**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 #1

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General comments:

The authors present new instrumentation to measure CO2 and CH4 columns. In particular, the use of a compact FFPI spectrometer for greenhouse gas measurements is a very good idea. This topic is very important and the new instruments provide good opportunities to set up a much denser global observing network. The data obtained by the new instruments have been compared with data from a high spectral resolution FTIR instrument, an FTIR onboard GOSAT and in-situ data. However, data basis of one day is too sparse to fully validate the new instruments.

The subject is fully appropriate for publication in AMT. I recommend publication after

some revisions. Please see specific comments below. Furthermore I would recommend to check the English by a native speaker.

Specific comments:

Validation covers just one day. In particular for the FFPI instrument which has to be calibrated with an independent instrument 1 day of observation is not sufficient to proof the quality of the instrument. What's the mid- or long term stability of the instrument? How often do you have to calibrate the instrument? What's about aging of the filters?

I do not fully understand the calibration of the FFPI instrument (p. 1625). It is made by lab measurement and by adjusting to a reference instrument (high resolution FTIR). What is the role of the lab calibration when the final adjustment is made with the FTS?

Can you describe your fit algorithm a bit more in detail. GFIT results show significantly less scatter as compared to results from your own code. What's the reason?

GOSAT data show a bias. What is the altitude of your observing site and the GOSAT observation? Is it a flat terrain?

Chapter 1: Introduction:

- TCCON network matches better for CO2 validation instead of 'network of SCIAMACHY'

- 'inexpensive': What's the approximate price of the instruments?

Chapter 2: Instrumental designs:

- What is the tracking accuracy?

- Are the optical filters wedged?

- How long is the scan time of the instruments?

- What kind of detector is used to record the reference signal?

Chapter 3: An FTS is not dispersing!

Tables 1+2: Column density obtained by FTS-GFIT is missing. Since individual data are shown a column average should be available, too.

Technical corrections:

- p.1616, line 19: due to greenhouse gasses => to anthropogenic greenhouse gases

- a few times: algorism => algorithm

- p. 1622, line 4: are in consistent => are consistent

- p. 1622, line 24: in the air => in dry air

- p. 1624, line 15: Perrot => Perot

- Fig 2, axis description: deg (C) => K

- Fig.3: Oversampling (zero-filling of the interferogram) of the GOSAT spectrum would help the reader to compare with OSA spectrum.

- Fig. 4a: Is it a fit result with GFIT or your own code? Maybe, you show fit results of both codes to illustrate the differences.

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

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