Author comment:
First we would like to thank Anonymous Referee #1 for the very useful comments and detailed corrections, which we found very constructive and helpful to improve our manuscript.

In the following we list our changes in our manuscript due to the “Specific Comments”.
We included nearly all of the Technical Corrections.

(1)
Page 4866, line 19: The reference to Toon et al., 2009 for TCCON could be added to or replaced by D. Wunch et al., Calibration of the Total Carbon Column Observing Network using aircraft profile data. Atmos. Meas. Tech., 3, 1351-1362, 2010. and D. Wunch, et al., The Total Carbon Column Observing Network (TCCON), Philos. T. R. Soc. A, in press, 2010.
The two TCCON papers by D. Wunch et al. were added.

(2)
Page 4867, line 26: Doesn’t 10 percent/degree correspond to 18 arcseconds for 0.05 percent (3600arcsec/10 x 0.05)?
The exact relative air mass change for a tropospheric gas retrieved from the formula is 9,58%, which results in 18,79 arc sec, which we rounded to 19 arc sec.

(3)
Page 4868, line 19: Explain the reason for the square root of two (extending 1-D results to 2-D?).
To explain the origin of the sqrt(2) factor for the total pointing we extended the relevant section by a sentence:
“[…] the mispointing cannot be retrieved from the observed Doppler shifts, because there is no sensitivity along the direction parallel to the solar rotation axis. For this reason, we apply in the following an additional factor of sqrt(2) when we estimate the total pointing error (we assume that the pointing uncertainty is of the same size for any direction on the solar disc).”

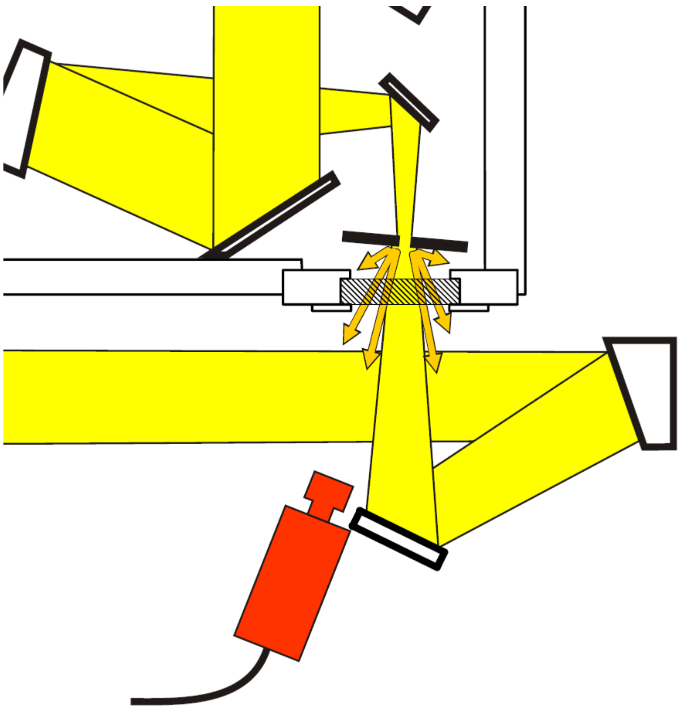
(4)
Page 4868, lines 19-21: For Kiruna, explain what happened in February 2006. For Izana, explain what changed in May 2007. What was the accuracy at Izana before May 2007? It would also be helpful to state upfront exactly what systems are used at each of the three sites considered in the paper.
We added the following section to provide more details about the setups at our measurement sites:
“To estimate current tracking accuracies with a quadrant diode setup, we evaluated the spectra measured at our FTIR sites Kiruna (67.84°N, 20.41°E) and Izana (28.30°N, 16.48°W).
The solar trackers at the two sites are not fully identical. In Kiruna, the solar light that is analyzed by the quadrant diode is decoupled from the converging beam a few cm in front of the entrance aperture by a tiny plane mirror, so only a small subsection of the full beam diameter is used. In Iza\~na, a plane semitransparent mirror is inserted between the spectrometer's focusing parabolic mirror and the entrance aperture, which covers the full beam diameter and reflects the IR radiation towards the spectrometer while a fraction of the VIS radiation is transmitted towards the quadrant sensor. We believe that the Kiruna setup is representative for most FTIR solar trackers in operation, whereas the Izana setup might be the optimum which can be achieved with the quadrant diode approach, because the same beam is used by the quadrant sensor as by the spectrometer. This solution is insensitive against optical

aberrations of the off-axis paraboloid and has to our knowledge not been realized at other FTIR sites so far.
The deduced pointing accuracy for Kiruna is shown in Fig. 2, indicating a tracking accuracy of sqrt{2}*69 arc sec = 98 arc sec. Note that any realignment of the quadrant sensor tends to affect the quality of the tracking, this is probably the reason for the reduced scatter since Feb. 2006. At the FTIR site Izana, we installed the setup with the semitransparent mirror in February 2005 and observed an accuracy of 93 arc sec. After small realignments of the quadrant diode in May 2007 we reached 34 arc sec."
(In our Discussion Paper, by mistake we stated a tracking accuracy of 50 arc sec in Izana for the time after May 2007, which we changed to the correct value of 34 arc sec.)

(5)
Page 4869, line 24: Explain why the input field stop is needed.
We added the sentence:
"The field stop is an important component of a high-resolution FTIR spectrometer as it defines the interferometer's field of view and so affects e.g. the instrumental line shape."
and the reference to the book "Fourier Transform Spectrometry" by Davis, Abrams and Brault.

(6)
Page 4870, line 8 and Figure 4: It is not clear from the figure how the solar beam is falling on the camera or how the "input side of the field stop wheel" is recorded. Explain and show in the optical diagram.
The solar beam is not falling directly onto the camera. Instead, it records the radiation which is scattered back from the input aperture wheel without affecting the spectrometers wanted signal. Therefore we added the following sentence into the paper:
"The wanted signal used by the spectrometer is not affected by the camera."

In addition, to illustrate how the light is falling onto the camera, we modified the following detail of Fig. 4 to clarify that the camera records radiation backscattered from the aperture wheel:



(7)

Page 4872, para 1: It is not really clear from this paragraph how the combination of the two procedures is used to determine the mirror movement. A more complete description should be added.

To clarify the calculation of the mirror movement, we added the following section:
"After this initialization procedure, the mirrors of the Camtracker setup are moved according to the calculated apparent motion of the solar disk. At a repeating rate of about 0.5 s, images are recorded by the camera and the current position offset is determined using the algorithm described above. This correction is superimposed to the result of the astronomical calculation in the next commanding loop of the mirrors."

(8)

Page 4874, line 10: There is no discussion of this point. What is the conclusion based on the results in Figure 7? Do the residuals imply that the offset must be much less than 5 arcmin because the real residual is less than the simulated one?

In Fig. 7, we included the simulation of a 5 arc min tracking offset simply to illustrate the senitivity of the solar lineshift approach. Therefore we modify a sentence as follows:
"To illustrate the sensitivity of the solar lineshift approach, we added a simulation for a 5 arc min tracking offset in the figure."

(9)

Page 4874, line 11: The spectral range used in Figure 8 differs from that used in Figure 2. Comment on why and whether any impact is expected from this.

A different spectral region was chosen for the determination of the Kiruna and Izana pointing errors, because no NIR-spectra are available in Kiruna. In Karlsruhe, we only have a limited number of MIR spectra available (182 MIR spectra vs 2155 NIR spectra). We found that the MIR error budget is slightly larger, but this will not significantly affect our conclusions, as the scatter of the Karlsruhe MIR data is only about 4" higher than those derived from the NIR spectra.

(10)

Page 4874, line 17: How is the 5 arcsec uncertainty due to winds obtained?

As explained in Section 3 the mispointing is ultimately derived from the relative shift of the solar wrt telluric absorption lines. For large solar zenith angle, a reasonable horizontal wind speed of 10m/s causes a Doppler shift (delta nue)/nue of 3.3e-8 on the telluric spectral lines if by chance the wind direction coincides with the line-of sight azimuth. A mispointing of 5 arc sec of the sun along the rotational direction would have the same effect (but shifting the solar lines).

(11)

Page 4875, lines 10-12: This discussion is a bit confusing. Clarify whether the VIS/NIR refers to observations with the IR filter in place. Does IR bandpass refer to the bandpass of this filter or to the IR region of the spectra? Also, at lines 16-17, what is the impact of not accounting for this 1 percent difference in the deviation of the beam?

We assume that the camera spectral bandpass is roughly 700nm – 900nm, the 700 nm border defined by a longpass optical filter, the 900 nm border defined by the typical spectral sensitivity of CCD or CMOS b/w sensors. The spectrometer might cover any region between 750 cm-1 (13 µm) and 15000 cm-1 (650 nm) for TCCON (4000-15000 cm^-1) or NDACC (750-5000 cm^-1) observations. If the raytracing recipe outlined in Section 8 is applied, the effect of the difference in beam deviation between the different spectral bandpasses on deduced gas columns can be safely neglected (<0.01%). By the nature of the Camtracker setup and the recommended raytracing scheme the spectrometer's line of sight and the line-of-sight defined by the Camtracker penetrate the atmosphere with the same elevation angle at the spectrometer's location (where most of the atmospheric column resides).