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Supplement of

Retrievals of formaldehyde from ground-based FTIR and MAX-DOAS observations at the Jungfraujoch station and comparisons with GEOS-Chem and IMAGES model simulations

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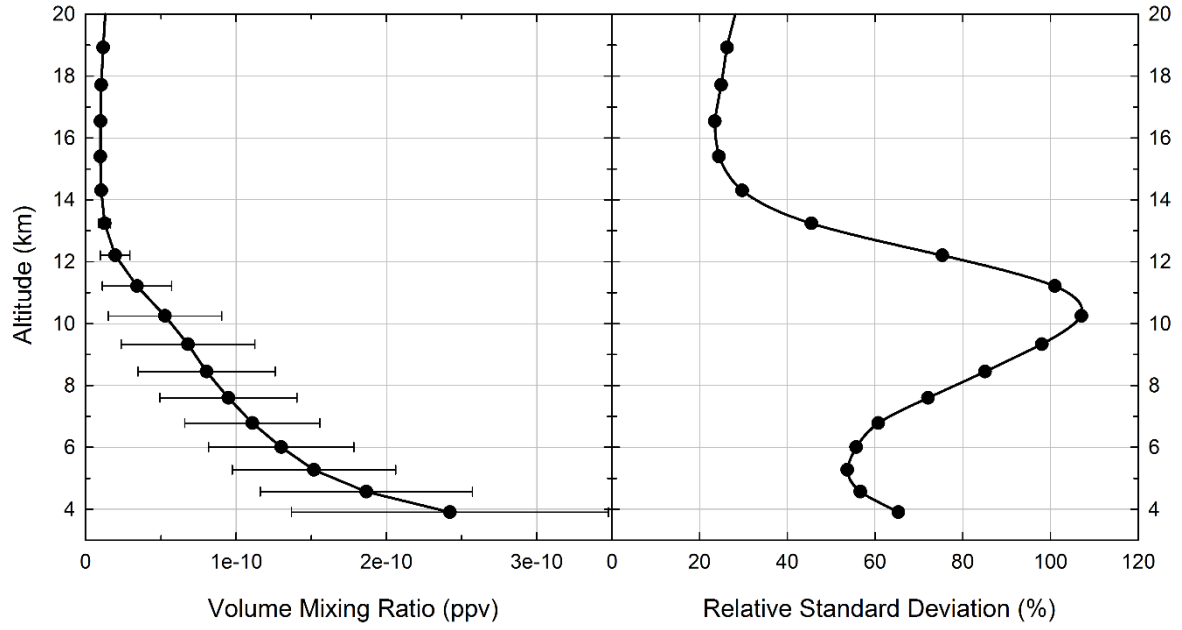

Figure S1. HCHO a priori profile with 1σ standard deviation (left frame) derived from WACCM v6 1980 – 2020 simulations used from the FTIR and MAX-DOAS retrievals of HCHO at the Jungfraujoch station. Averaged Relative Standard Deviations (right frame) of HCHO VMR used as diagonal elements of the covariance matrix for the FTIR retrievals.

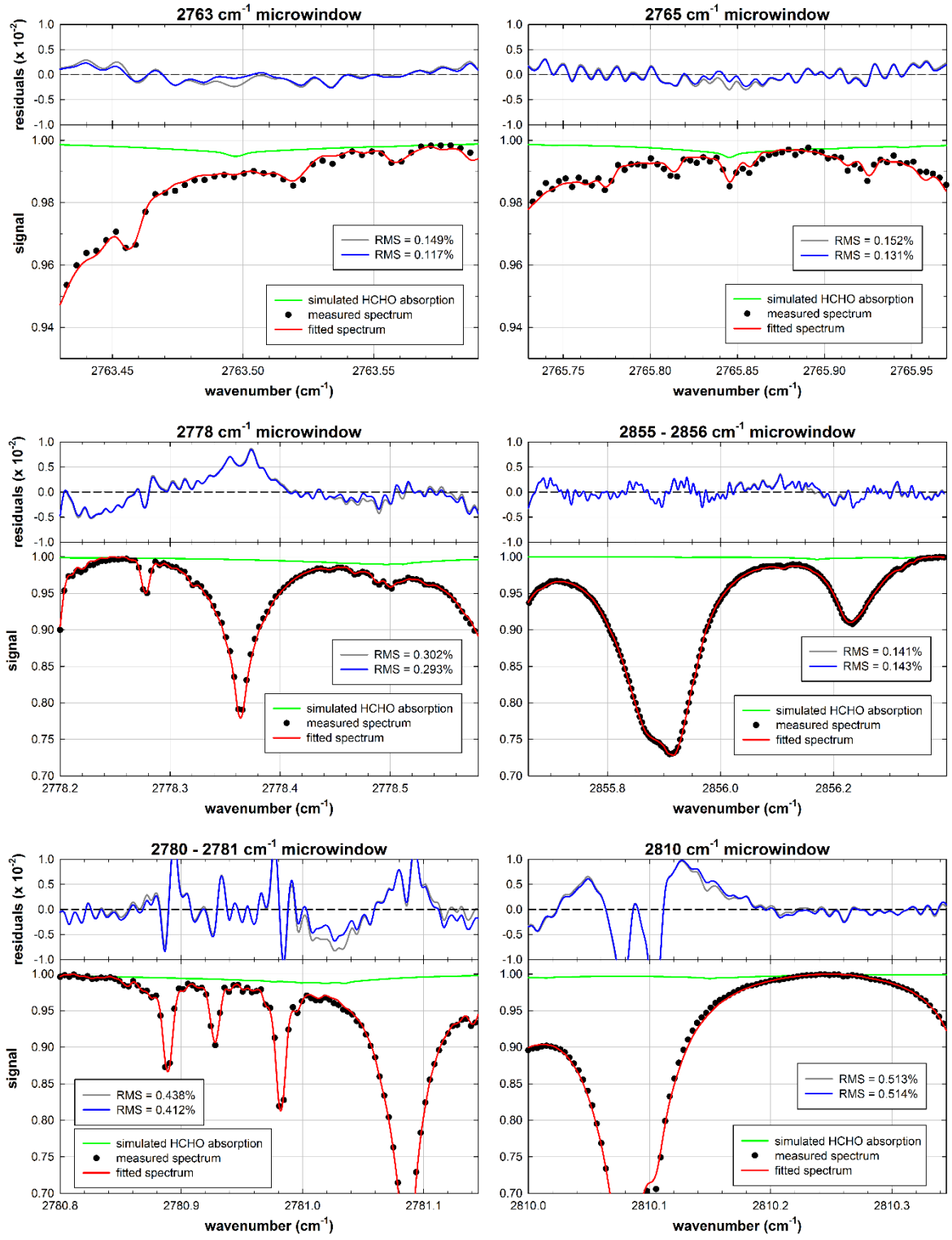

Figure S2. Typical example of HCHO FTIR spectral fits at ISSJ using the six microwindows from Vigouroux et al. (2009), for 22 August 2010, 6:40 UTC and a SZA of 80°. The related residuals when fitting HCHO absorption and assuming no HCHO absorption are in blue and grey curves, respectively. This solar spectrum is characterized by a S/N ratio of 1656, and produced a DOFS equals to 1.02 and HCHO column of 1.26×10^{15} molec cm^{-2} (compared to a S/N ratio of 1627, a DOFS of 1.05 and HCHO column of 1.56×10^{15} molec cm^{-2} averaged over the whole FTIR July 2010 – December 2012 data set). The solid green line corresponds the HCHO solar absorption simulated at the ISSJ for the same date and SZA. This figure can be compared to Fig. 1 representing the same HCHO FTIR spectral fits, but using four microwindows.

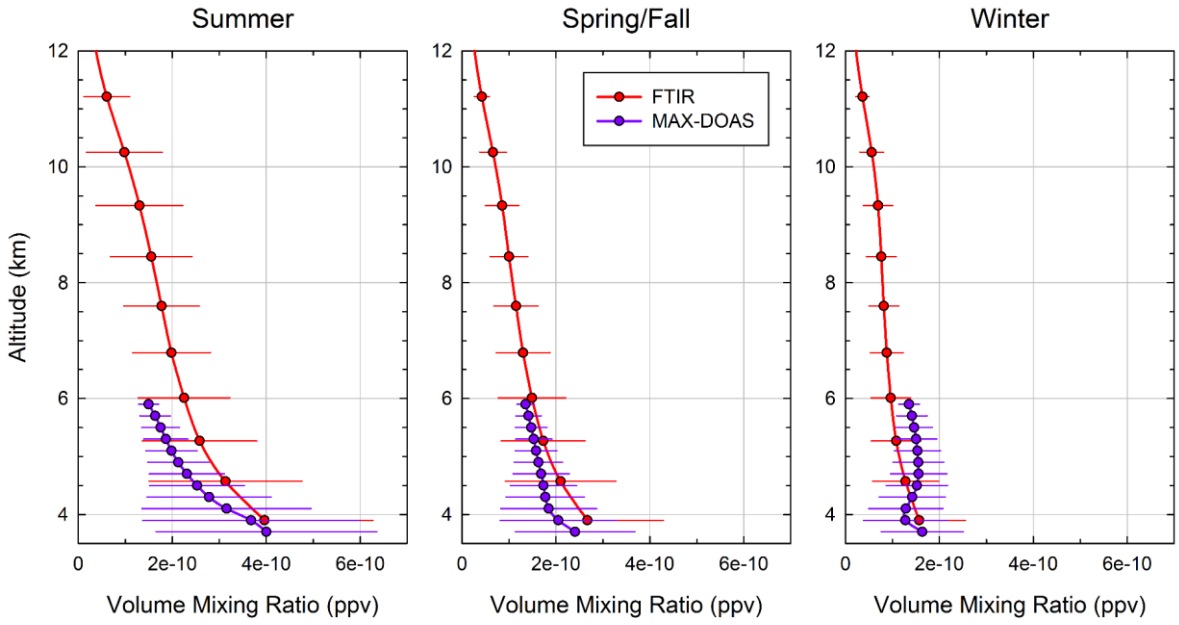

Figure S3. Mean tropospheric seasonal profiles of HCHO (VMR, in ppv) above Jungfraujoch as derived from the FTIR and MAX-DOAS retrievals, calculated over the July 2010 – December 2012 time period. The error bars correspond to the 1σ standard deviation around the mean profiles.