Supplementary Material for “Joint spectral retrievals of ozone with Suomi NPP CrIS augmented by S5P/TROPOMI” by Malina et al.

Additional CrIS-TROPOMI/CrIS/TROPOMI Retrievals and Comparisons for 2020-08-13

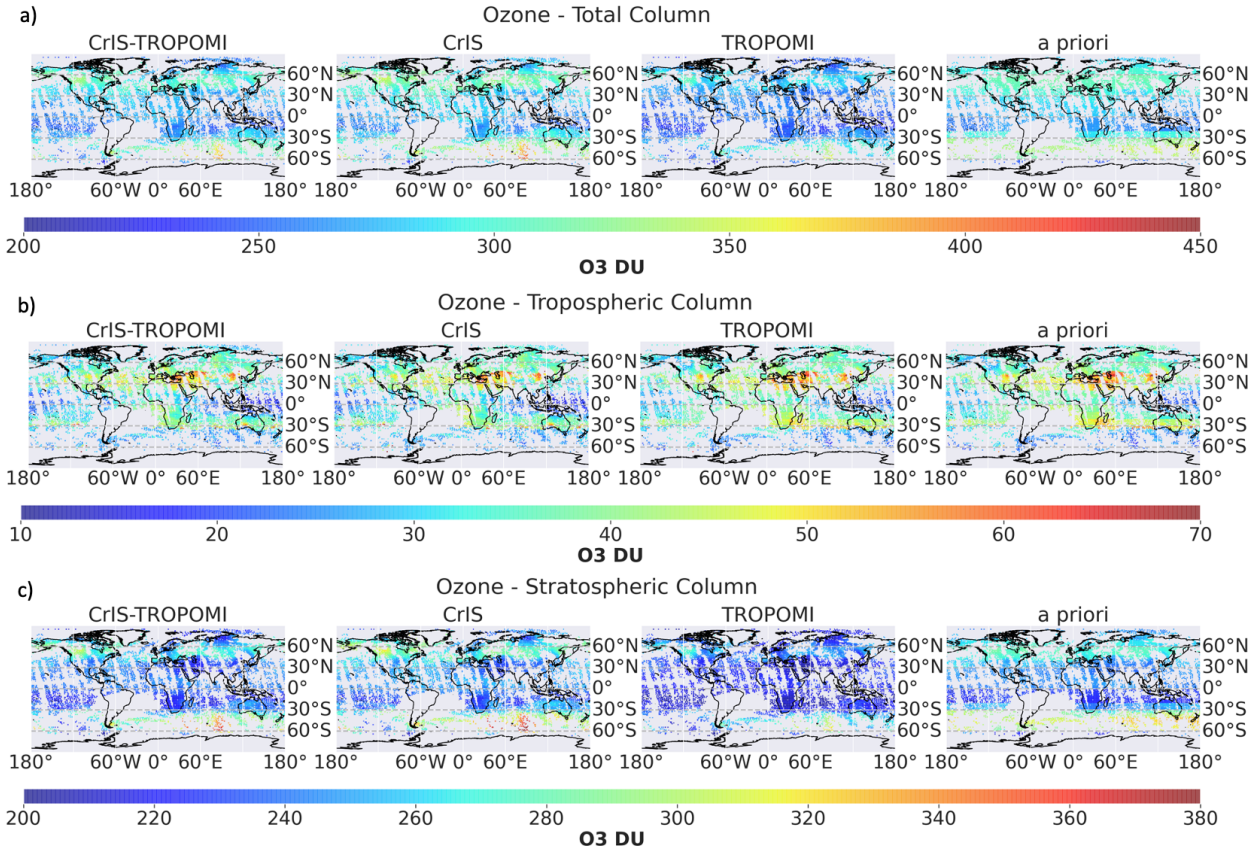

Figure S1: Global distributions of ozone on August 13 2020 in DU, comprising of ~10k quality retrievals. The results shown in the left hand column are from the CrIS-TROPOMI retrievals, followed by CrIS, TROPOMI and the a priori in the right hand column. Each row indicates the ozone concentrations. The total column, tropospheric sub-column and stratospheric sub-columns are indicated in the rows.

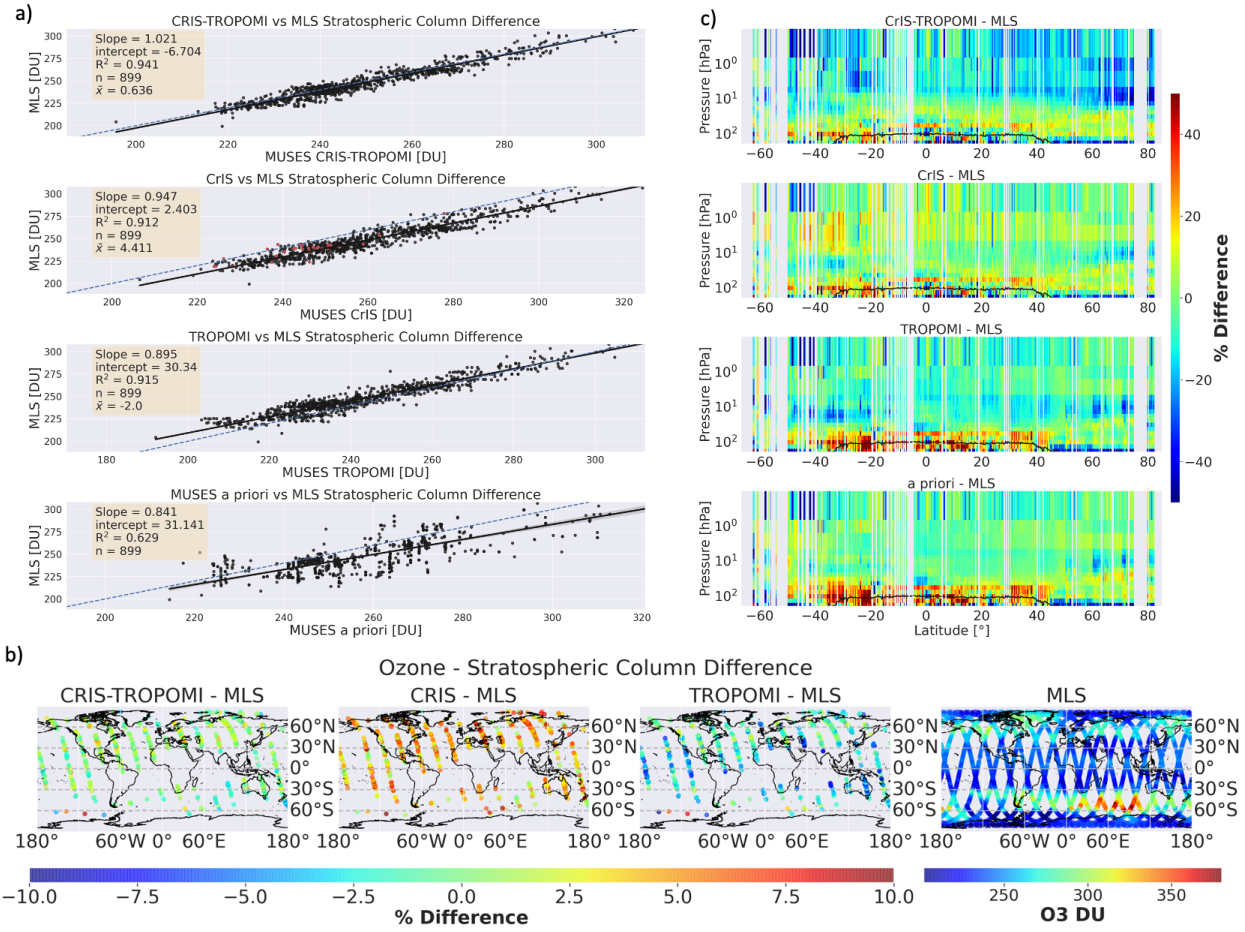

Figure S2. Cross-comparisons of MLS with CrIS, TROPOMI and CrIS-TROPOMI on August 13 2020 for the stratospheric profile. The three subplots highlighted by a) show the linear relationship between the matched stratospheric columns of MLS and, moving top to bottom, CrIS-TROPOMI, CrIS, TROPOMI and the MUSES a priori. For the CrIS plot, the black dots represent daytime retrievals, and red dots show nighttime retrievals. The linear fit statistics are indicated in the plot, showing in order the linear slope, intercept, coefficient of determination and the number of matched footprints. The second section of subplots indicated by b) shows the percentage difference between the instrument retrievals and MLS in the stratospheric column on a global grid. Moving from left to right, CrIS-TROPOMI, CrIS and TROPOMI data are shown, with the plot on the far right showing the MLS ozone stratospheric column for reference. The third section of subplots shown by c) indicates the difference between the retrieved profiles from (moving top to bottom) CrIS-TROPOMI, CrIS, TROPOMI and the MUSES a priori, compared with MLS. All values are based on the co-located points shown in a) and b) binned into one longitudinal bin, shown between 0 and 200 hPa. The black lines indicates the tropopause.

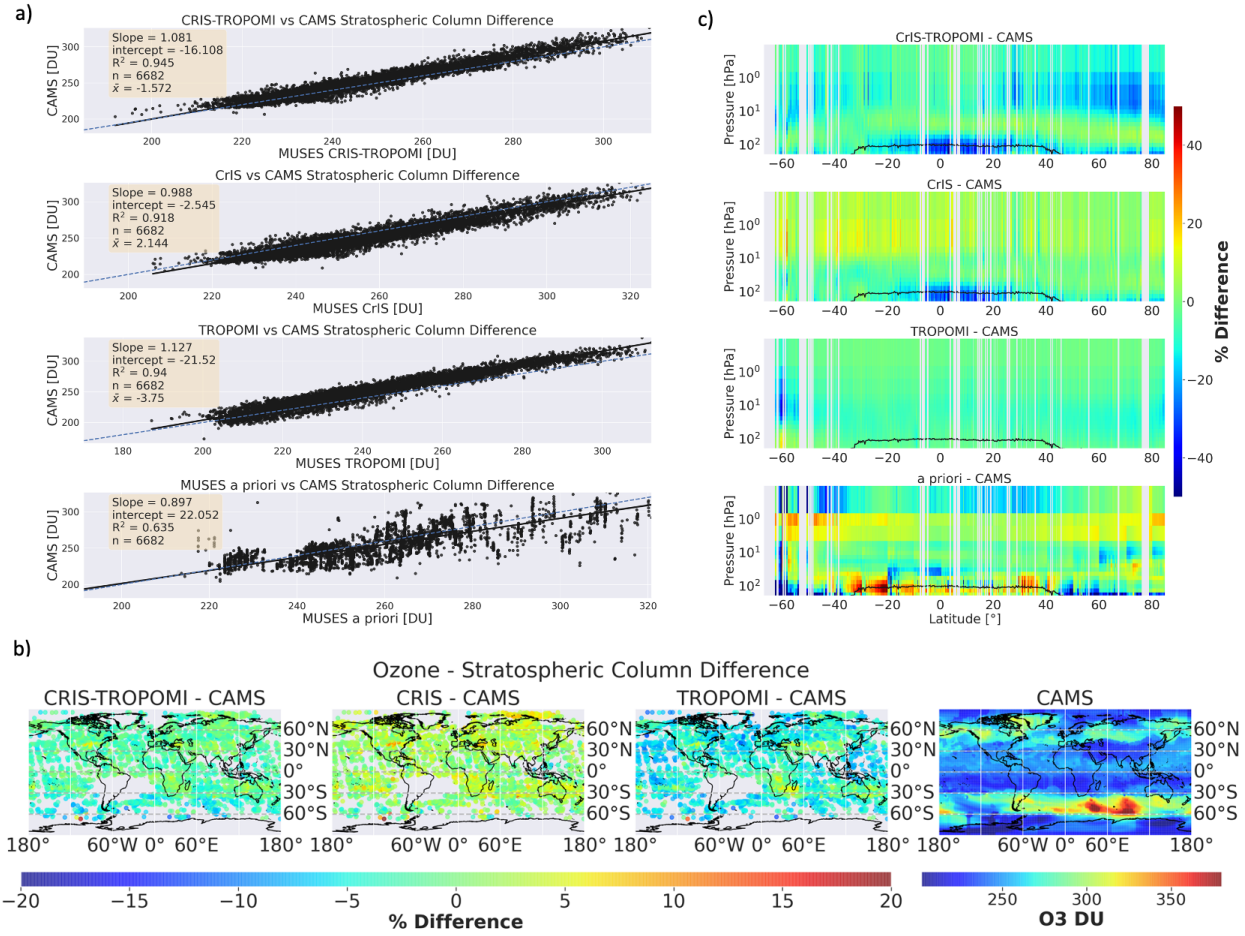

Figure S3: Cross-comparisons of CAMS-reanalysis with CrIS, TROPOMI and CrIS-TROPOMI on August 13 2020 for the stratospheric sub-column. The layout of this figure is as Fig. S2.

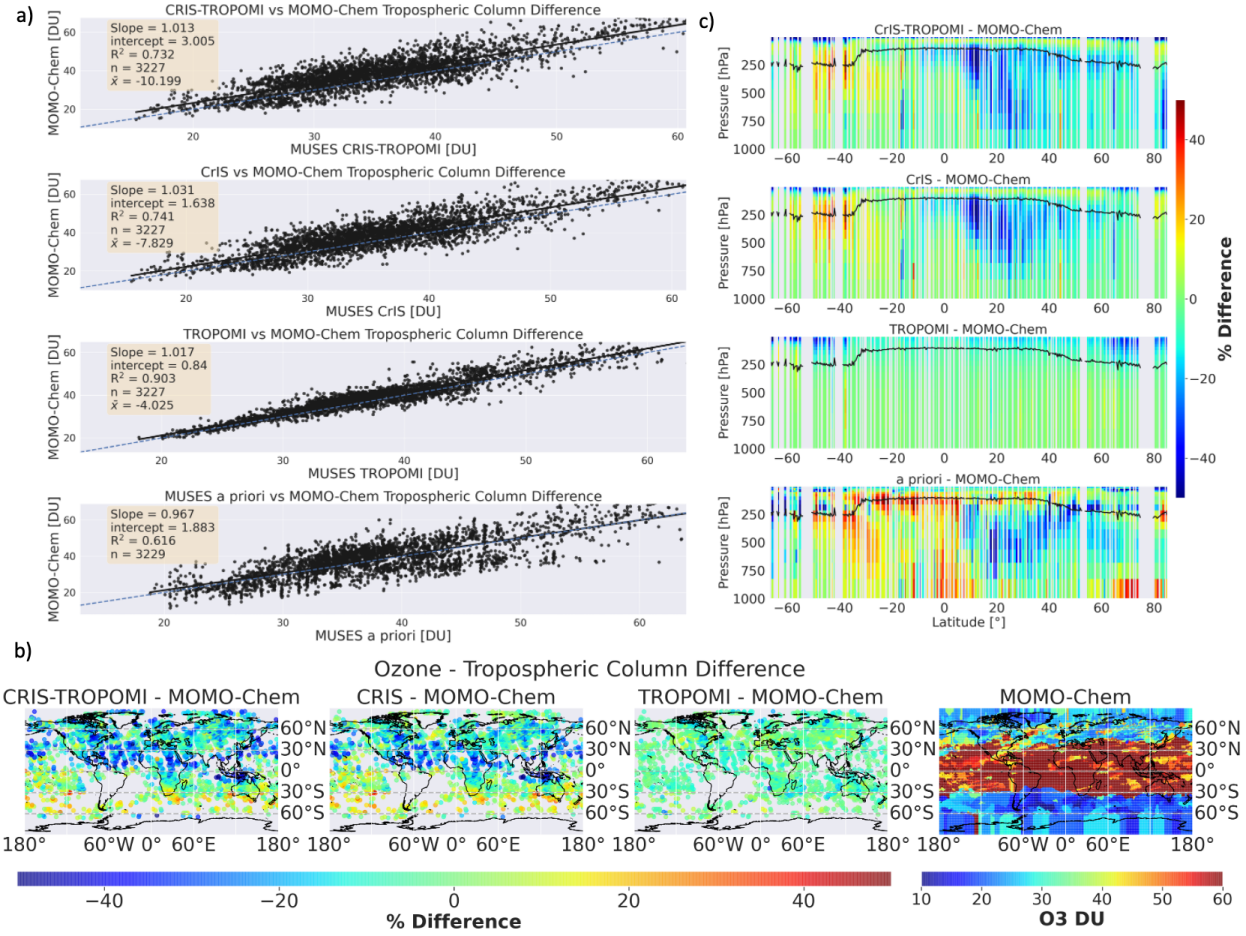

Figure S4: Cross-comparisons of MOMO-Chem with CrIS, TROPOMI and CrIS-TROPOMI on August 13 2020 for the tropospheric sub-column. The layout of this figure is as Fig. S2.

Additional CrIS-TROPOMI/CrIS/TROPOMI Retrievals and Comparisons for 2020-08-14

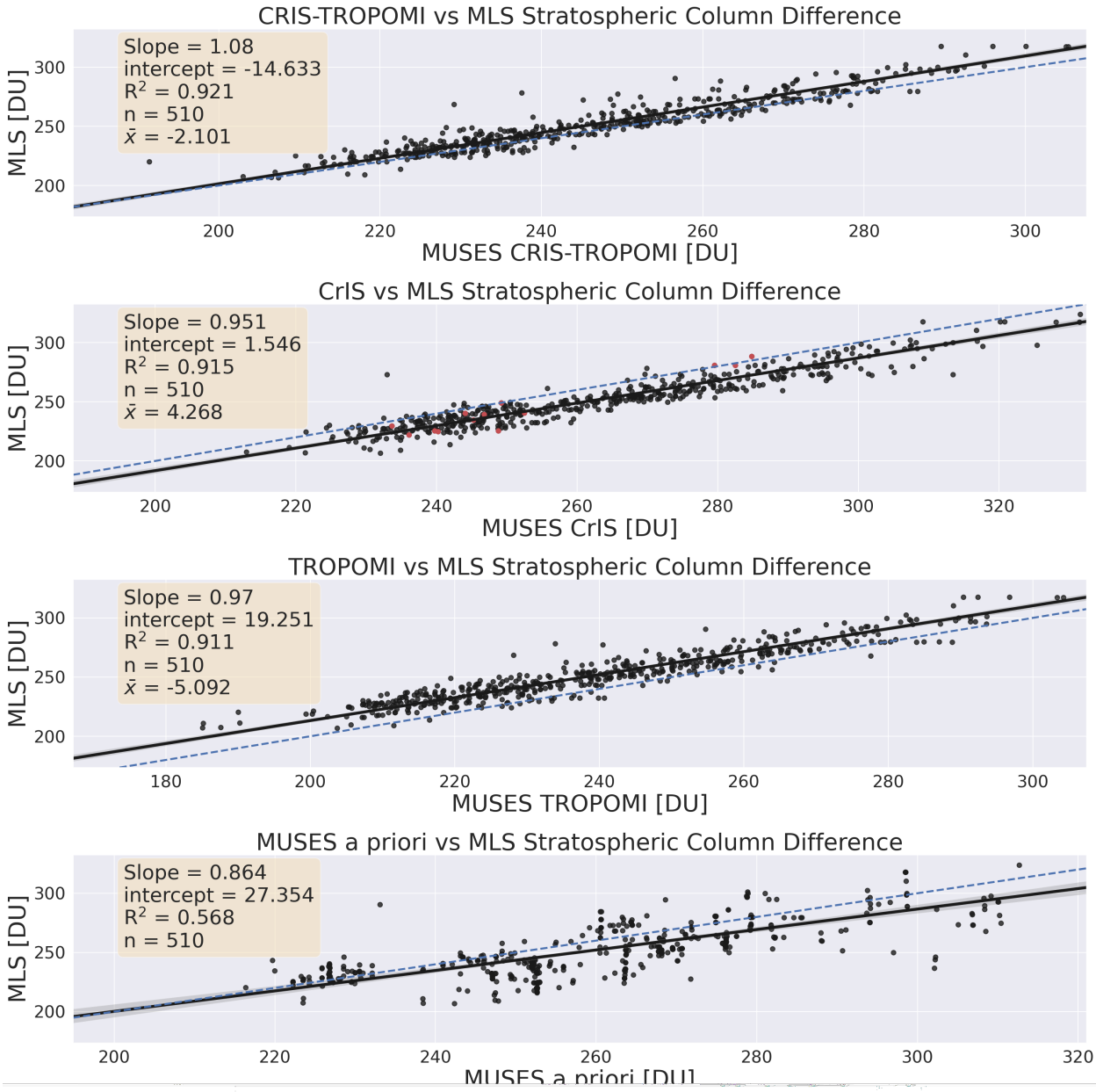

Figure S5: Cross-comparisons of MLS with CrIS, TROPOMI and CrIS-TROPOMI on August 14 2020 for the stratospheric profile. The three subplots highlighted show the linear relationship between the matched stratospheric columns of MLS and the relevant instruments.

Additional CrIS-TROPOMI/CrIS/TROPOMI Retrievals and Comparisons for 2020-08-15

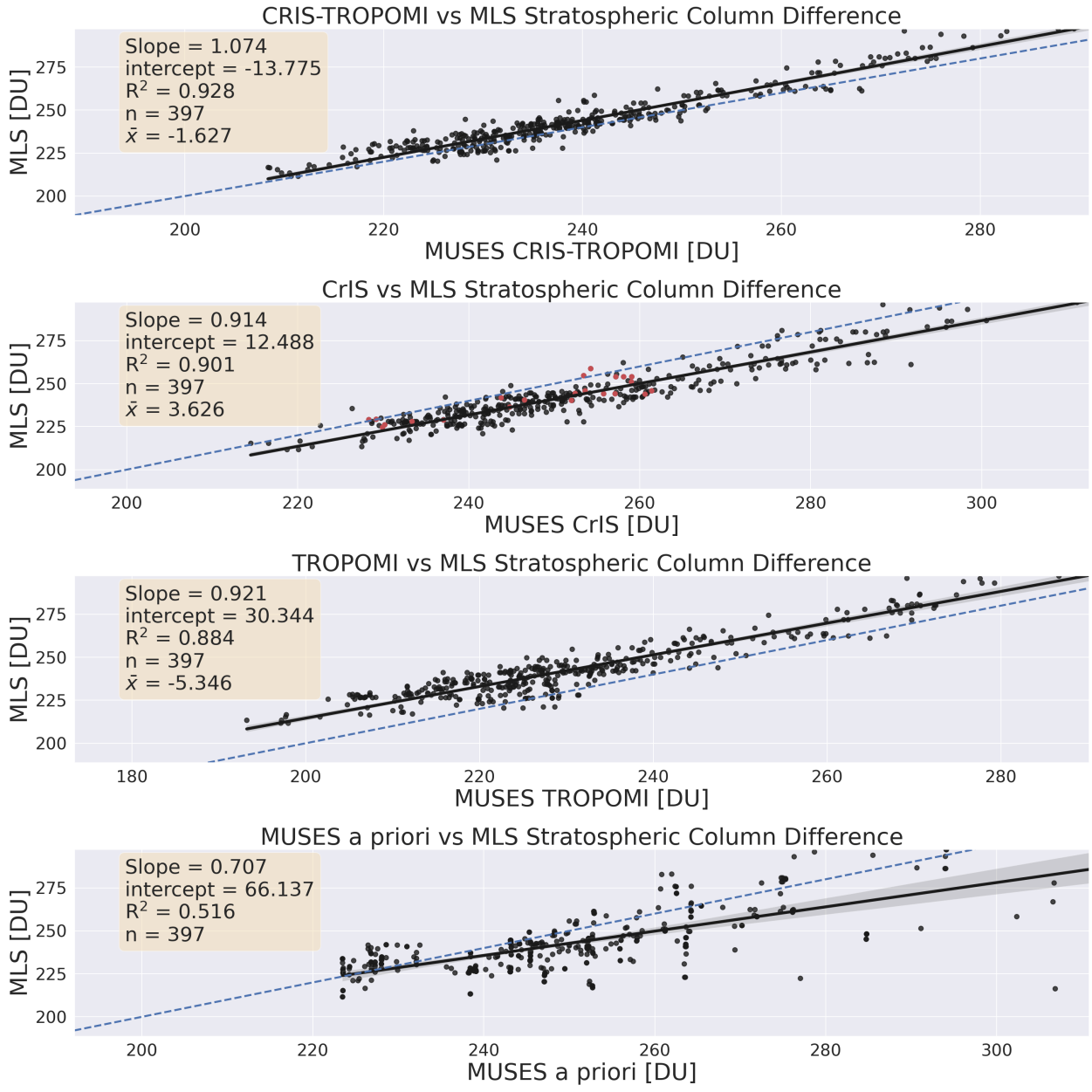

Figure S6: Cross-comparisons of MLS with CrIS, TROPOMI and CrIS-TROPOMI on August 15 2020 for the stratospheric profile. The three subplots highlighted show the linear relationship between the matched stratospheric columns of MLS and the relevant instruments.

Additional CrIS-TROPOMI/CrIS/TROPOMI Retrievals and Comparisons for 2020-04-19

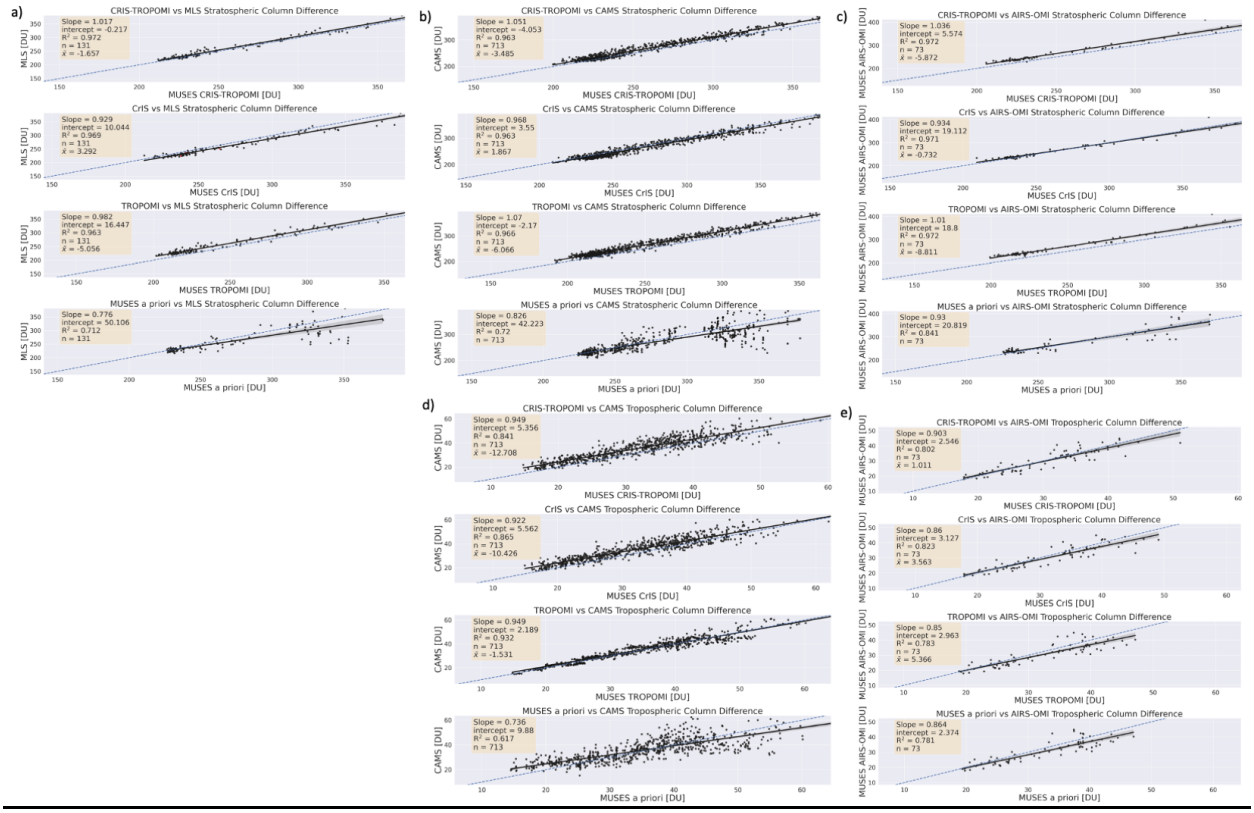

Figure S7: Cross comparisons of CrIS-TROPOMI/CrIS/TROPOMI on 2020-04-19 against a) MLS in the stratospheric column, b) CAMS-reanalysis in the stratospheric column, c) AIRS-OMI in the stratospheric column, d) CAMS-reanalysis in the tropospheric column and e) AIRS-OMI in the tropospheric column.