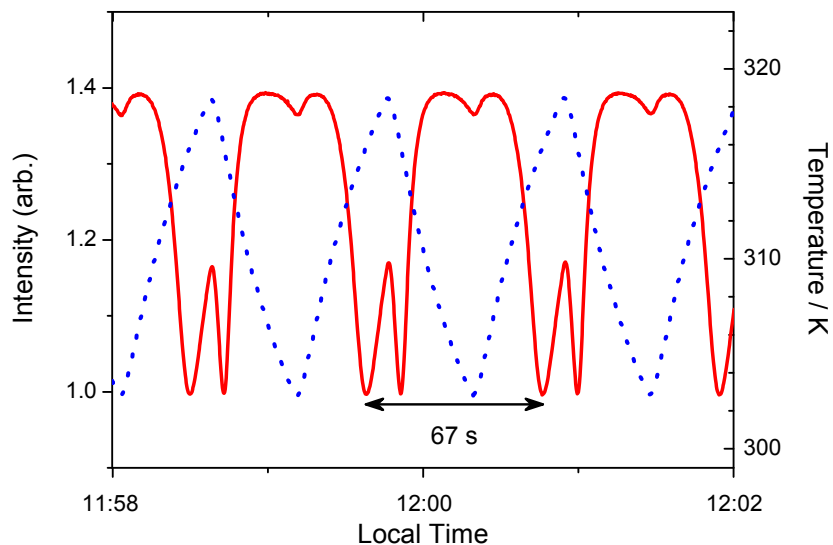


Fig. 11

Fig. 11. Signal intensity of the CO₂ photoabsorption (solid curve) measured by modulating the FFPI temperature in a 67 s cycle (dotted curve). The highest value gives the I₀ while the lowest one corresponds to

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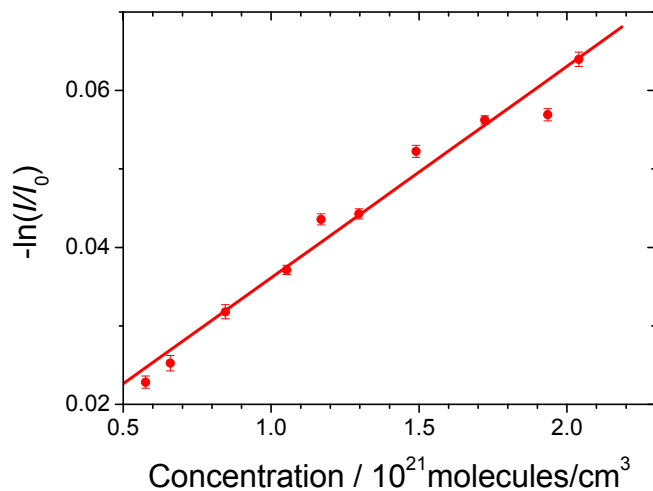


Fig. 12

Fig. 12. Absorbance of CO₂ for determination of the effective total photoabsorption cross section measured with neat CO₂ at room temperature in the laboratory

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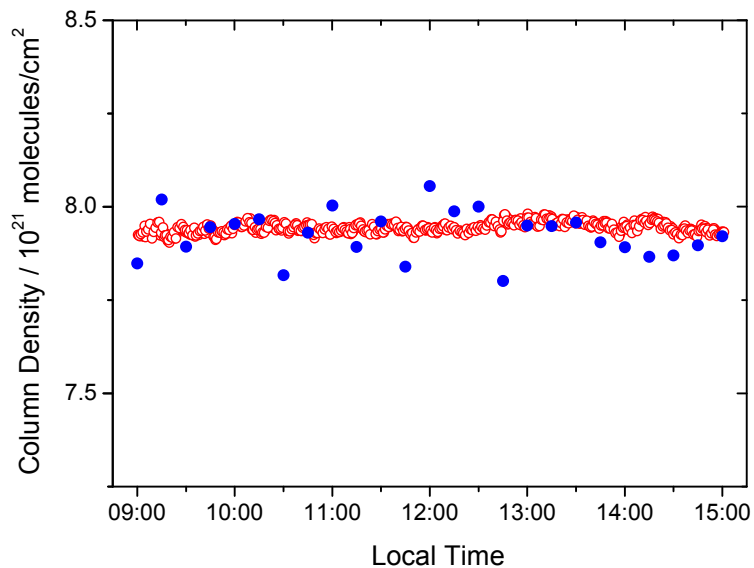


Fig. 13

Fig. 13. CO₂ column density measured by FFPI on 31 October 2009 at Katsura Campus of Kyoto University, Kyoto Japan. Open circles are the CO₂ column densities after normalization and the solid circles are those

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