Supplement of

CO₂ and CO temporal variability over Mexico City from ground-based total column and surface measurements

N. taquet et al.

Correspondence to: Noémie Taquet (noemi.taquet@gmail.com)
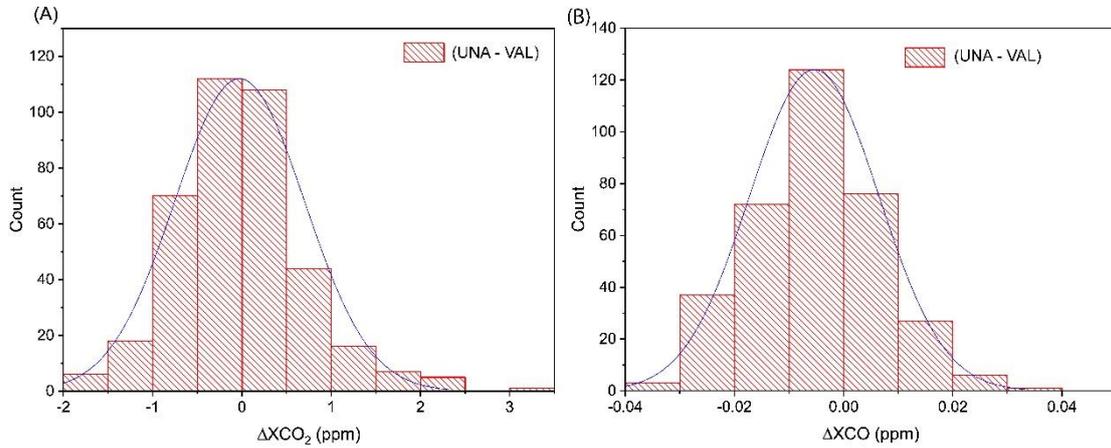
Figure S1: Statistical distribution of the (UNA-VAL) XCO₂ and XCO differences over the 2019-2021 period.
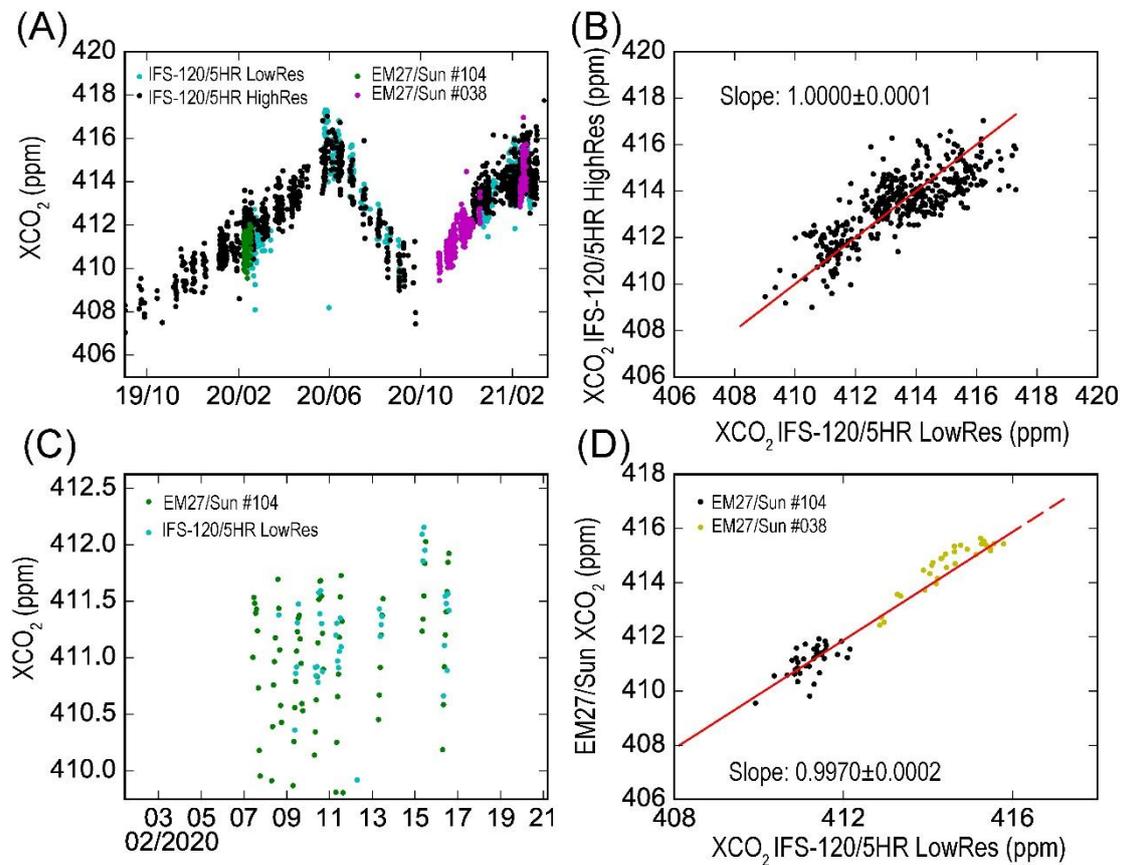
Figure S2: Determination of calibrated factors between the HR120/5 and EM27/Sun products from side-by-side measurements. (A) XCO₂ time series of from the different instruments. (B) Correlation plot of XCO₂ from the IFS120/5HR high and low resolution products after aplying the calibration factors. (C) Zoom of (A) for February 2020. (D) Correlation plot of XCO₂ from EM27/Sun and IFS120/5HR low resolution products.
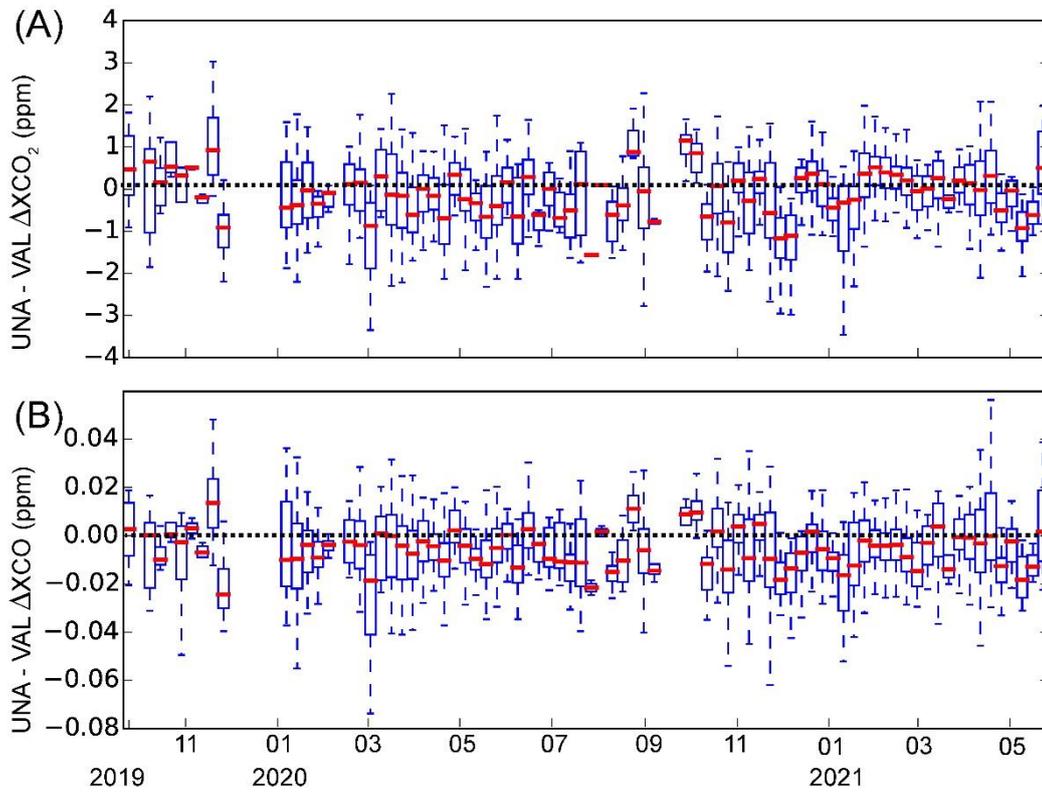
Figure S3: Whisker diagram representing the weekly-average difference between the UNA and VAL total columns of (A) XCO₂ and (B) XCO.
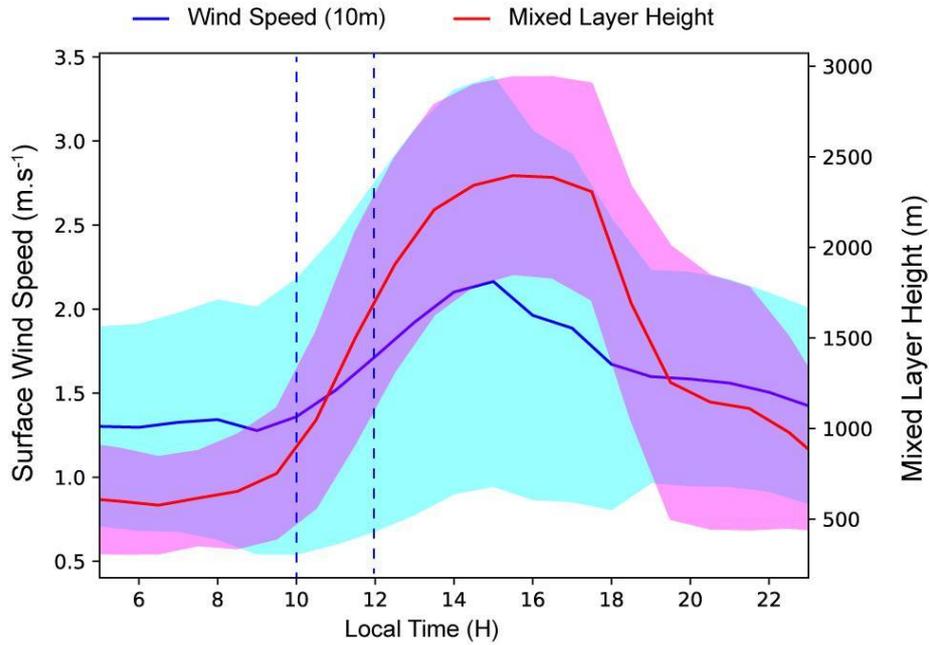
Figure S4: Diurnal pattern of the mixed layer height from the UNA ceilometer data and of the surface wind speed from the ERA5 data. The dash lines represent the time window used to calculate the XCO growth rate (see text for details).
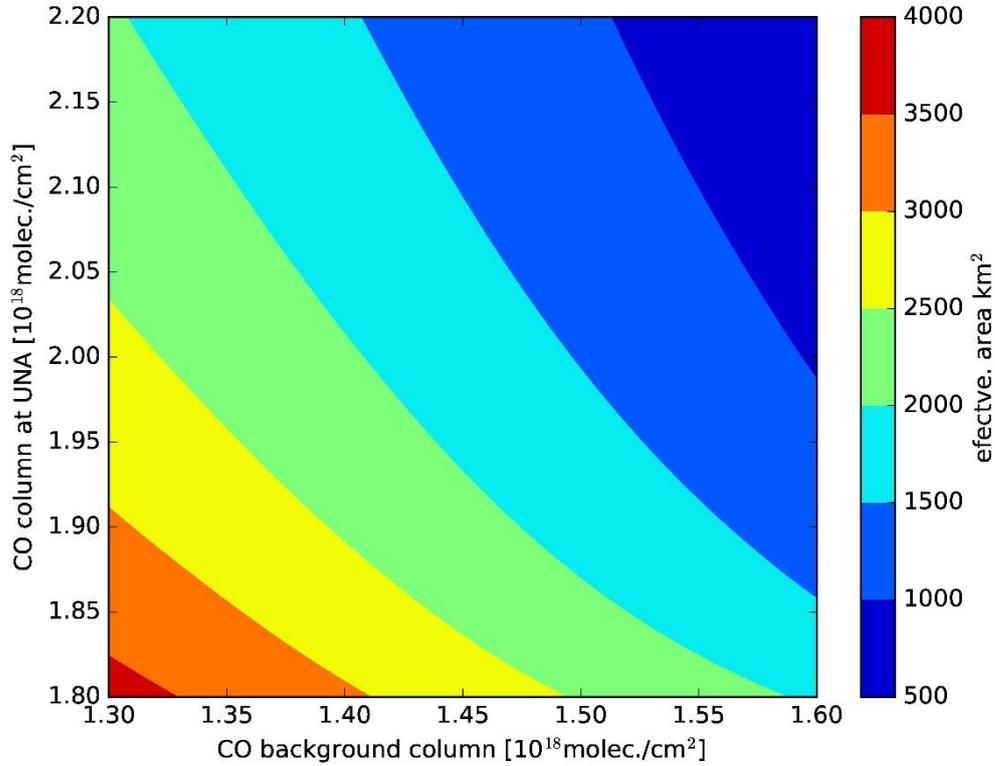
Figure S5: Sensitivity of the effective area to the background uncertainties.

Table S1: Calibration factors determined for the intercalibration of all the FTIR studied products.

Instrument/product	Calibration factor
EM27_62 XCO_2	1.0
EM27_104 XCO_2	0.9983
EM27_38 XCO_2	0.9986
EM27_62 XCO	1.0
EM27_104 XCO	1.0055
EM27_38 XCO	0.9907
HR_120/5 -XCO_2	1.0043
VERTEX-XCO MIR	1.00

Table S2: Parameters of correlation plots between the different products (after applying the calibration factors). R^2 stands for the coefficient of determination.

Instrument 1, product1	Instrument 2, product 2	Slope +/- errSlope; Offset +/- errOffset	R^2
EM27_62, XCO_2	EM27_38 XCO_2	1.00	1.0
EM27_62, XCO_2	EM27_104 XCO_2	1.00	1.0
EM27_104, XCO_2	HR_120/5 -XCO_2	0.9957+/-0.0002	0.96
EM27_38_104, XCO	HR_120/5 -XCO MIR	1.49+/-0.07 -0.034+/-0.005	0.96
HR_120/5 -XCO MIR	HR_120/5 -XCO NIR	0.98+/-0.01	0.96
EM27_62, XCO	VERTEX-XCO (MIR)	1.04+/-0.01	0.92

Table S3: CO and CO_2 emissions derived from inventories (SEDEMA) and from the FTIR data for the MCMA. *corresponds to the indicated period but excluding the lock-down period.

Year	CO (inventory -Total) (kt/year)	CO (inventory Mobile source) (kt/year)	CO_2 (inventory -Total) (kt/year)	CO_2 (inventory) Mobile source) (kt/year)	CO (FTIR) from CO growth rates (kt/year)	CO (FTIR) uncertainties[1]	CO_2 (FTIR) from CO/CO_2 ratio at UNA and CO growth rates (kt/year)	CO_2 (FTIR) uncertainties[1]
2016	728.6	646.4	54,020	52,439	634.7	106.2	63,470	10,620
2018	728.9	689.3	66,031	43,217	716.6	64.3	71,660	6,430
2019					534.2	33.9	53,420	3,390
2020	974.0	928.5	58, 273	35, 271	328.4	18.7	32,840	1,870
2021					553.9	37.5	55,390	3,750
2016-2020					547.6* 519.2	21.25* 21.4	54,760* 51,920	2,125* 2,400

[1] only includes the propagated growth rate error. An estimation of errors due to the spatial and temporal interpolation is given in Figure 11 and discussed in the text.