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Supplement of

A sampler for atmospheric volatile organic compounds by copter unmanned aerial vehicles

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Description of the calibration standard.

The thermal desorption cartridge samples were calibrated using a commercial standard from Apel-Riemer Environmental Inc. on a daily basis. The standard contained isoprene, α -pinene, β -pinene, limonene, myrcene, aromadendrene, methyl vinyl ketone, terpinolene, methacrolein, farnesol, cis-3-hexenyl-acetate, caryophyllene, 3-carene, longifolene, acetaldehyde, methanol, acetone, benzene, toluene, o-xylene, 1,3,5-trimethylbenzene, 1,2,4-trichlorobenzene, 1,3,5-triisopropylbenzene, C₃-C₁₀ alkanes, and C₃-C₆ alkenes.

Table S1. Sampler Components.

| Item | Manufacturer | Part number | Specification |
|----------------------|-----------------------|--------------------|--------------------------------|
| Pressure sensor | NXP | MPX4100AP-ND | 20 to 105 kPa \pm 1.8% FS |
| Valve manifold | NResearch Inc. | 161T102 | 5 sample channels |
| Valve driver board | NResearch Inc. | 161D5X24 | |
| Flow sensor | Omron | D6F-P | 0 to 1 SLPM \pm 5% FS |
| Micro Diaphragm pump | Parker Hargraves | E155-11-050 | 0.1 to 0.6 L min ⁻¹ |
| Needle Valve | Universal Power Conv. | F-2822-51-B85-K-V | |
| Microcontroller | Arduino | Uno | |
| Power | DJI Matrice 600 | TB48S | 18 VDC, 130 Wh, 2.5 Wh used |

Table S2. Measured VOC masses in Sample and Blank Adsorbent Cartridges.^a “n.d.” denotes that the VOC mass was below the detection limit of the instrument. ^bSampling time for the blanks is the duration for the blanks that were uncapped. ^cSampling volume was calculated under standard conditions (273 K and 1 atm).

| Sample | Local time | Location (Distance to Tower, m) | Altitude (m) | Sample type | Isoprene (pg) | α -Pinene (pg) | β -Pinene (pg) | d-Limonene (pg) | Athujene (pg) | Tricyclene (pg) | Camphene (pg) | Carene (pg) | Sampling time ^b (min) | Sampling volume ^c (L) |
|--------|---------------|---------------------------------|--------------|-------------|---------------|-----------------------|----------------------|-------------------|---------------|-----------------|---------------|-------------|----------------------------------|----------------------------------|
| 1 | 11:15 - 11:35 | 711 m | 75 | Sample | 6405.1 | 464.1 | 101.6 | 53.1 | 12.0 | 22.2 | 11.7 | 1.5 | 10.0 | 1.54 |
| | | | | Blank | 327.7 | 27.1 | 5.2 | 10.7 | 1.2 | n.d. | 2.7 | 0.4 | 20.3 | |
| 2 | 11:15 - 11:35 | Tower top | 42 | Sample | 11601.2 | 1081.4 | 208.2 | n.d. ^a | 8.7 | 57.7 | 0.9 | 3.5 | 20.0 | 1.76 |
| | | | | Blank | 736.8 | 121.6 | 24.5 | n.d. | 3.3 | 1.9 | 5.6 | 13.8 | 20.0 | |
| 3 | 13:15 - 13:35 | 711 m | 100 | Sample | 12225.6 | 528.4 | 119.6 | 96.0 | 9.1 | 22.8 | 9.6 | 6.6 | 10.0 | 1.46 |
| | | | | Blank | 392.4 | 57.2 | 11.0 | n.d. | 1.7 | 0.2 | 6.0 | 4.1 | 28.8 | |
| 4 | 15:15 - 15:35 | 711 m | 60 | Sample | 8275.2 | 492.2 | 112.4 | n.d. | 17.3 | 25.7 | 37.1 | 5.6 | 10.0 | 1.51 |
| | | | | Blank | 381.7 | 18.1 | 4.1 | n.d. | n.d. | n.d. | 2.9 | 0.3 | 25.9 | |
| 5 | 15:15 - 15:35 | Tower top | 42 | Sample | 14507.6 | 675.7 | 127.5 | 8.3 | 5.2 | 42.7 | 7.2 | 6.1 | 20.0 | 1.76 |

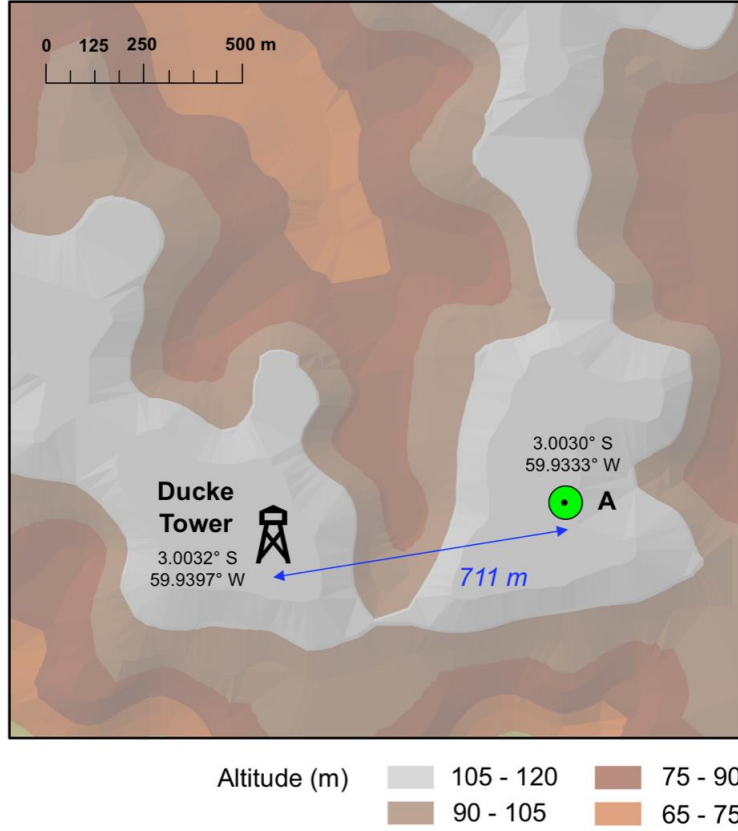


Figure S1. Topographical map of the experimental site. Labels indicate the location of the tower and point A, where samples were taken with the UAV.