Supplementary Figure 1(a). Averaging kernel for the CO$_2$ $\nu_2$ band temperature retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The averaging kernel for LBLRTM v9.4+ (not shown) is similar.
Supplementary Figure 1(b). Averaging kernel for the CO$_2$ v$_3$ band temperature retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The averaging kernel for LBLRTM v9.4+ (not shown) is similar.
Supplementary Figure 2(a). Averaging kernel for the P- and R-branch water vapor retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 2(b). Averaging kernel for the P-branch only water vapor retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 3. Averaging kernel for the second, constrained CO$_2$ v$_2$ band temperature retrieval using LBLRTM v12.1 for an example profile with 1.5 cmPWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 4. Averaging kernel for the O₃ retrieval using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 5. Averaging kernel for the CO retrieval using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 6. Averaging kernel for the CH$_4$ retrieval using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.
Supplementary Figure 7: Error in mean residuals (averaged over 120 scans) from noise in radiance units.
Supplementary Figure 8: Error in mean residuals (averaged over 120 scans) from noise in brightness temperature units (calculated by adding the radiance error to the observed radiances of the moderate water vapor case).