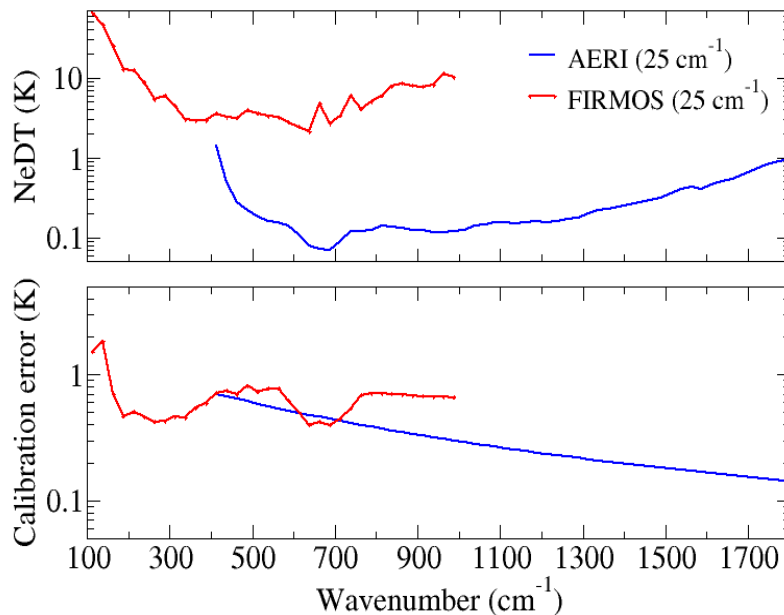


Reply to Referee comment *essd-2020-377-RC1*

We thank the reviewer for the positive comments. Here below the reply to the specific minor comments.

1) In the revised text, we have added the required information:

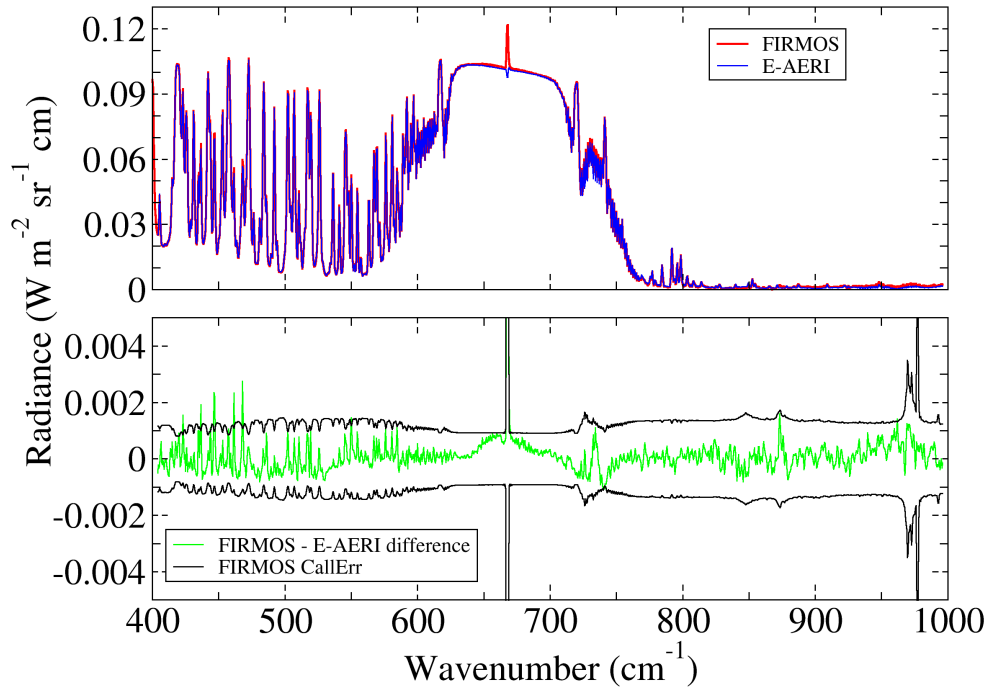
- The field-of-views (full angle) of the spectrometers have been added both in the text and in Tab.1:
 - FIRMOS FOV = 22 mrad
 - E-AERI FOV = 46 mrad
- A new figure, shown here below, will be added in the revised paper to show the comparison both for the mean NeDT and the calibration accuracy in brightness temperature units calculated at 280 K for the whole dataset. For this comparison, an average over 25 cm^{-1} wavenumber bins across the spectrum, which is used for E-AERI, is also applied to FIRMOS estimates.



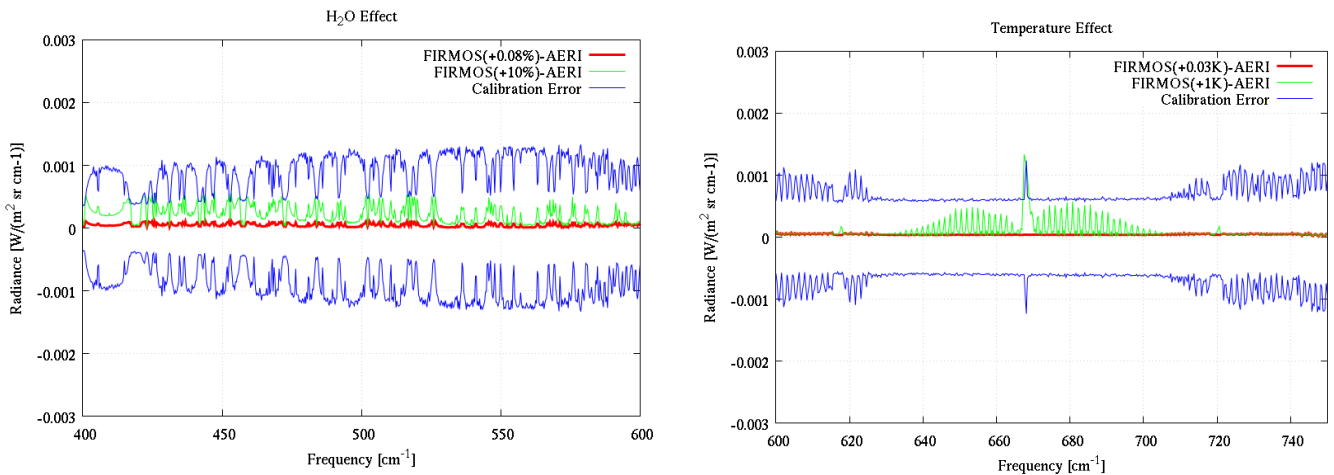
2) Actually, the frequency scale residual difference between the two instruments was corrected before the comparison.

The instrument FOV of the interferometer is responsible for part of this effect (30 ppm for FIRMOS and 132 ppm for E-AERI); another contribution comes from the calibration of the metrology system. However, all these contributions are corrected globally during the spectral calibration in both instruments. Nevertheless, a residual small difference of -50 ppm for E-AERI and + 50 ppm for FIRMOS was found with an a-posteriori fit of the frequency scale. Therefore before the comparison, shown in Fig. 7, these correction factors were applied with the Norton-Bier apodization and the resampling on the same spectral grid. We notice also that both instruments have an instrument line shape very close to the sinc function (see also the reply to the review RC3), which is further equalised by the Norton-Bier apodization before the comparison.

For a better estimate of the residual differences, Figure 7 will be updated with the figure here below, where we have considered the total uncertainty calculated using both the noise and the calibration accuracy (summed in quadrature) of both instruments.



We have also investigated the effect of the different observing locations of the two instruments. As described in the paper, E-AERI is located on the roof-top of the Zugspitze observatory, whereas FIRMOS is installed on the terrace below, 4 m lower, in a southward corner protected from winds. In these conditions, the different mean temperature and humidity close to the instruments, and the presence of an additional layer of 4 meters of air in front of FIRMOS could produce some differences in the lines of CO_2 and H_2O but always below the calibration error estimated for FIRMOS, as shown by the sensitivity study in the figure here below.



The residual differences still present in the range 400-450 cm^{-1} might be due to the different instrument FOVs, which on average might observe a slightly different scene.

3) The acronyms in Table 1 have been written in full names.