Response to comments #2

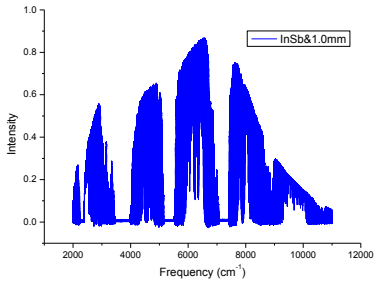
We appreciate your constructive and positive comments. The comments and proposed corrections have been taken into account and helped improving the paper. Each comment has been addressed as follows. There is an extensive discussion among the authors regarding how to revise the content. So the response is delayed, and we are sorry for this.

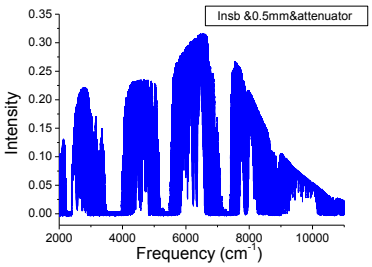
General comments:

The article under consideration introduces a new high-resolution FTIR spectrometer site in Hefei, China. The quality of the presentation is good, and the results presented by the authors indicate that the new station generates useful data. I agree to RC1 that a future regular submission of data collected at the new site to the TCCON data archive would be highly desirable. Concerning the possibility of nonlinearity in the former measurements taken with the InSb detector, it would be advisable to check (in resolution-reduced spectra) for indications of a bias in the zero intensity baseline in the opaque regions of the spectrum between the atmospheric windows. Further, it would be preferrable to replace Figure 3 by an updated version based on results generated with LINEFIT 14.5 (and to follow the recommendations for TCCON cell analysis as described in the examples included in the current version of the distribution). Finally, I would encourage the authors to share and discuss their results for CH4 in addition to CO2 and CO, as it is a standard data product of the TCCON analysis and GOSAT provides methane observations which can be used for comparison purpose.

Response: We would like to be one of the TCCON site and deliver our data to TCCON archive regularly. But at present there are limitations for data-share from the Chinese academy of Sciences. We once applied for data-share for our data, but there are limitations especially for data those haven't been published. After we will have publications using our data for scientific research, it is easier for us to be allowed to share the data publicly. We will take steps to deliver our data to TCCON archive and make them publicly available as soon as possible.

Concerning the possibility of nonlinearity in the former measurements taken with the InSb detector, we compared the InSb spectra with 1.0mm aperture and 0.5mm aperture. We had no InGaAs detector before 2015, so we used a InSb detector to record NIR solar spectra until the end of July 2015. An InGaAs detector has been used since July 2015. The Insb spectra were collected with the 1.0mm aperture in the first 3 months, but many spectra were saturated and showed nonlinearlity (the left panel in the figure below). So we began to use the 0.5mm aperture and added two attenuators in front of the InSb detector, the spectra showed no obvious zero level offsets in saturated windows again (the right panel in the figure below).





The continuum curvature could impact our retrievals. Also, different properties of the two detectors may result in biases between the measurements. To examine the consistency between the InSb and InGaAs detector, the InSb & 0.5mm aperture and InGaAs & 1mm aperture were used alternatively to record solar spectra on a clear day on 1 April 2016.The statistical biases between the measurements of InSb & 0.5mm aperture with InGaAs & 1mm aperture are calculated. The results show that the O_2 window has a large bias ~0.6% for InSb & 0.5mm aperture compared with InGaAs & 1mm aperture, whereas the bias in each CO_2 or CH_4 window is much smaller, with mean biases of 0.129% and 0.026%, respectively. These biases are probably attributed to the response discrepancy of the two detectors. To avoid the systematic biases, the bias correction factors of 1.991ppm and 0.011ppm were applied to all XCO_2 and XCH_4 time series for InSb spectra, respectively, provided that these biases are consistent throughout the entire measurement period. We added a supplement for this paper, in which we describe the observation activities, consistency evaluation and corrections, including optical alignment evaluation, surface pressure correction, timing error correction, and consistency between InSb and InGaAs detector. We discussed the details how to ensure the consistency between InSb and InGaAs detector in the section 3.4 of supplement.

We redid the ILS analysis with LINEFIT14.5, following the recommendations for TCCON cell analysis as described in the examples included in the current version of the distribution, and found that the results are consistent with the LINEFIT 12. We replaced Figure 3 by an updated version based on results generated with LINEFIT 14.5. We added the daily, monthly and annual variability of XCH_4 and the corresponding discussions in section 5.3 “Daily, monthly and annual variability of XCO_2, XCO and XCH_4”. One of my colleagues are writing a manuscript about the comparison of XCH_4 data with surface in situ data, model data and GOSAT data. So this paper didn’t include a comparison of XCH_4 with GOSAT to avoid repetition.