

## ***Interactive comment on “Characteristics of the Greenhouse Gas Concentration Derived from the Ground-based FTS Spectra at Anmyeondo, Korea” by Young-Suk Oh et al.***

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General comments:

The authors present a new TCCON site in Korea. This paper characterizes the instrumentation and gives an example of its application: inter-comparison with OCO-2 satellite data. This site really fills a gap in the existing TCCON network and will be very useful to assessing sink and sources of GHGs. The data and also the comparison with OCO-2 data are of good quality.

The subject is appropriate for publication in AMT. The paper is well written and I recommend publication after major revisions, in particular a more comprehensive description

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of the variable aperture system OASIS system is needed.

Major comment:

A specific feature of the described instrumentation is the so called OASIS (Operational Automatic System for Intensity of Sunray) system. While analog systems are used in active remote sensing systems, for example laser output control in LIDAR systems, an intensity control of passive systems is typically not used.

In the TCCON network the variability of the DC signal is used to quality check and correct the recorded interferograms and resulting spectra. Since you remove this signal you cannot apply this kind of quality check anymore. Do you record and use the actual setting of the aperture to do so?

If the motivation to introduce such a system is to limit the intensity to avoid non-linear response a smaller constant aperture or smaller preamp gain or a smaller sensitivity of the detector might be more appropriate. Would you please add a statement for the motivation to add this system. Or a comparison of XCO<sub>2</sub> time series recorded with and without OASIS system which might demonstrate the difference, for example in terms of signal to noise ratio.

Where is the variable aperture positioned? Is it in the parallel or focused beam? Did you check the influence on the ILS (Instrumental Line Shape) due to the variable aperture while scanning?

I assume a lamp was used and hence the OASIS system was not active while performing cell measurements. Cell measurements using the sun as source might be an option to check the ILS while the OASIS system is active. Or, if the HCl lines in the atmospheric spectrum are covered by interfering species you might do cell measurements with the lamp using different fixed aperture settings to check the influence of the OASIS system on the ILS.

How does your system and its influence on the ILS compares with the results of the

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recent paper by Sun et al, AMT, 2017 on the ‘Sensitivity of instrumental line shape monitoring for the ground-based high-resolution FTIR spectrometer with respect to different optical attenuators’?

While most of the site complies with the TCCON standard setup the OASIS system does not. Therefore a more detailed description is needed as well as a discussion on its influence on the ILS.

Specific comments:

- In Chapter 3.1 the time series of the O2 columns is compared with atmospheric pressure. Therefore including surface pressure in Fig. 8 might support your statement.
- The errors are shown in Fig. 9. How is the error calculated and which sources of errors are included?
- Can you specify ‘regular cell measurements’?

Technical comments:

- p.1 + 12: were generally agreed => generally agreed
- p.2: space born => space borne
- p.3: area is; => area is:
- p.4: with oil-free => with oil-free pump
- p.5: beamsplitters =< beamsplitters
- p. 7: to these derived => to those derived (?)
- p. 9:
  - orbit, devoted => orbit. It is devoted
  - can available => is available

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- p.10: are varied => varied

- p.11:

- over the land => over land

- square => squares

- p.12:

- and this suggesting => suggesting

- new page within Table 4

p.13:

- the source and sink of them. => their sources and sinks.

- outcome this => outcome of this

- Is '... to be withered that turns out to be weak photosynthesis ... a grammatically correct sentence?

Since I'm not a native speaker I would like to suggest to ask a native speaker of the author list to decide on the technical suggestions.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-88, 2017.

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