UV and IR absorption cross-sections of atmospheric key species

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For the measurement of atmospheric ozone and formaldehyde concentrations, mid-infrared and ultraviolet absorptions are both used by ground, air or satellite instruments. It is then of the utmost importance to have consistent spectral parameters in these various spectral domains to have coherent profiles of concentrations retrieved by various instruments using different spectral domains. Consequently the aim of the study was to intercalibrate spectra in the infrared and ultraviolet regions. The experiments were performed at LISA by acquiring simultaneously UV and IR spectra at room temperature and atmospheric pressure using a common optical cell. The reactor contains two multiple reflection optical systems interfaced to a Fourier transform infrared spectrometer and to an UV-visible absorption spectrometer. Additional experiments were performed in the photoreactor in Oslo to determine infrared cross sections of formaldehyde by quantifying HCHO in the cell using titration by bromine atoms. Then, using IR/UV intercomparison experiments, UV cross sections were deduced from infrared absorption coefficients.

For both compounds, results will be presented and discussed to check whether the published spectroscopic data in the two spectral regions are in agreement. Moreover, UV and IR cross sections of formaldehyde obtained in this study will be compared to previous data.