

## ***Interactive comment on “Intercomparison of in-situ NDIR and column FTIR measurements of CO<sub>2</sub> at Jungfraujoch” by Michael F. Schibig et al.***

**Anonymous Referee #1**

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While CO<sub>2</sub> is the most important greenhouse gas, its sources and sinks are still not well understood. Studies of the carbon cycle require qualitatively good and long-term measurements. Beside in-situ observations remote sensing observations have become an important tool to study the carbon cycle.

This paper forms an important contribution for such studies. While so far most remote sensing observations are performed in the near-infrared spectral region, organized in TCCON, this paper presents observations in the mid-infrared, organized in the NDACC. Since most NDACC observations cover a longer-time span, it makes sense to perform such studies also in the mid-infrared. This holds especially for the Jungfraujoch site, where, together with the Kitt-Peak studies in the US, the longest mid-infrared observations exist. The long-term data set presented, and especially the studies of the seasonality together with the footprint analysis are important and new scientific

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contributions.

The paper is well written and I have only a few comments.

Major comments:

The results of the paper depend on the comparability of near-infrared with mid-infrared observations. This needs to be studied in much more detail. Great care has to be taken in order to consider the different sensitivities of both infrared techniques to understand differences and potential biases. Recently two papers have been published where these differences are studied in detail. Barthlott et al, AMT, 2015 and Buschmann et al., AMT, 2016. The authors mention shortly the paper by Barthlott, but do not mention the paper by Buschmann et al. Since the study of the comparability of the mid-infrared data set from Jungfraujoch with near-infrared observations, as performed within TCCON, are extremely important, the results should be discussed and interpreted with respect to both papers. Besides the presentation of the CO<sub>2</sub>-data, section 2.3 of the manuscript form the most important part of the paper, and much more details on the analysis should be given.

Minor comments:

The introduction is quite interesting and detailed, but very long. To me, many details about the carbon cycle are not worth mentioning here, this part should be shortened.

For me the Figures 10, 11 and 12 do not tell important new findings. I suggest skipping these Figures, or showing only one instead.

Page 7, line 1: The seasonality is also influenced by fossil fuel combustion, not only by respiration and photosynthesis.