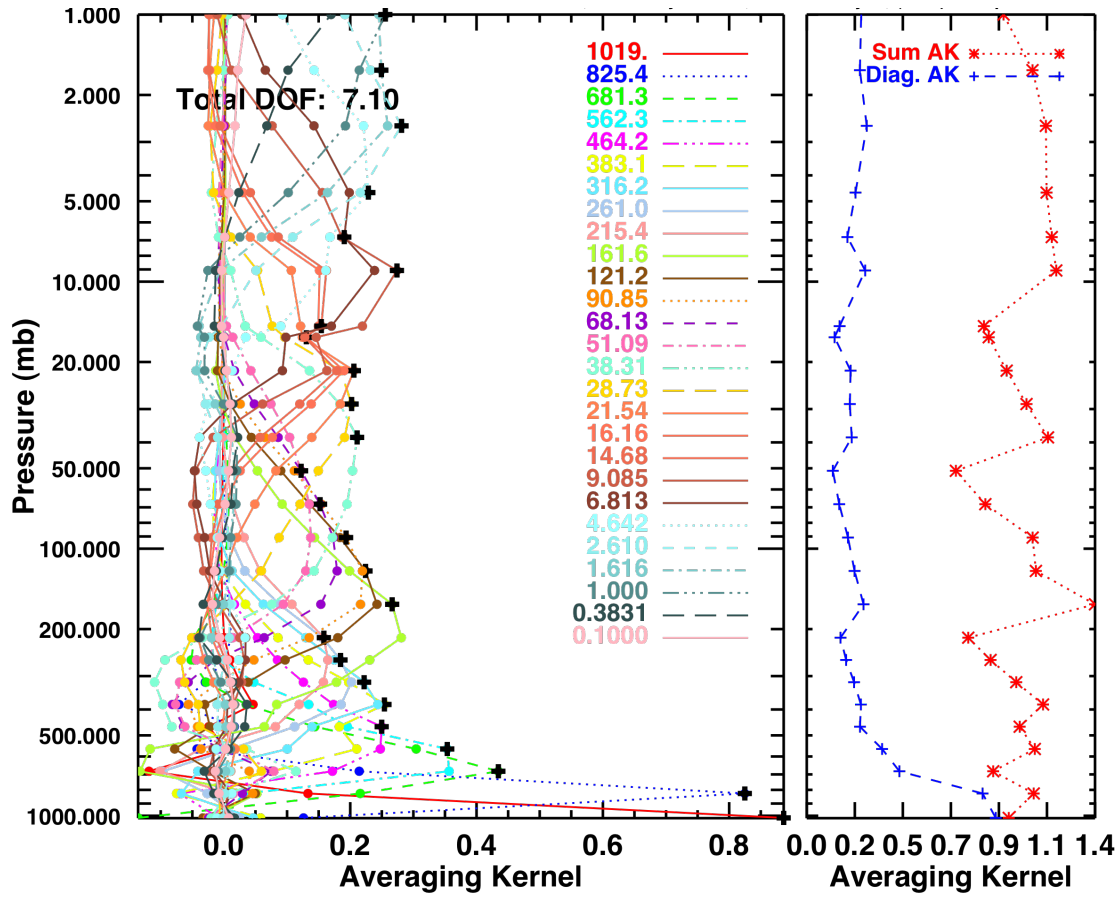


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Supplementary Figure 1(a). Averaging kernel for the CO₂ v₂ band temperature retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The averaging kernel for LBLRTM v9.4+ (not shown) is similar.

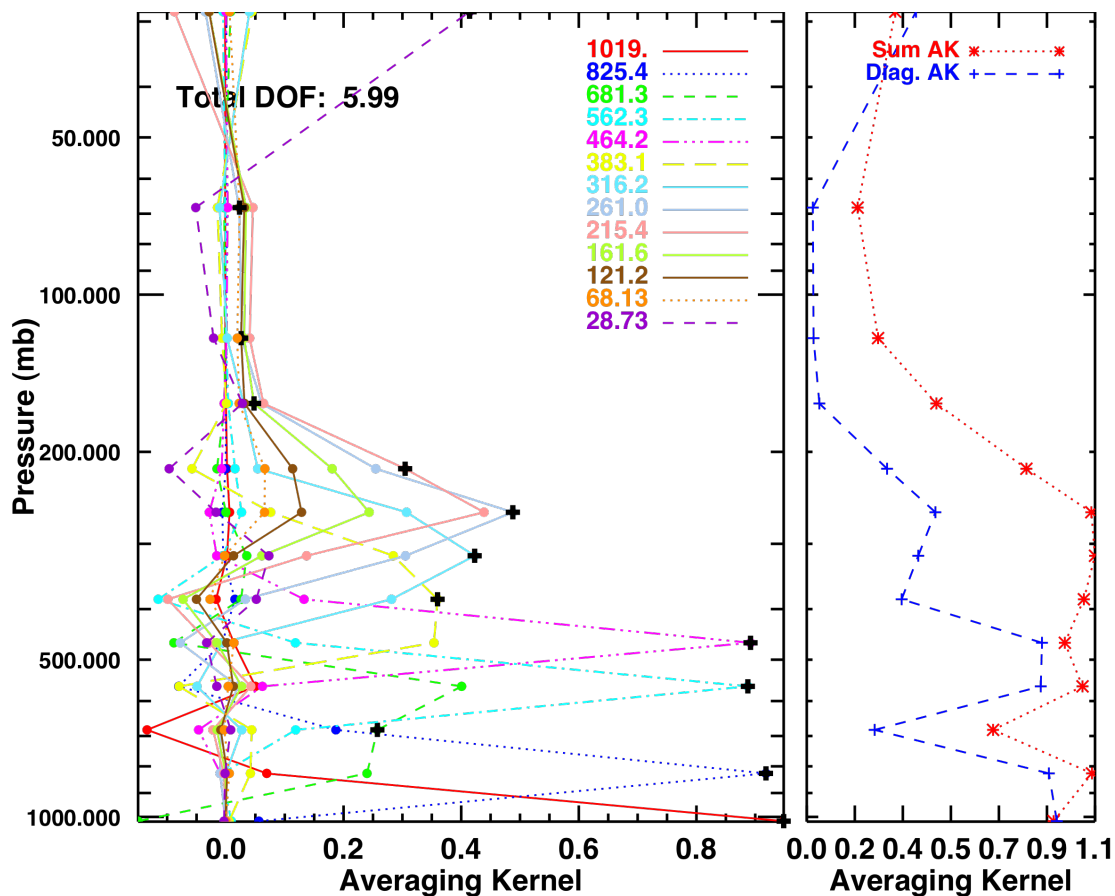


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3 Supplementary Figure 1(b). Averaging kernel for the CO₂ v₃ band temperature retrievals
 4 using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The averaging kernel
 5 for LBLRTM v9.4+ (not shown) is similar.

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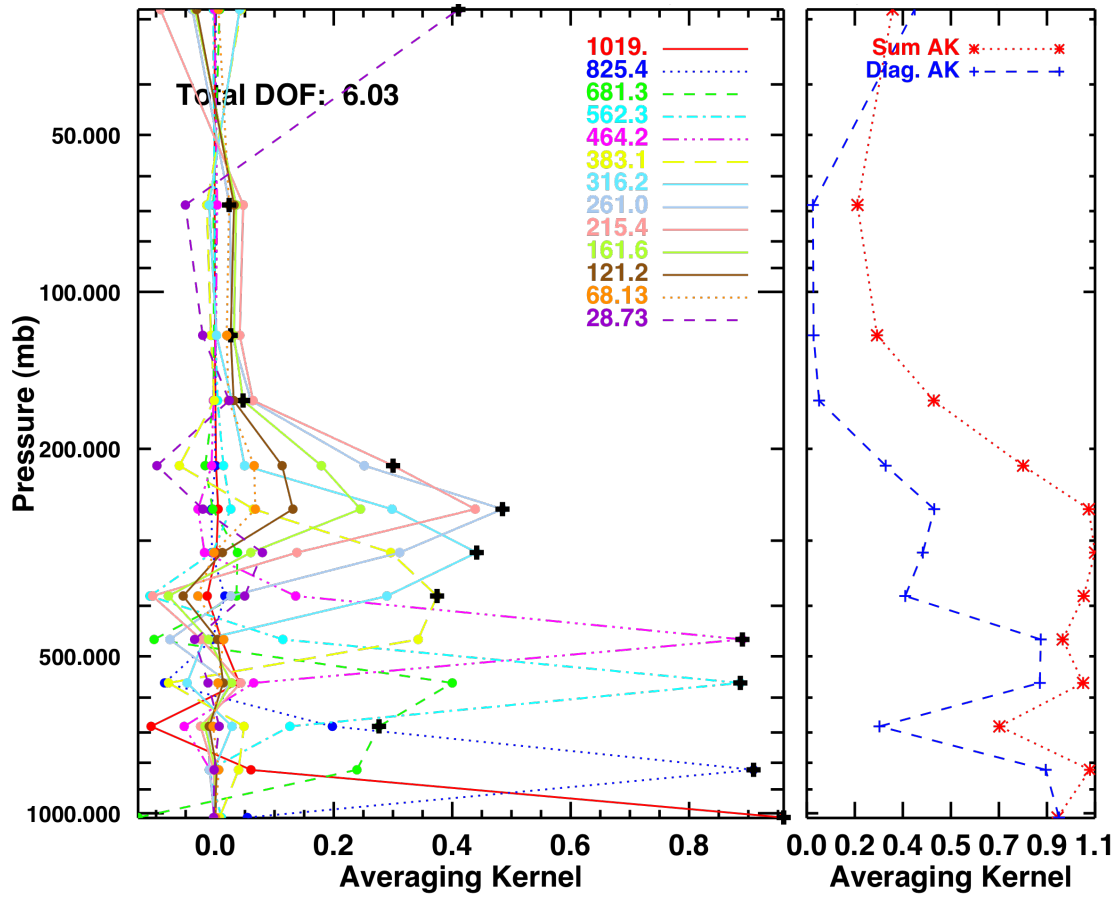


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3 Supplementary Figure 2(a). Averaging kernel for the P- and R-branch water vapor
 4 retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM
 5 v9.4+ averaging kernel (not shown) is similar.

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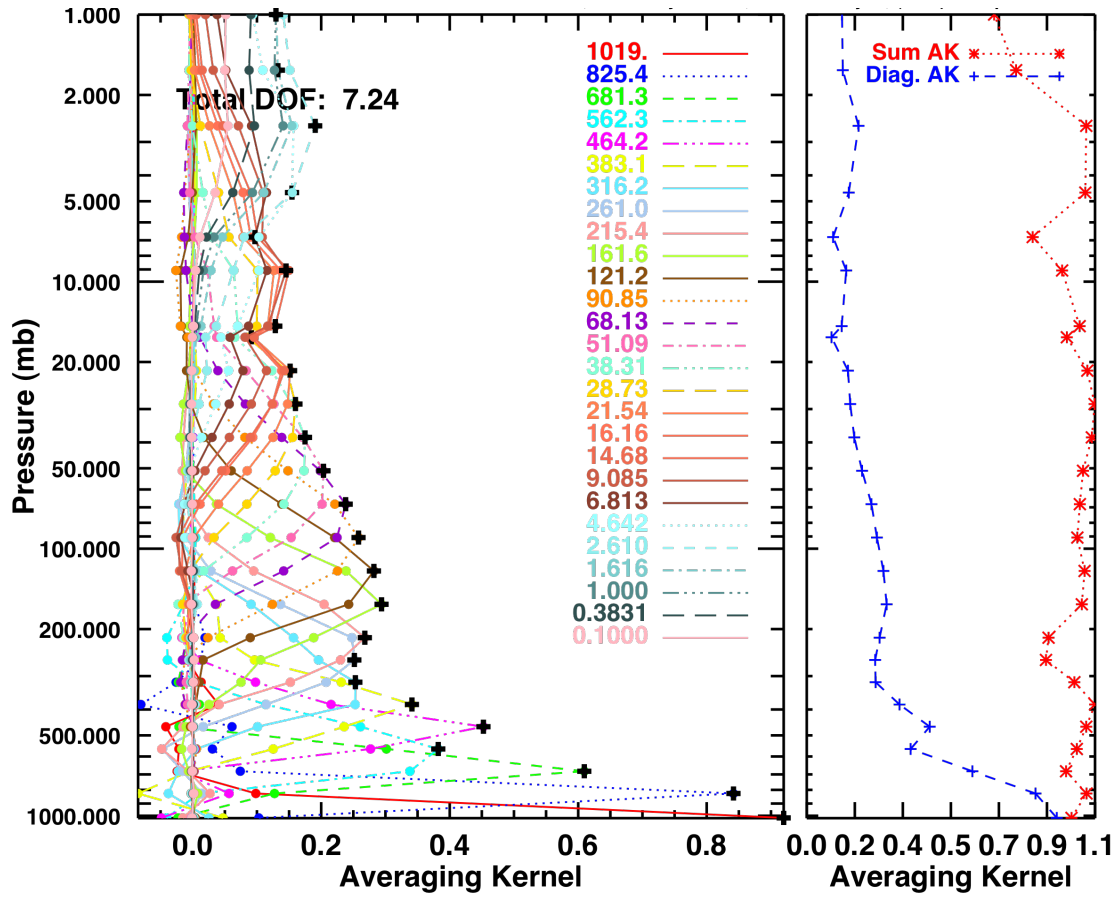


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3 Supplementary Figure 2(b). Averaging kernel for the P-branch only water vapor
 4 retrievals using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM
 5 v9.4+ averaging kernel (not shown) is similar.

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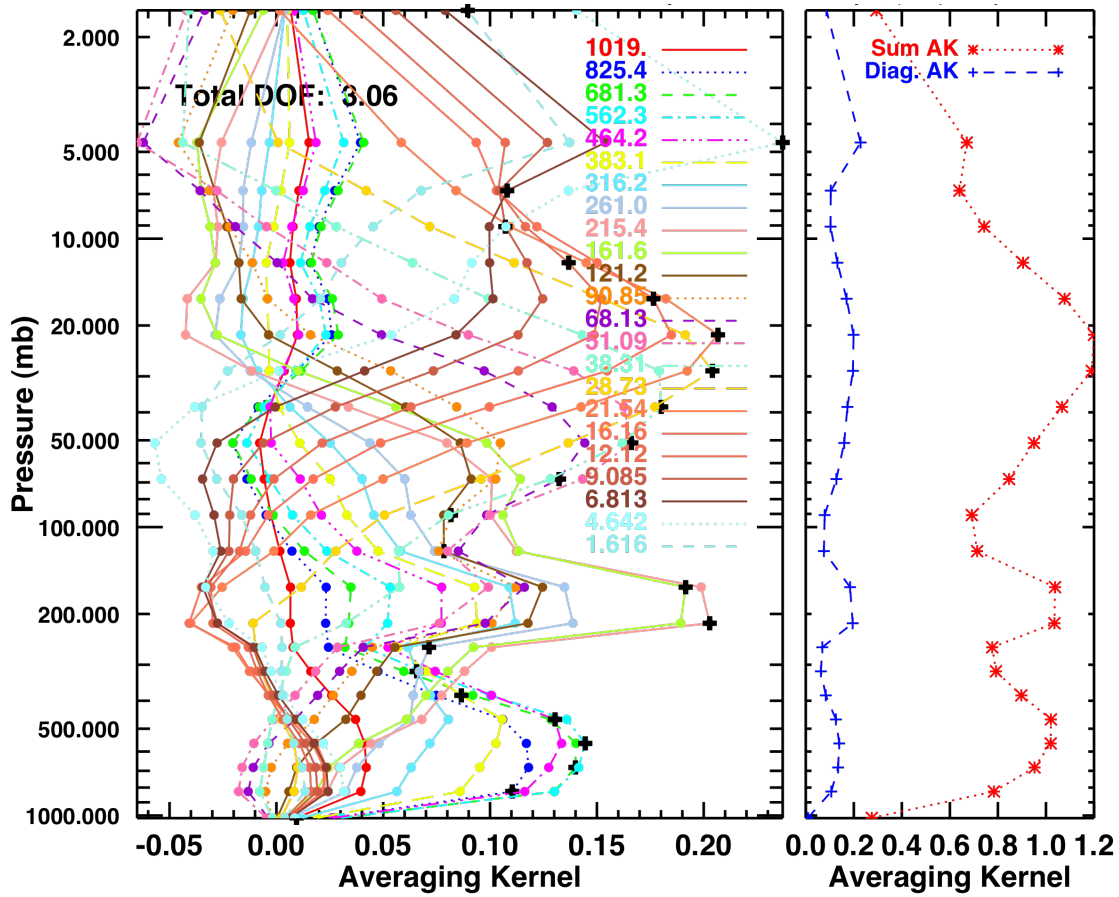


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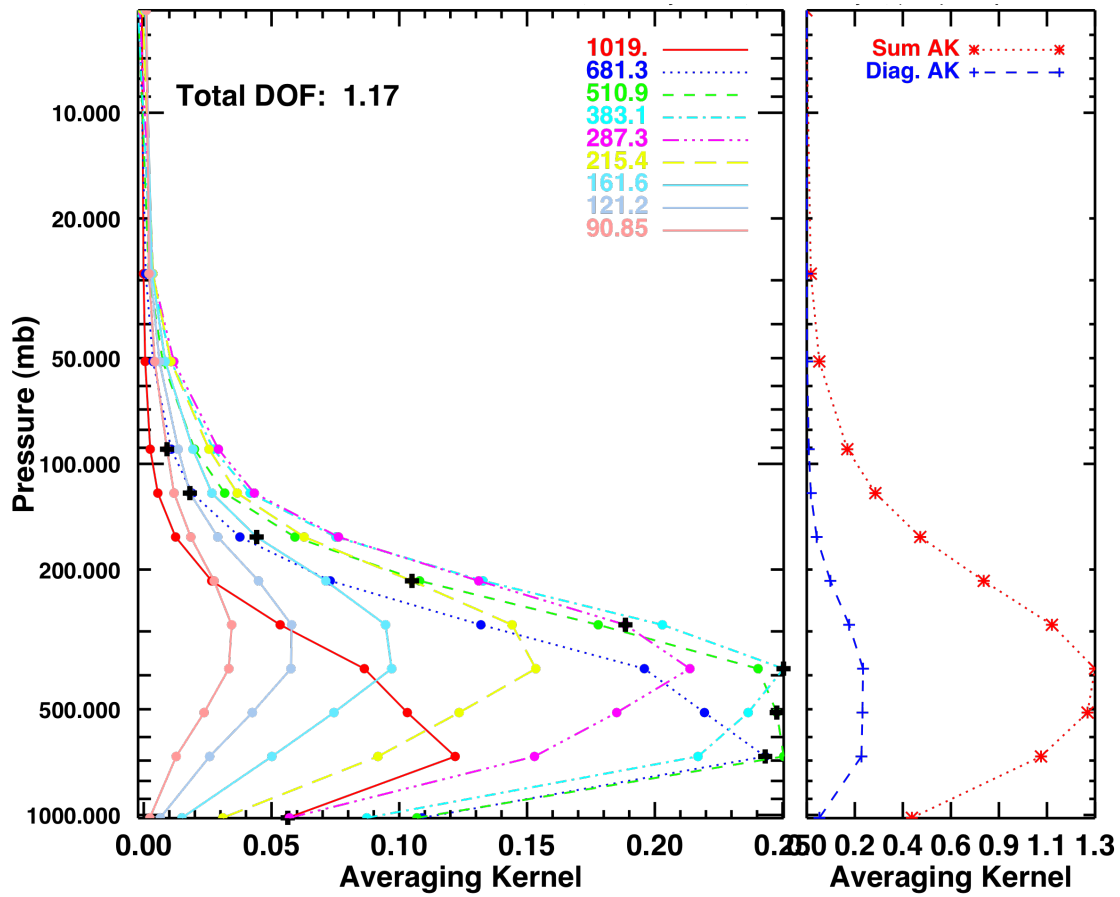
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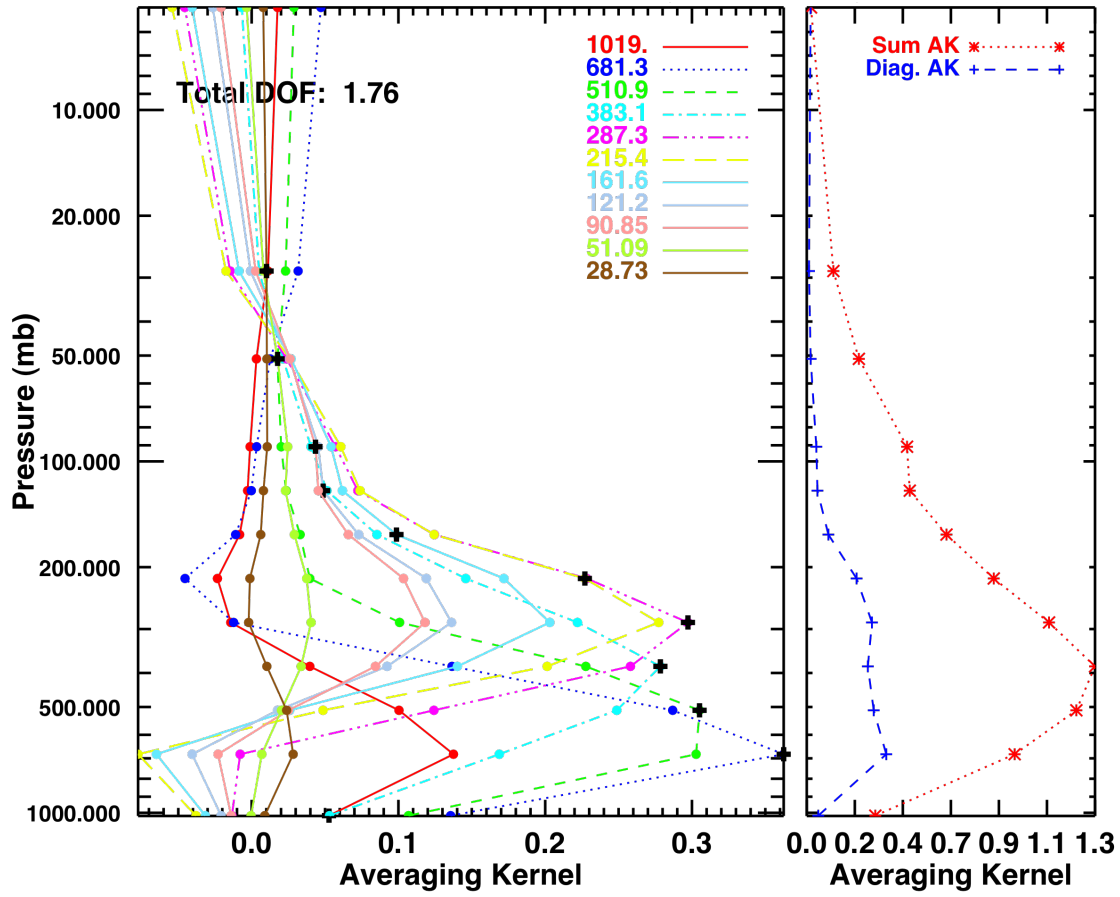
3 Supplementary Figure 3. Averaging kernel for the second, constrained CO₂ v₂ band
 4 temperature retrieval using LBLRTM v12.1 for an example profile with 1.5 cm PWV.
 5 The LBLRTM v9.4+ averaging kernel (not shown) is similar.

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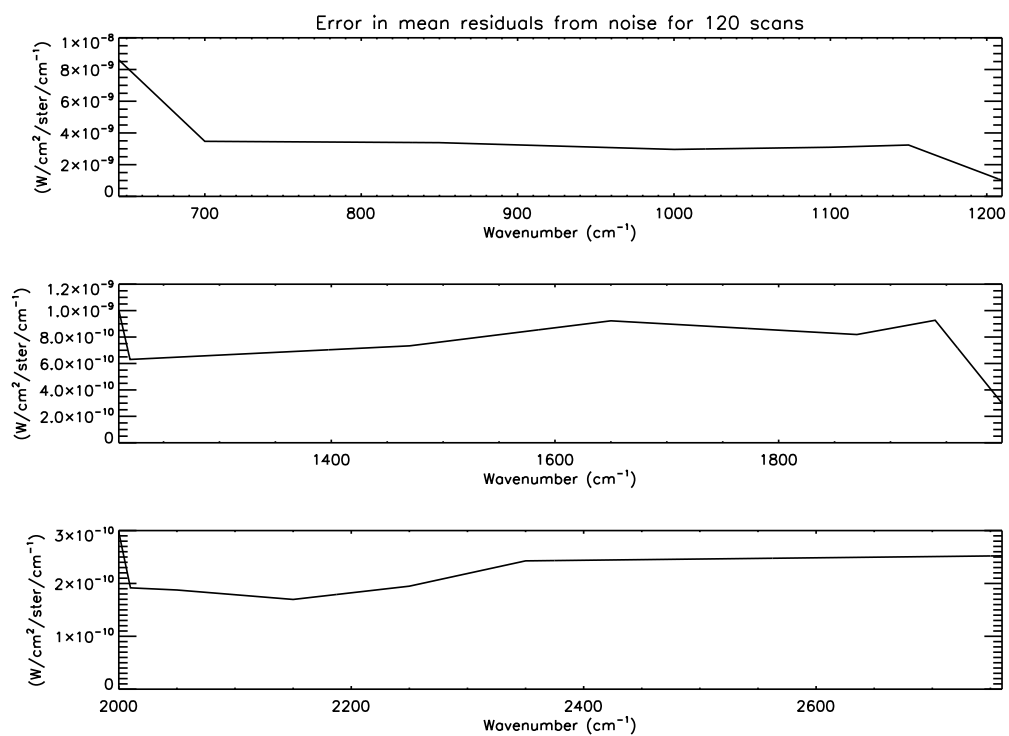


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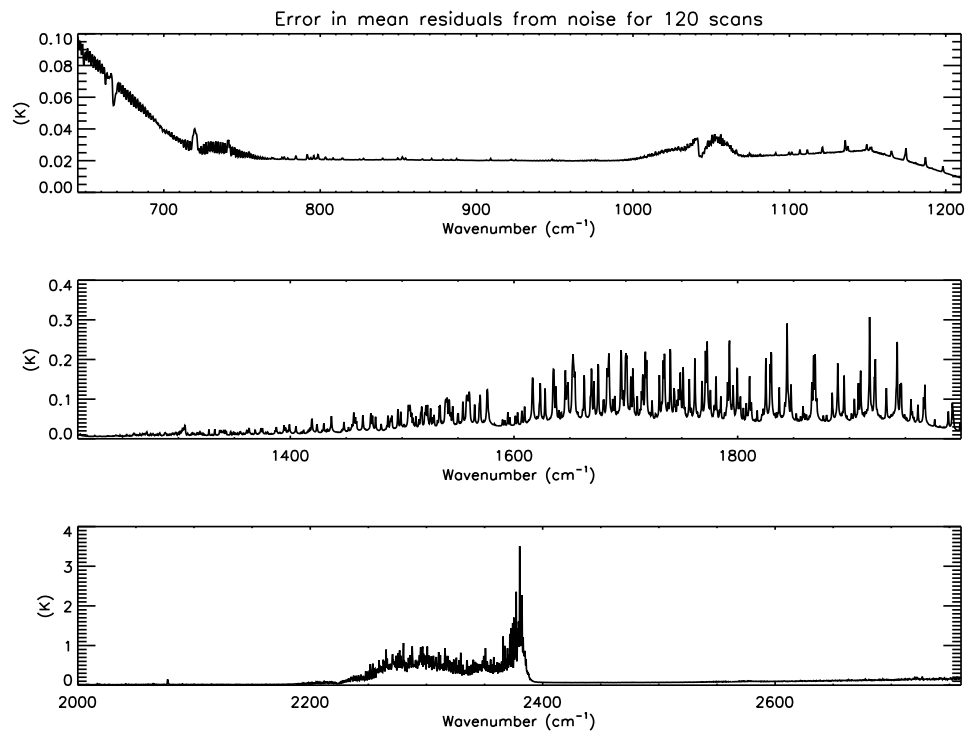




Supplementary Figure 6. Averaging kernel for the CH₄ retrieval using LBLRTM v12.1 for an example profile with 1.5 cm PWV. The LBLRTM v9.4+ averaging kernel (not shown) is similar.



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2 Supplementary Figure 7: Error in mean residuals (averaged over 120 scans) from noise in
3 radiance units.



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2 Supplementary Figure 8: Error in mean residuals (averaged over 120 scans) from noise in
3 brightness temperature units (calculated by adding the radiance error to the observed
4 radiances of the moderate water vapor case).
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