Supplemental Material

Figure S1. Panel (a) shows an example of a D0 ozone sensor time series with the reference monitor and (b) shows its calibration, (c) the distribution of residuals and the relationship between residual with different terms: (d) concentration (e) absolute humidity (f) temperature, and (g) time.

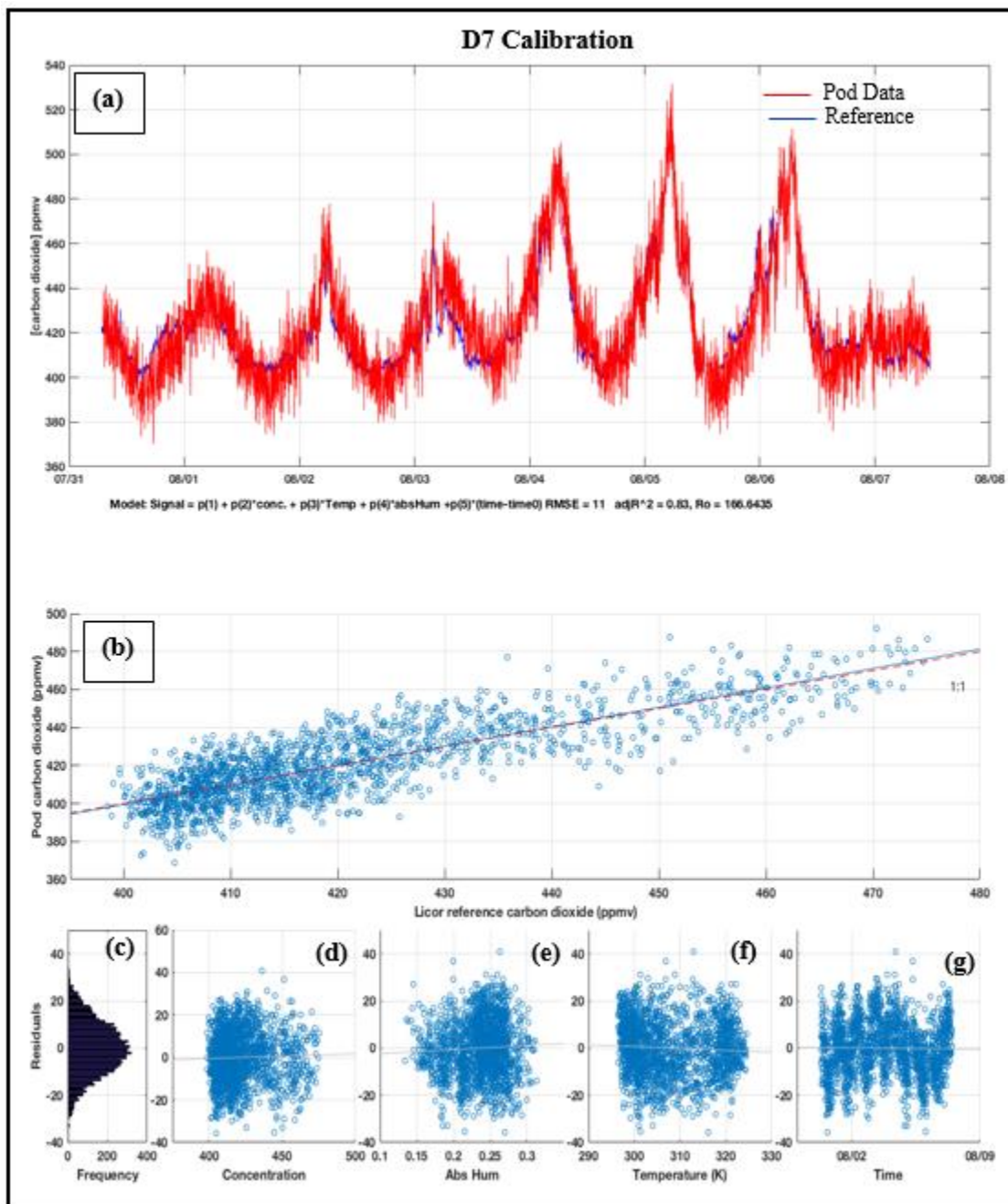



Figure S2. Panel (a) shows an example of a D7 CO_2 sensor time series with the reference monitor and (b) shows its calibration, (c) the distribution of residuals and the relationship between residual with different terms: (d) concentration (e) absolute humidity (f) temperature, and (g) time.

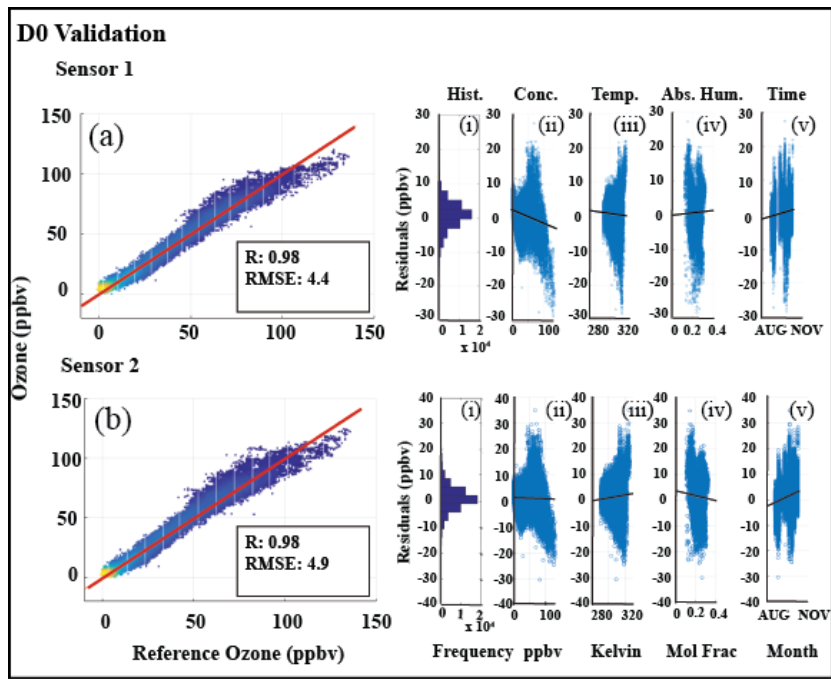



Figure S3. Panel (a) shows D0 sensor validation for the first sensor and (b) shows the same for the second sensor, with warmer shading showing a higher density of points. Then, from left to right for each sensor: a histogram of residuals (i), and then residuals against concentration (ii), temperature (iii), absolute humidity (iv) and time (v).

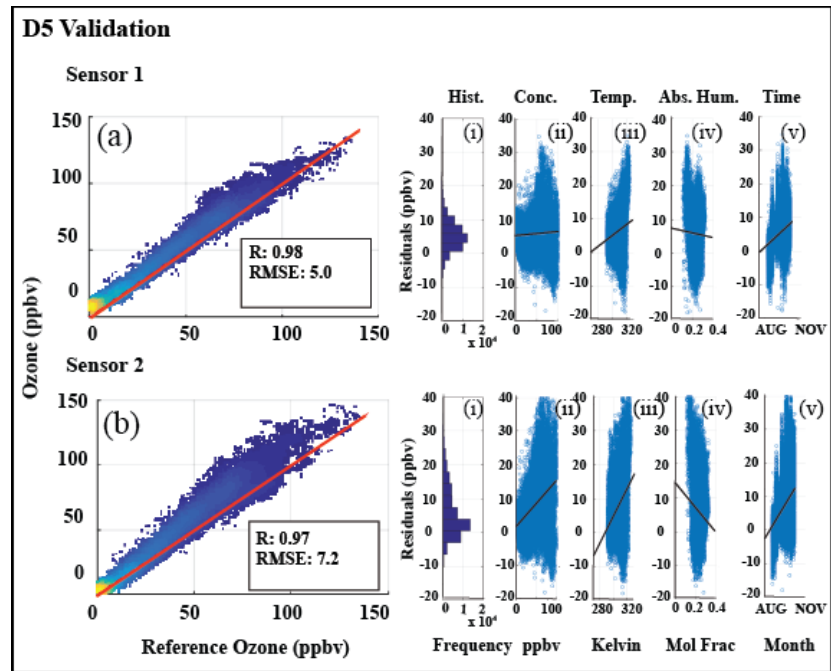



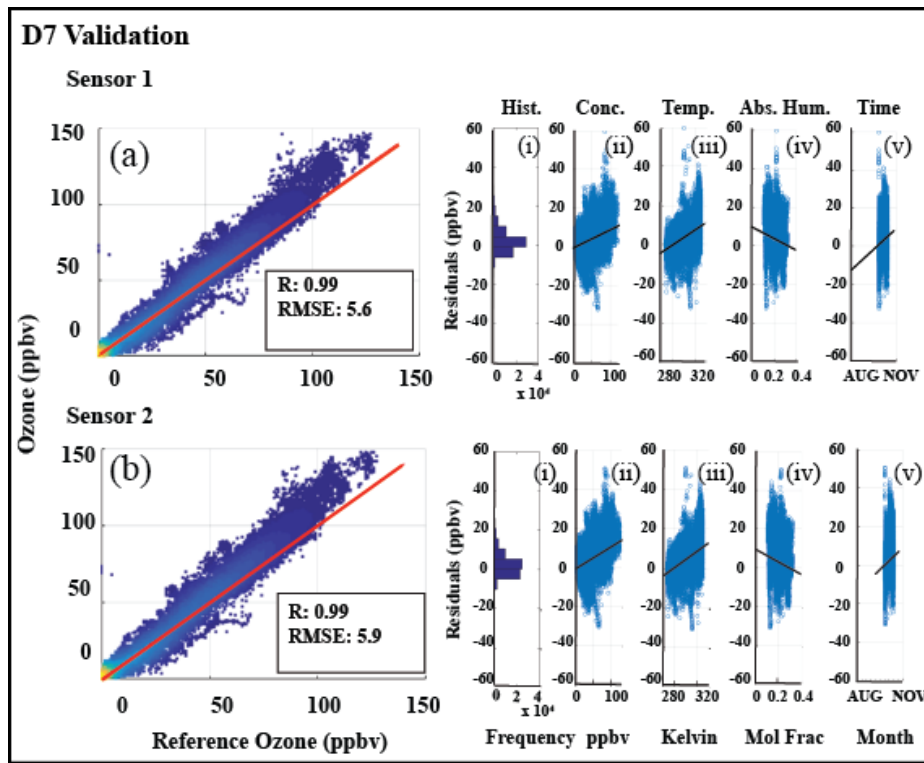
Figure S4. Panel (a) shows D5 sensor validation for the first sensor and (b) shows the same for the second sensor, with warmer shading showing a higher density of points. Then, from left to right for each sensor: a histogram of residuals (i), and then residuals against concentration (ii), temperature (iii), absolute humidity (iv) and time (v).

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Figure S5. Panel (a) shows D7 sensor validation for the first sensor and (b) shows the same for the second sensor, with warmer shading showing a higher density of points. Then, from left to right for each sensor: a histogram of residuals (i), and then residuals against concentration (ii), temperature (iii), absolute humidity (iv) and time (v).

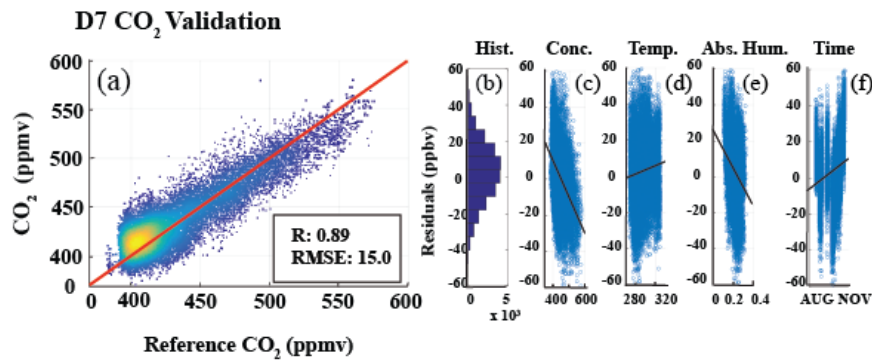
25 U-Pod ozone measurements tend to have more error at higher temperatures, which usually corresponds with higher ground level ozone. A temperature-concentration interaction term was included in the current calibration linear model to help account for this phenomenon but may not be addressing transient temperature effects on the ozone sensor or temperature/humidity sensors on board.

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Figure S6. Panel (a) shows the linear 3 model with minute U-Pod D7 CO_2 measurements against reference - warmer shading shows higher density of points. The rest of the panels show (b) a histogram of residuals, residuals against concentration (c), temperature (d), absolute humidity (e) and time (f).

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Table S1: Field calibration results of different regression models showing R^2, RMSE (ppb/O_3, ppm/CO_2) for each gas-specific pod sensor signal. Two O_3 entries means there are two sensors in that U-Pod.

U-Pod ID	Linear 3 (conc., temp, abshum)		Linear 3T (conc., temp, abshum, temp|conc.*)		Linear 4 (conc., temp, abshum, time)		Linear 4T (conc., temp, abshum, time, temp|conc.)	
	O_3	CO_2	O_3	CO_2	O_3	CO_2	O_3	CO_2
D0	0.88, 7.2	0.75, 17	0.98, 3.3	-	0.88, 7.0	0.77, 14	0.97, 2.9	-
	0.86, 7.6		0.97, 3.4		0.87, 7.4		0.97, 3.0	
D3	0.83, 7.1	0.55, 36	0.98, 2.5	-	0.84, 7.4	0.51, 26	0.97, 3.0	-
	0.85, 6.9		0.98, 2.7		0.85, 8.0		0.97, 3.0	
D4	0.84, 4.9	NA	0.96, 2.7	NA	0.86, 5.2	NA	0.97, 2.5	NA
	0.83, 5.1		0.96, 2.2		0.84, 5.5		0.97, 2.7	
D5	0.90, 5.9	0.80, 36	0.98, 2.5	-	0.90, 5,6	0.89, 20	0.98, 2.5	-
	0.87, 6.6		0.98, 2.9		0.87, 6.5		0.97, 2.8	
D6	0.82, 7.3	0.63, 77	0.98, 2.9	-	0.83, 7.6	0.78, 75	0.95, 3.5	-
	0.90, 5.8		0.98, 2.4		0.90, 5.8		0.98, 2.4	
D7	0.87, 4.9	0.86, 12	0.96, 3.3	-	-	0.83, 11	0.95, 3.0	-
	0.86, 5.0		0.94, 3.5		-		0.95, 3.2	
D8	0.90, 6.2	0.84, 12	0.98, 2.9	-	0.90, 6.2	0.83, 11	0.97, 3.3	-
DA	0.82, 7.6	-	0.97, 4.3	-	0.82, 7.6	0.92, 9.0	0.97, 3.0	-
	0.81, 7.6		0.97, 4.3		0.81, 7.6		0.97, 3.1	
DB	0.57, 15	0.49, 37	0.69, 17	-	0.61, 14	0.48, 25	0.97, 2.8	-
DC	0.87, 6.6	0.56, 25	0.98, 2.6	-	0.87, 6.6	0.44, 29	0.97, 2.6	-
	0.89, 6.3		0.98, 2.8		0.89, 6.2		0.97, 2.7	
DD	0.89, 4.6	NA	-	NA	0.91, 4.6	NA	0.98, 1.8	NA
	0.91, 4.4		-		0.93, 4.2		0.98, 1.6	
DE	0.85, 7.3	0.77, 27	0.97, 2.9	-	0.86, 7.4	0.76, 36	0.96, 3.3	-
	0.91, 6.0		0.98, 2.7		0.91, 6.0		0.97, 2.6	
DF	0.87, 6.5	NA	0.98, 2.4	NA	0.87, 6.6	NA	0.97, 3.1	NA
	0.90, 6.0		0.98, 2.5		0.90, 6.0		0.97, 3.0	

* temp|conc. is the interaction term between temperature and concentration, the second term in Eq. (1). Also note that these R^2 values are between reference signal in ppb or ppm and the sensor signal in volts, not between the reference concentration and the U-Pod, as they are in Table 1.

Table S2. Percentage of original data lost from post-process filtering

U-Pod ID	O_3 sensor 1				O_3 sensor 2				CO_2				Totals		
	MM	CD	AH	T	MM	CD	AH	T	MM	CD	AH	T	Sen1	Sen2	CO₂
D0	0.0	0.1	11.9	3.6	0.0	0.2	11.9	3.5	NaN	0.0	12.0	3.5	15.5	15.6	15.5
D3	0.0	0.2	8.5	2.5	0.0	0.2	8.5	2.5	NaN	0.0	8.6	2.5	11.2	11.2	11.1
D4	0.0	0.2	21.1	5.2	0.0	0.2	21.2	5.2	NaN	NaN	NaN	NaN	26.6	26.7	NaN
D5	0.0	0.1	13.4	4.4	0.0	0.2	13.5	4.4	NaN	0.2	13.6	4.3	17.9	18.1	18.0
D6	0.0	0.1	5.1	4.2	0.0	0.1	5.2	4.2	NaN	0.0	5.3	4.2	9.4	9.5	9.5
D7	0.1	0.0	1.3	5.2	0.1	0.0	1.3	5.3	NaN	0.0	1.3	5.3	6.7	6.7	6.6
D8	0.0	0.1	14.9	3.7	NaN	NaN	NaN	NaN	NaN	0.0	14.9	3.6	18.6	NaN	18.5
DA	0.0	0.0	20.8	4.6	0.0	0.1	20.8	4.6	NaN	0.0	21.0	4.6	25.4	25.4	25.6
DB	0.0	0.1	2.7	2.3	NaN	NaN	NaN	NaN	NaN	0.0	2.7	2.3	5.1	NaN	5.1
DC	0.1	0.0	2.8	8.3	0.9	0.2	2.5	8.0	NaN	0.0	2.8	8.2	11.1	11.6	11.0
DD	0.0	0.1	37.4	8.3	0.4	0.1	37.2	8.3	NaN	NaN	NaN	NaN	45.8	45.9	NaN
DE	0.0	0.1	9.6	2.7	0.0	0.0	9.7	2.7	NaN	0.0	9.7	2.6	12.4	12.4	12.4
DF	0.0	0.2	11.4	1.0	0.0	0.2	11.4	1.0	NaN	NaN	NaN	NaN	12.6	12.6	NaN

MM stands for minimum and maximum filtering. CD stands for consecutive differences, which were filtered if they exceeded 8 standard deviations away from the mean. AH stands for absolute humidity, filtered if it the value was not observed during collocation. T stands for temperature, also filtered out if the value was not observed during collocation. Sen1 stands for ozone sensor 1, and sen2 stands for the second ozone sensor. CO_2 stands for the carbon dioxide sensor. NaN indicates there is either not

a sensor, or this filtering method was not used.