Supporting Information

Vertical Profiles of Atmospheric Species Concentrations and Nighttime Boundary Layer Structure in the Dry Season over an Urban Environment in the Central Amazon Collected by an Unmanned Aerial Vehicle

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Total SI pages: 20

Total Figures: 4

Total Tables: 1

List of Supplementary Figures

Figure S1. Vertical profiles of ozone concentration, potential temperature, and specific humidity from land surface to an altitude of 500 m for 84 flights between 13 Sep 2018 and 18 Oct 2018 between 20:00 and 00:00 (LT). The red line represents the median of the data at each altitude. The dashed line represents the instrumental limit of detection for ozone (3 ppbv). Local time (LT) is 4 h earlier than UTC.

Figure S2. Vertical profiles of concentrations of carbon dioxide, carbon monoxide, sulfur dioxide, $PM_{2.5}$, and PM_{10} from land surface to an altitude of 500 m for 32 flights between 20:00 and 00:00 (LT). The red line represents the median of the data at each altitude. The dashed line represents the instrumental limit of detection for ozone (3 ppbv).

Figure S3. Backtrajectories at UAV sampling point for altitudes of 0, 100, 200, 300, 400, and 500 m for (a) 29 Sep 2018 between 20:00 and 00:00 (LT) and (b) 27 Sep 2018 at 21:30. The trajectories are superimposed onto sites of biomass burning. The HYSPLIT model, available from the Air Resources Laboratory of the USA National Oceanic and Atmospheric Administration (NOAA), was used (Stein *et al*., 2015; Stein and Stunder, 2017). Sites of biomass burning were obtained from http://queimadas.dgi.inpe.br/queimadas/portal (accessed 5 Sep 2020).

Figure S4. Photograph of hexacopter UAV equipped with sensor package.

Table S1. Flight count on each night.

Night	Flight count
13SEP2018	5
15SEP2018	8
18SEP2018	6
20SEP2018	8
22SEP2018	8
25SEP2018	7
27SEP2018	8
29SEP2018	8
02OCT2018	4
04OCT2018	7
09OCT2018	8
13OCT2018	7

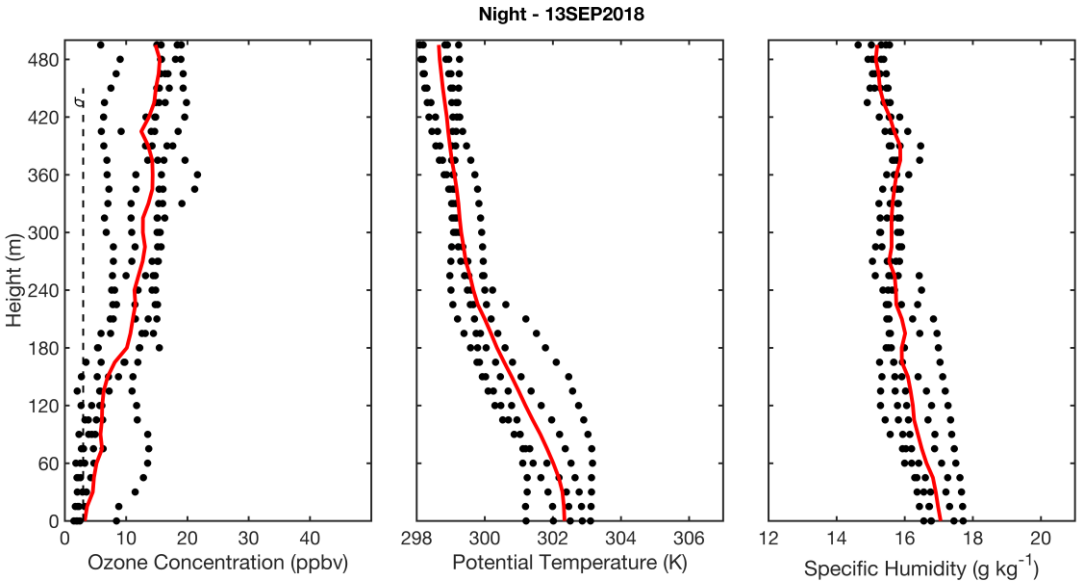

Night - 13SEP2018
Height (m)
480
420
360
300
240
180
120
60
0
σ
0
10
20
30
40
Ozone Concentration (ppbv)
298
300
302
304
306
Potential Temperature (K)
12
14
16
18
20
Specific Humidity (g kg-1)

Figure S1.

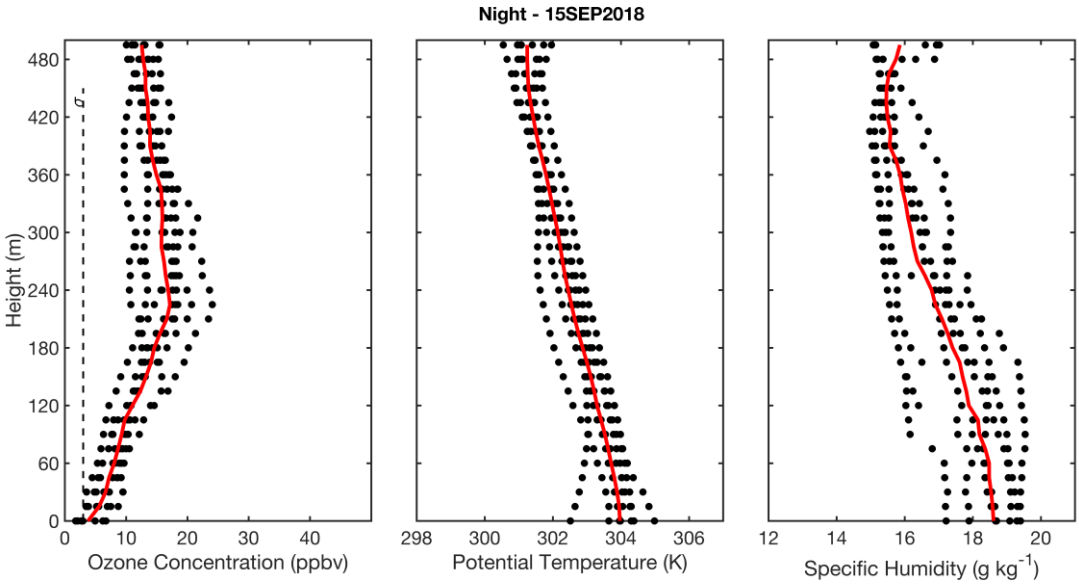


Figure S1. (continued)

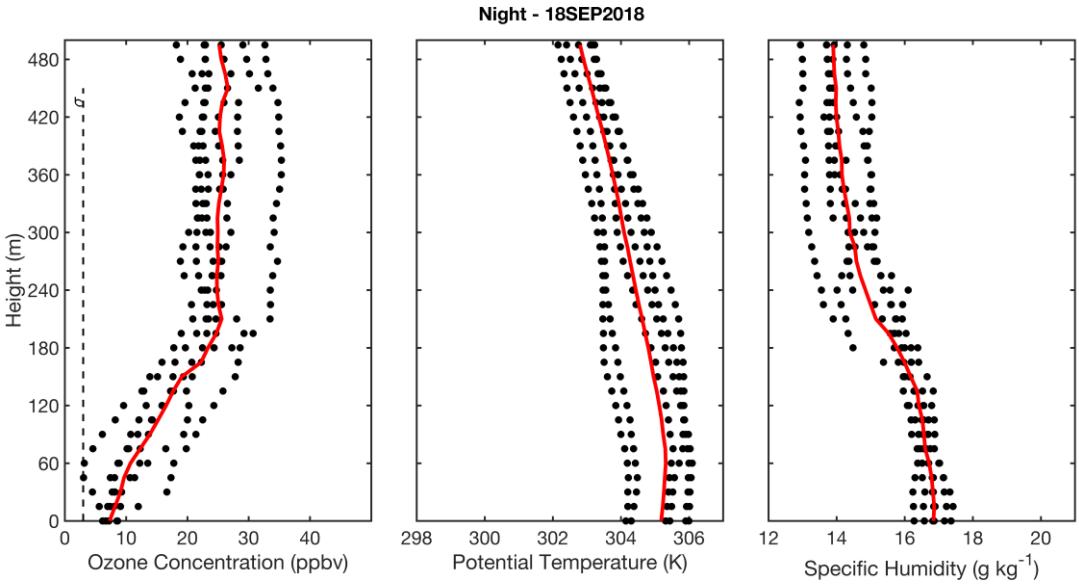


Figure S1. (continued)

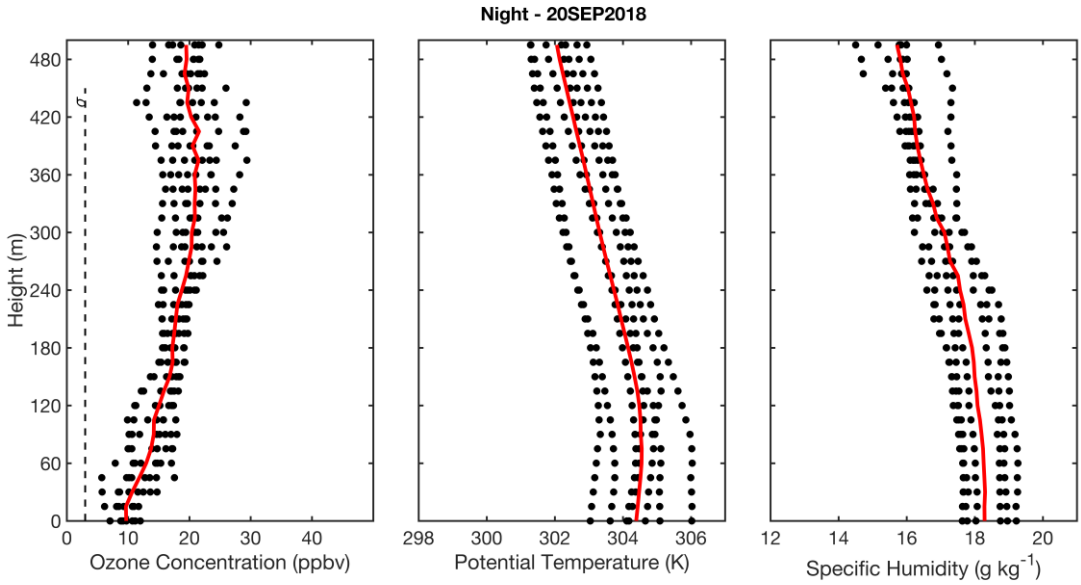


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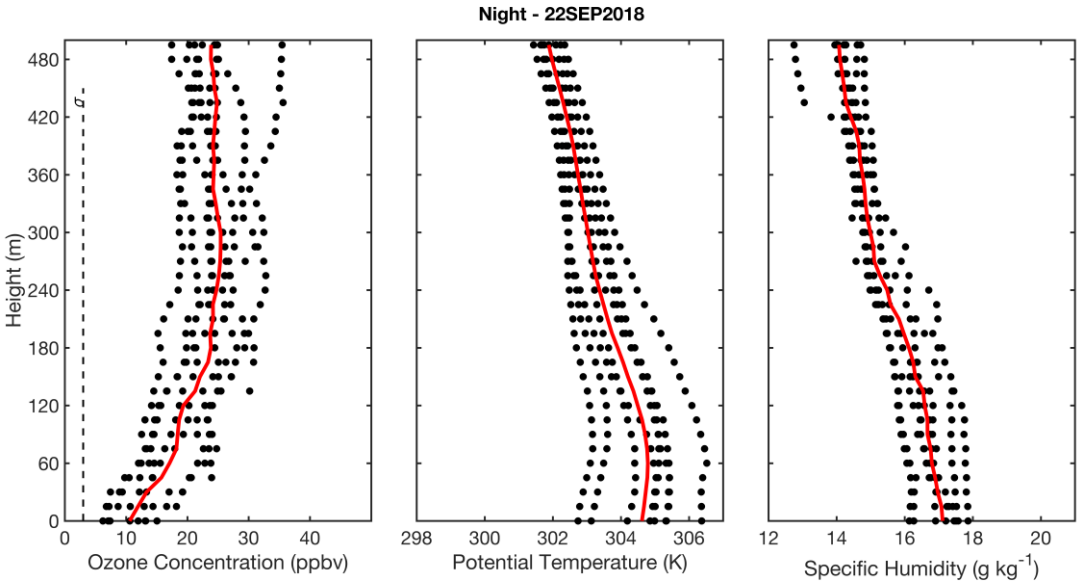


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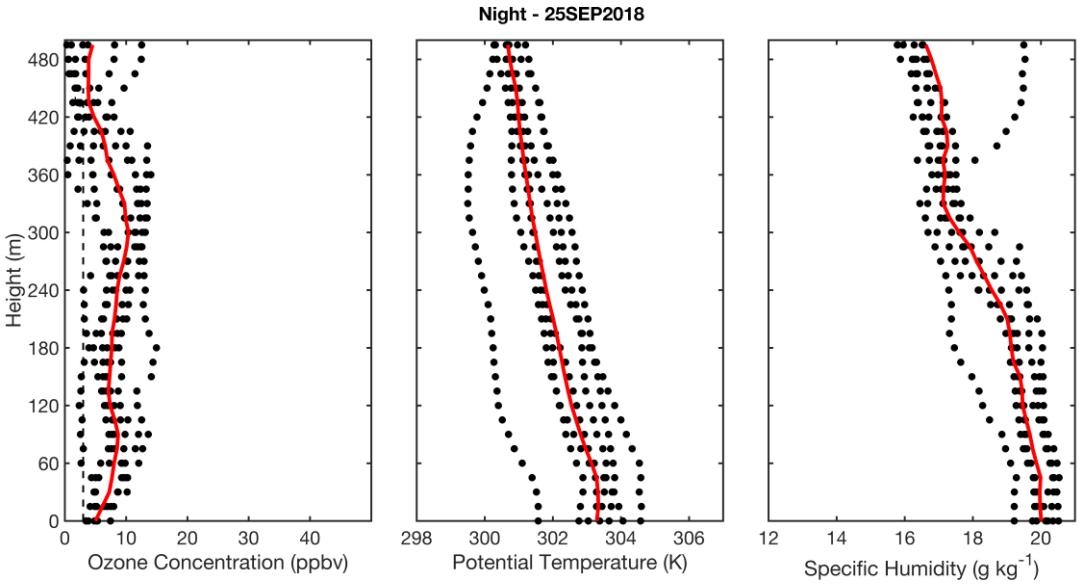


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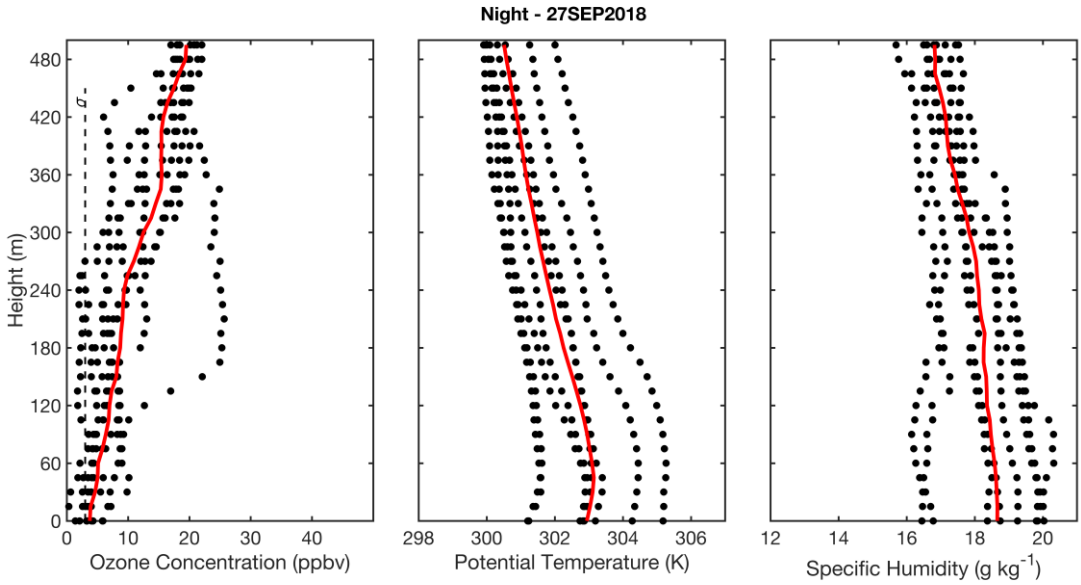


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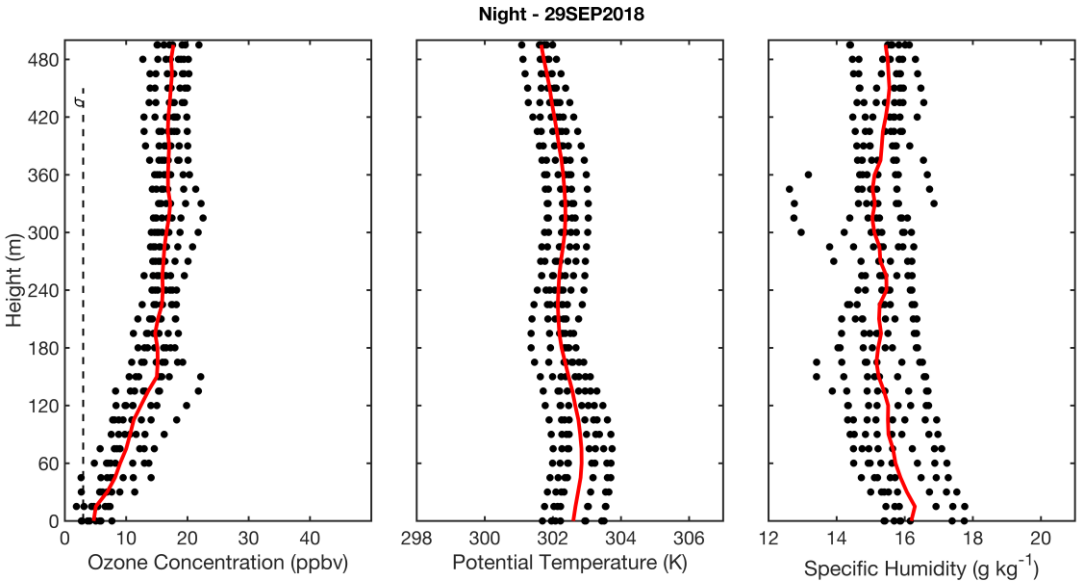


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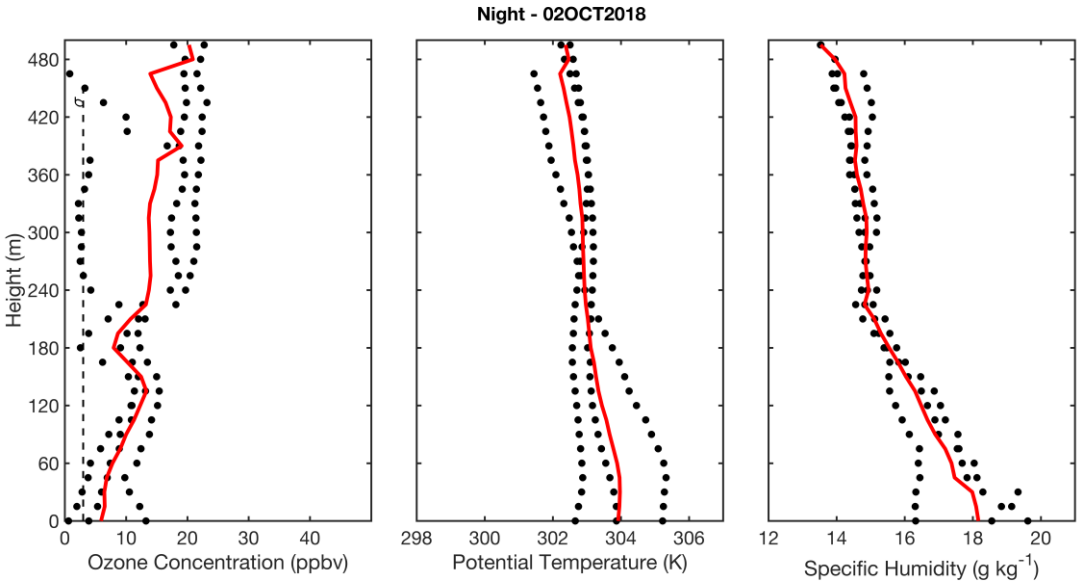


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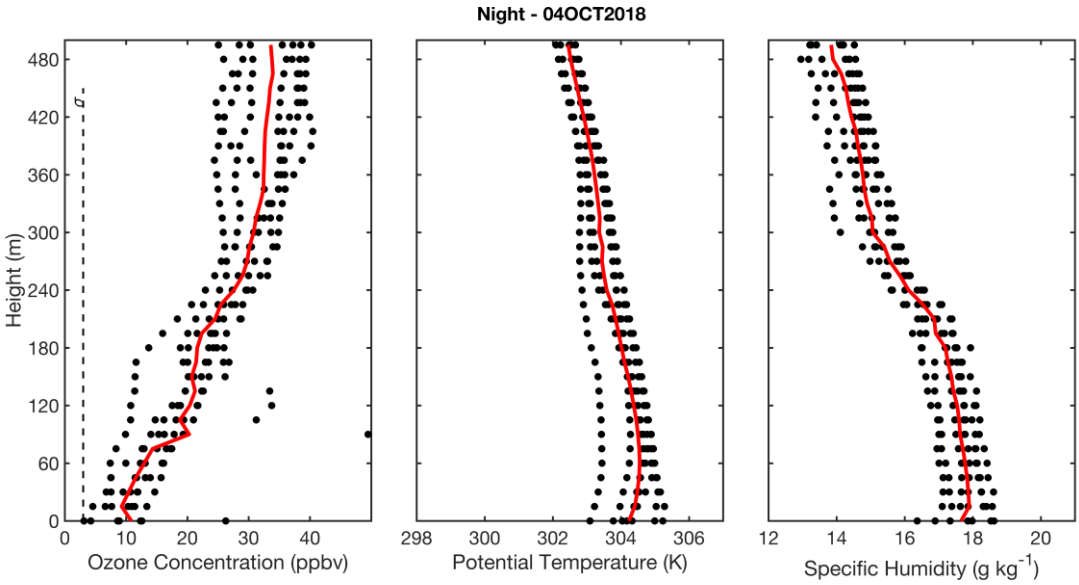


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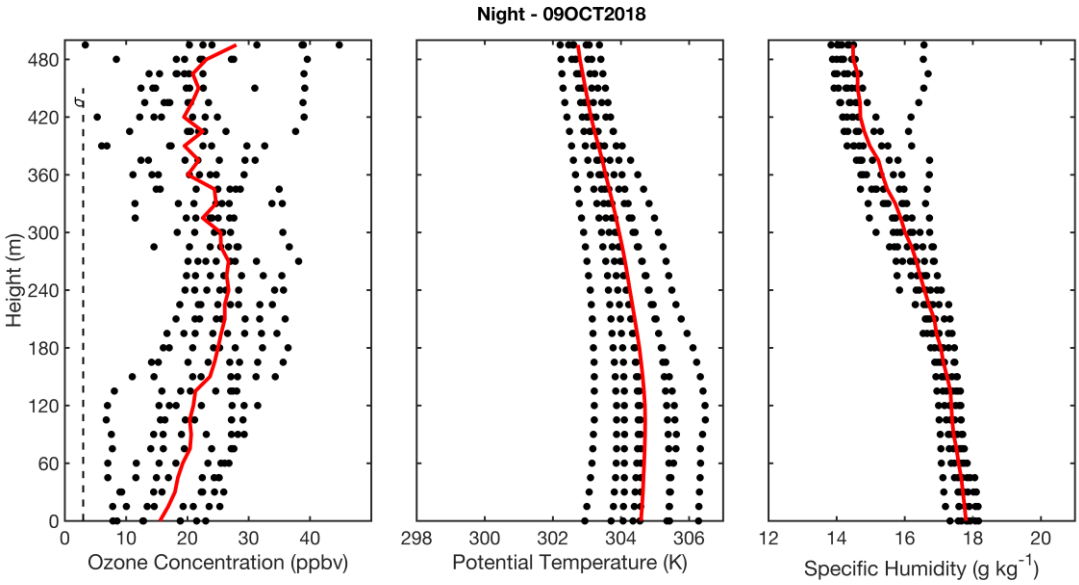


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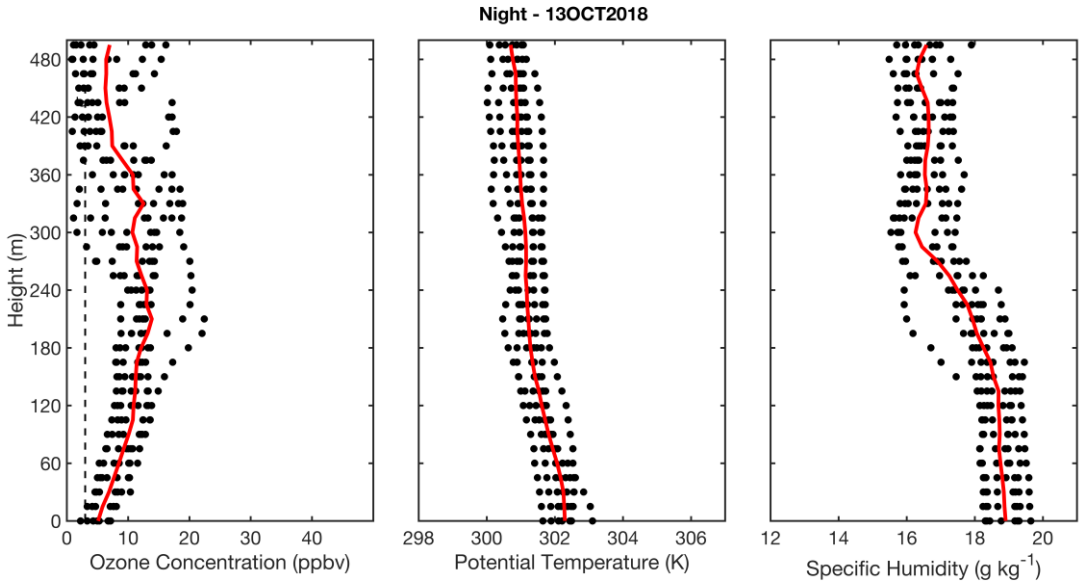


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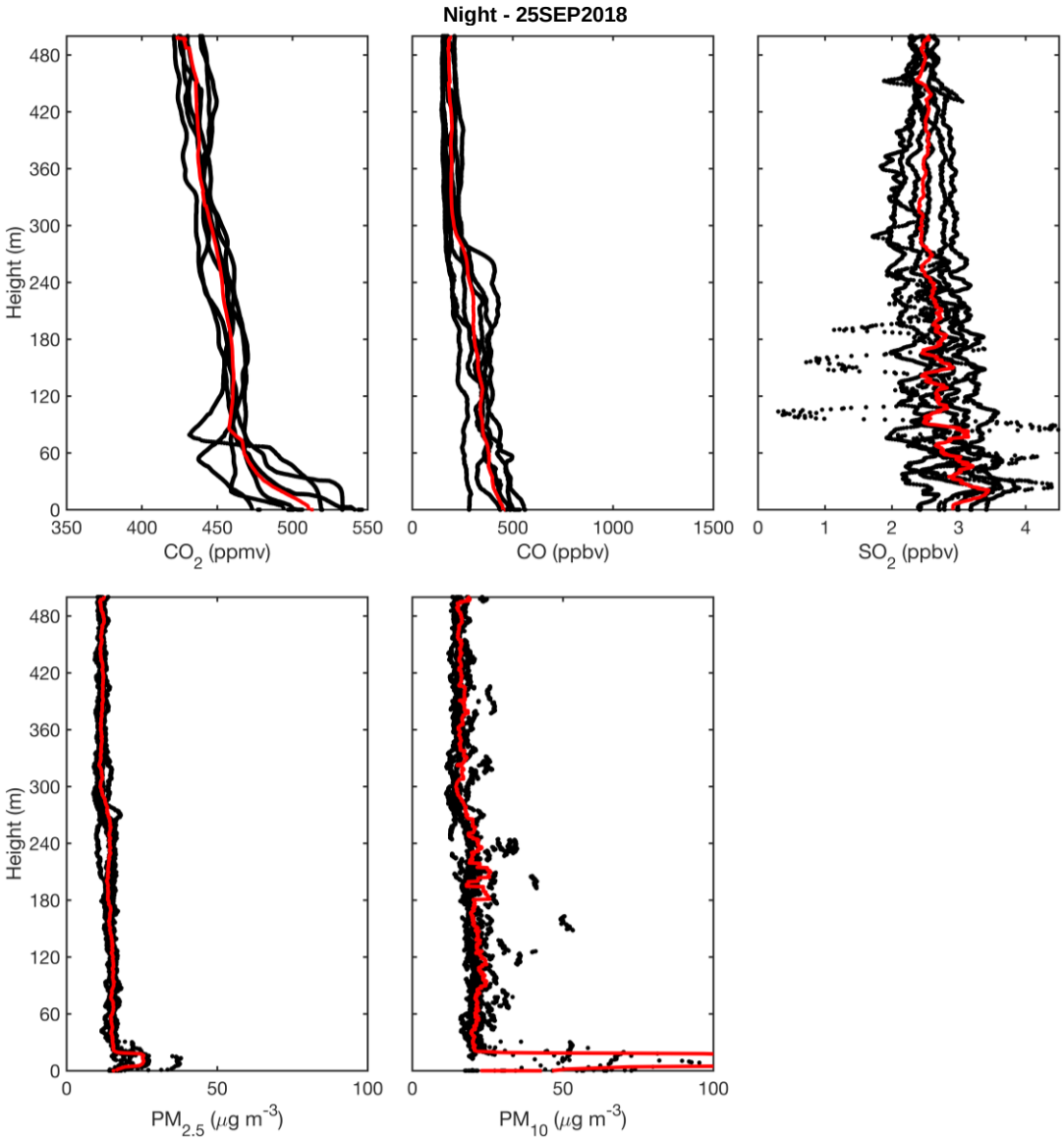

Night - 25SEP2018
Height (m)
CO2 (ppmv)
CO (ppbv)
SO2 (ppbv)
PM2.5 (μg m-3)
PM10 (μg m-3)

Figure S2.

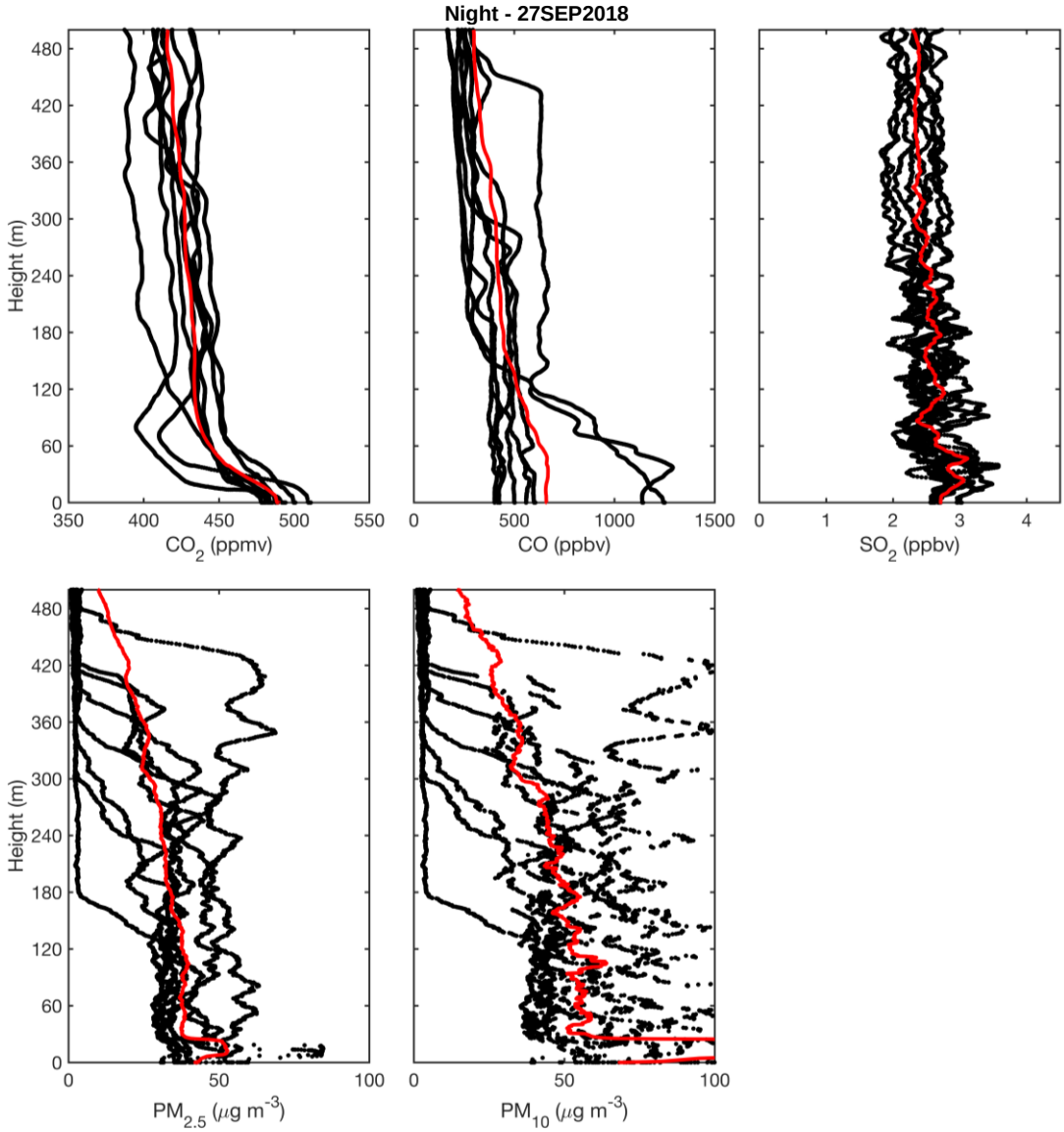


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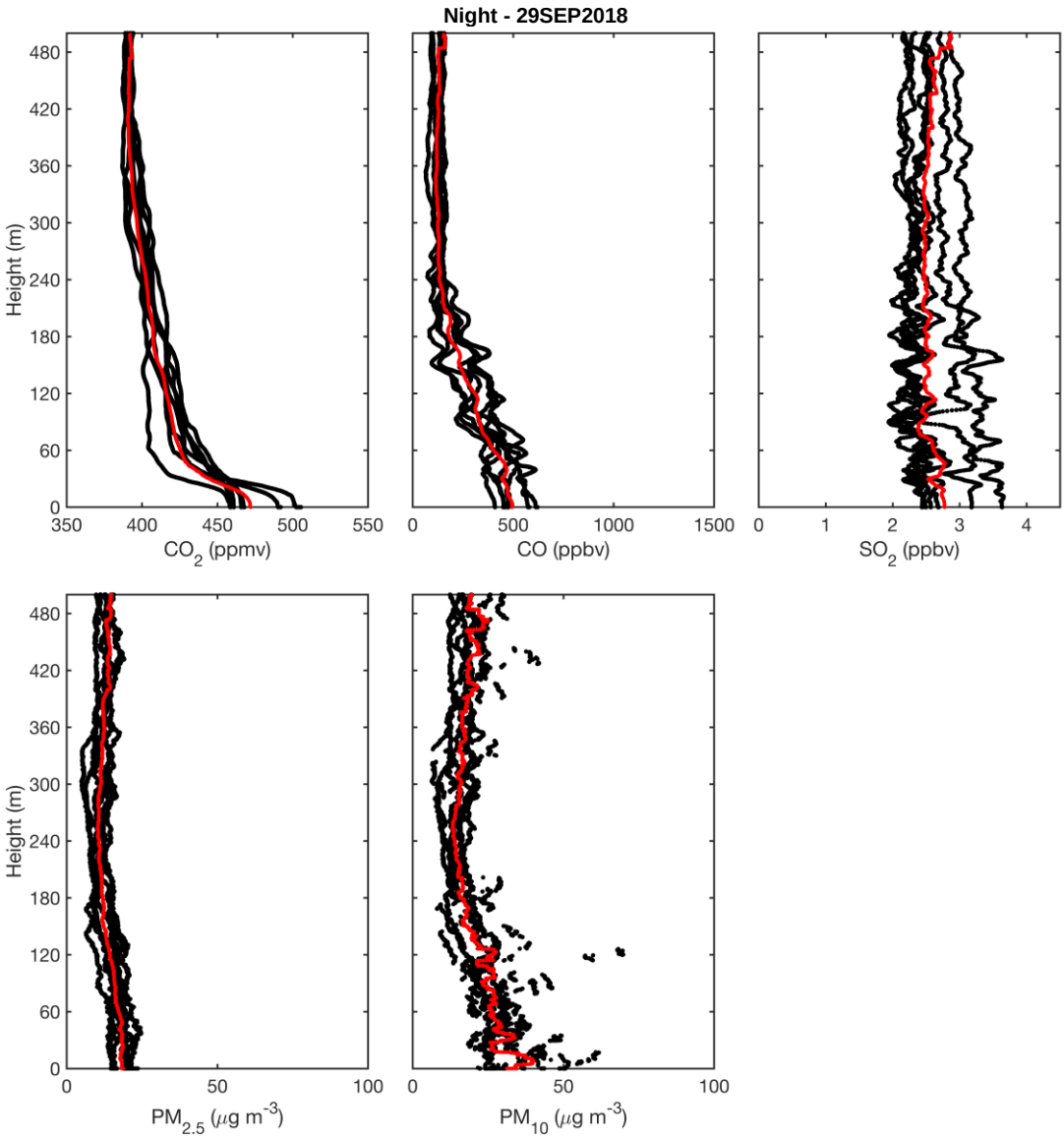


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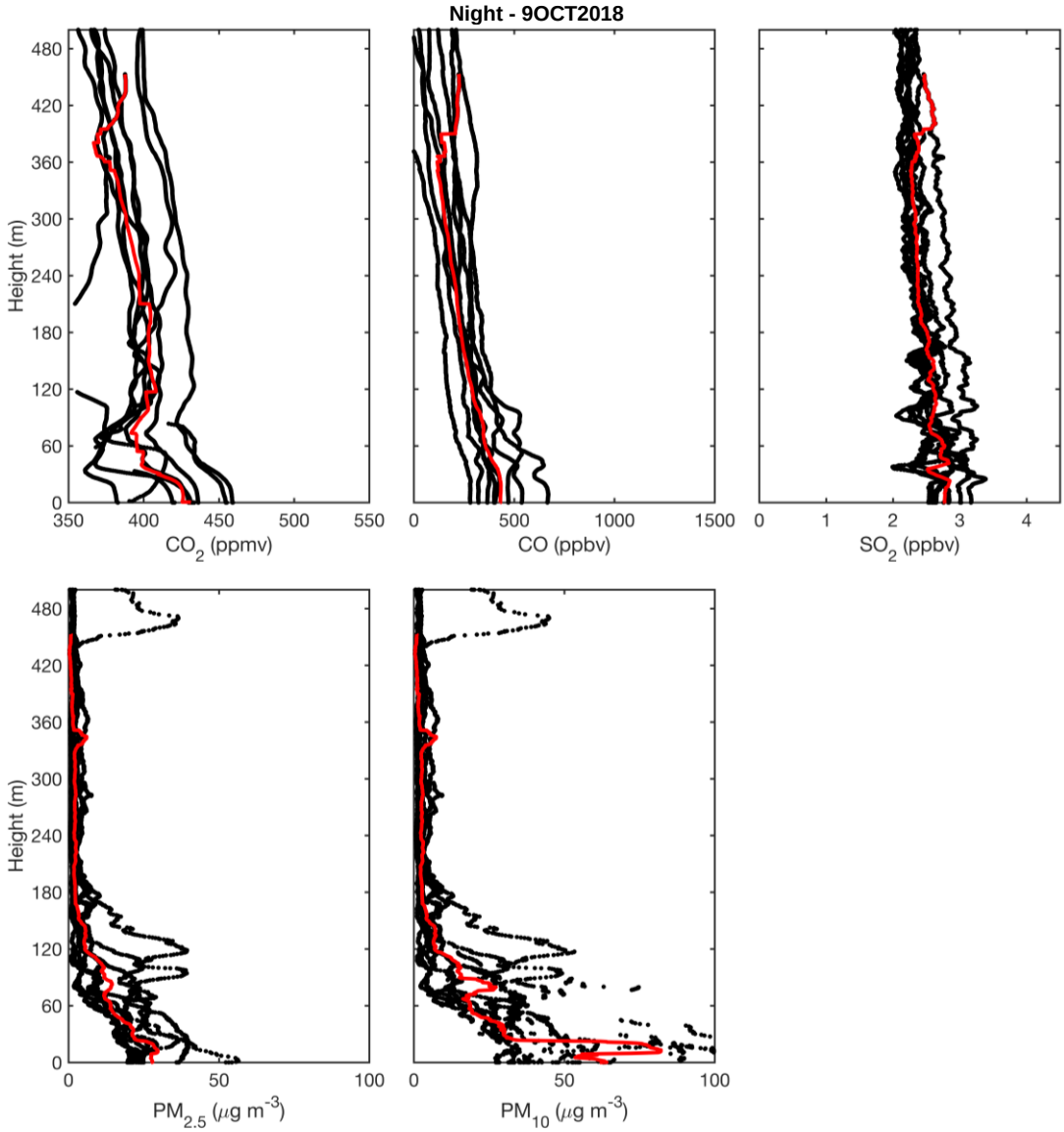
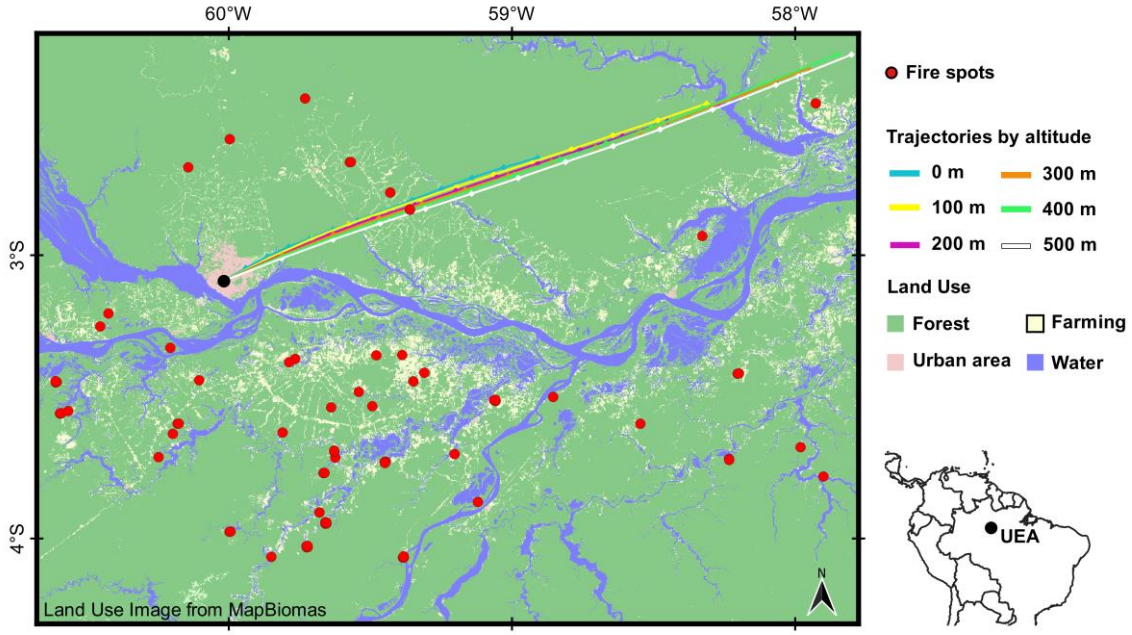


Figure S2. (continued)

(a)


60°W
59°W
58°W
3°S
4°S
Land Use Image from MapBiomas
N
Fire spots
Trajectories by altitude
0 m
300 m
100 m
400 m
200 m
500 m
Land Use
Forest
Farming
Urban area
Water
UEA

(b)

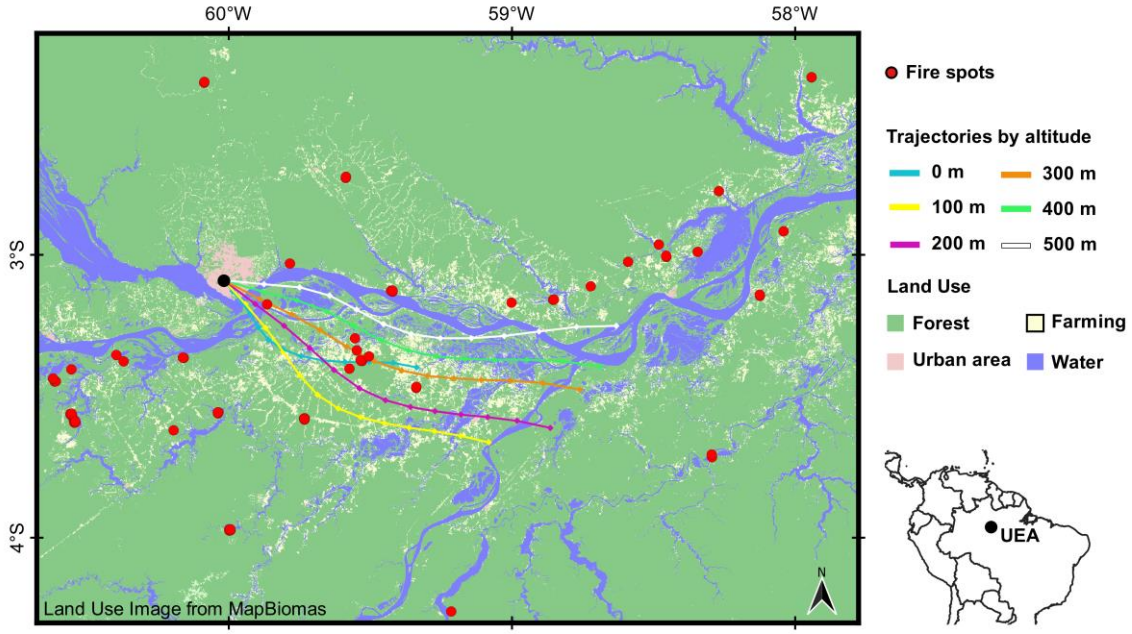

60°W
59°W
58°W
3°S
4°S
Land Use Image from MapBiomas
N
Fire spots
Trajectories by altitude
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300 m
100 m
400 m
200 m
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Land Use
Forest
Farming
Urban area
Water
UEA

Figure S3.

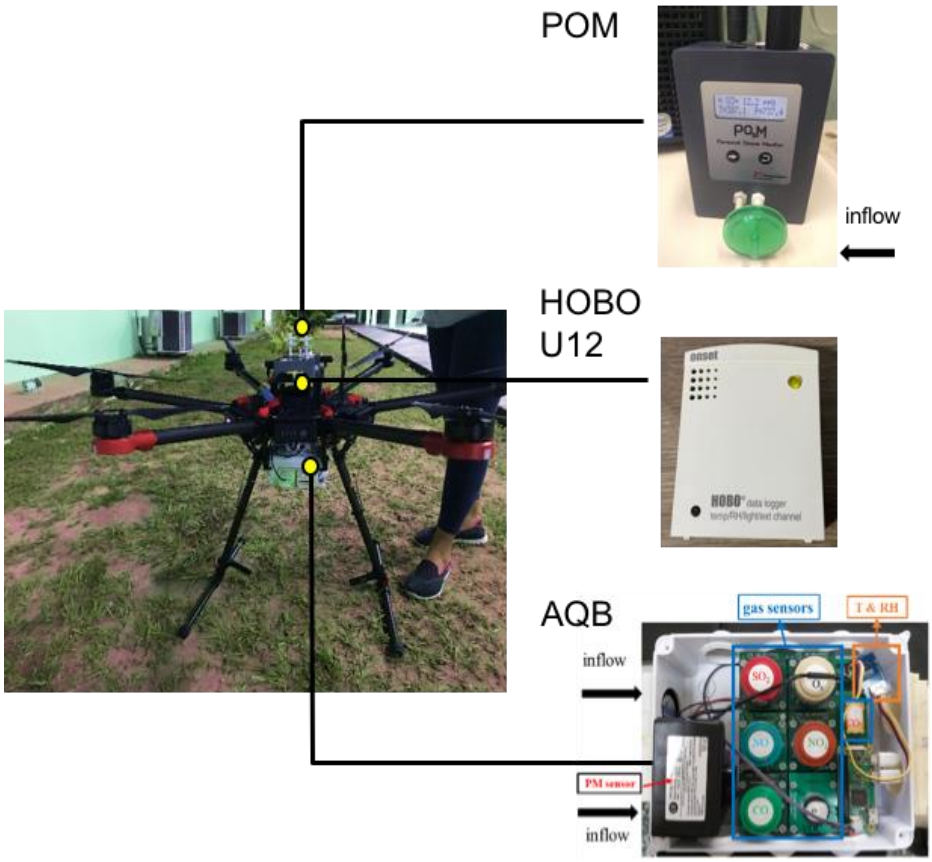

POM
inflow
HOBO
U12
AQB
gas sensors
T & RH
inflow
PM sensor
inflow

Figure S4.