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Atmospheric Measurement Techniques Discussions

Interactive comment on "Remotely operable compact instruments for measuring atmospheric CO_2 and CH_4 column densities at surface monitoring sites" *by* N. Kobayashi et al.

Anonymous Referee #2

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Review of AMT paper:

Title: Remotely operable compact instruments for measuring atmospheric CO2 and CH4 column densities at surface monitoring sites Author(s): N. Kobayashi et al. MS No.: amt-2010-32

General comment

This paper shows an interesting application of solar spectroscopy, replacing advanced FTIR spectrometers by considerably smaller instrumentation. The paper shows convincing results that the both types of instrumentation works qualitatively However the authors also claim that the method works nicely quantitatively, primarily by compar-

ing to FTIR measurements and to do this I believe more experimental and analysis details are needed. The authors don't reference the FTIR network, named TCCON (Twww.tccon.caltech.edu) working with the CO2 and methane measurements and in which progress has been conducted over the last years; for instance correcting FTIRs measurements for variable light intensity. More reference to the FTIR network should be given (since this the reference method chosen here) and whether the FTIR measurements here have been conducted according to the TCON guidelines. The paper is generally written in fluent language, but here and there sentences need to be fixed.

Specific comments

Replace column average concentration by column average mixing ratio

The paper needs more details about experimental equipment including illustrations of the experimental setups for both the OSA and FFPI. Especially the FFPI is difficult to understand.

More explanations of the reference methods, especially FTIR,but also about the balloons is needed including calibration issues.

fig 4, why not identical wavelength regions here, to facilitate direct comparison.

section 3.1.1 Here the xCO2 for the FTIR is explained. Try to improve the presentation so that it is clearer that equation 4 is related to FTIR. This is said afterwards in the text.

The calibration issues on page 162 are difficult to follow, why the FFPI yileds 2.7 instaed of 1.74

Appendix A should be improved in the text by more details and by by more references to publications , removal of initials of names to real ones (pers comm).

Technical corrections

p1616, row 19, gasses to gases, p1616, row 25, has progressed to "has been conducted p 1618 row 5 reference TCCON here instead. p 1618 row 15 improve sentence

ending with "..scanned in a 34 s period" p 1619 row 12: Don't understand meaning of sentence that includes "glass ceramic shroud" improve by possible illustration. p 1619 row 25 "When NIR..", improve sentence p 1621 row 1 , make reference to GFIT and explain NIES. p 1622 row 20, change "lies in consistent" to "are consistent" p 1623: row 6, Explain more about calibration of flask samples. p 1623 row 8: change to assumption as in . p 1623 21 use OSA for consistency instead of Yokogawa... p 1624 8 use OSA for consistency instead of Yokogawa... p 1624 26 change to FFPI is shifted p 1624 27 changed to changes p 1625 27 improve sentence with the that p 1626 row 24, avoid references here, should be done in the experimental section

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