**Supplemental Material**

**Interannual variability of ozone fluxes in a broadleaf
deciduous forest in Italy**

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July 28, 2022

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**Table S1.** Average meteo-climatic conditions registered at the Bosco Fontana site in the 4 different seasons for the seven years of measurements. The values reported are seasonal and yearly average for each year of measurements and average for the overall seven years period.

**Table S1 – Climatic conditions registered in the different seasons of the seven years of measurements. Bold italics numbers represent the minimum value, while bold underlined numbers represent the maximum value.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Season** | **Variable** | **Unit** | **2013** | **2014** | **2015** | **2017** | **2018** | **2019** | **2020** | **Mean** |
| SPRING | T mean | °C | ***12.6*** | 14.5 | 14.7 | 14.2 | 14.6 | 13.5 | **14.7** | 14.1 |
|  | T max, average of daily max | °C | ***16.2*** | 19.0 | 18.9 | 18.8 | 18.5 | 18.0 | **19.2** | 18.4 |
|  | T min, average of daily min | °C | ***9.1*** | 10.1 | 10.3 | 9.5 | **10.7** | *9.1* | 10.1 | 9.9 |
|  | Rainfall | mm | **515** | 195 | 118 | 140 | 252 | 268 | ***117*** | 229 |
|  | Rainfall below canopy | mm | - | - | - | - | 67 | **80** | ***61*** | 69 |
|  | PAR | kJ m-2 d-1 | 110 | **133** | 126 | 125 | 110 | ***105*** | 120 | 118 |
|  | RH mean | % | **77.9** | ***57.8*** | 58.2 | 68.5 | 75.1 | 75.3 | 61.7 | 67.8 |
|  | RH min, average of daily min | % | 55.4 | ***39.2*** | **35.6** | 46.0 | 55.1 | 51.5 | 39.5 | 46.0 |
|  | VPD mean | kPa | ***0.40*** | 0.78 | **0.80** | 0.60 | 0.54 | 0.45 | 0.76 | 0.62 |
|  | VPD max, average of daily max | kPa | ***0.93*** | 1.39 | **1.49** | 1.21 | 1.13 | 1.04 | 1.44 | 1.23 |
|  | SWC, average | m3H2O /m3soil | 0.299 | 0.301 | 0.258 | 0.250 | 0.299 | **0.316** | ***0.227*** | 0.279 |
|  | SWC, min | m3H2O /m3soil | 0.276 | 0.225 | 0.198 | ***0.192*** | 0.218 | **0.295** | 0.212 | 0.231 |
|  | [O3] mean | ppb | 31.5 | 29.5 | 31.3 | 32.7 | ***29.4*** | **39.8** | 33.2 | 32.5 |
|  | [O3] max, average of daily max | ppb | 48.1 | 49.5 | 53.2 | 54.3 | ***46.1*** | **58.5** | 53.1 | 51.8 |
|  |  |  |  |  |  |  |  |  |  |  |
| SUMMER | T mean | °C | 24.2 | ***21.0*** | 25.6 | 23.8 | 24.9 | **25.7** | 24.4 | 24.2 |
|  | T max, average of daily max | °C | 28.7 | ***25.9*** | 30.2 | 28.9 | 29.5 | **30.5** | 29.2 | 29.0 |
|  | T min, average of daily min | °C | 19.3 | ***16.5*** | 20.8 | 18.8 | 20.1 | **20.8** | 19.7 | 19.4 |
|  | Rainfall | mm | 142 | **317** | 140 | 93 | 226 | ***70*** | 253 | 177 |
|  | Rainfall below canopy | mm | - | - | - | - | 64 | ***36*** | **132** | 77 |
|  | PAR | kJ m-2 d-1 | **190** | 170 | 183 | 174 | 171 | 168 | ***164*** | 174 |
|  | RH mean | % | 65.3 | 69.1 | ***53.9*** | **77.7** | 72.1 | 70.4 | 69.2 | 68.2 |
|  | RH min, average of daily min | % | 41.9 | 44.5 | ***31.0*** | **54.8** | 50.4 | 47.1 | 44.6 | 44.9 |
|  | VPD mean | kPa | 1.22 | 0.93 | **1.72** | ***0.74*** | 1.02 | 1.13 | 1.12 | 1.13 |
|  | VPD max, average of daily max | kPa | 2.35 | 1.93 | **3.06** | ***1.75*** | 2.11 | 2.35 | 2.31 | 2.27 |
|  | SWC, average | m3H2O /m3soil | 0.224 | 0.225 | 0.213 | ***0.205*** | **0.233** | 0.213 | 0.222 | 0.223 |
|  | SWC, min | m3H2O /m3soil | 0.189 | 0.191 | ***0.183*** | 0.190 | **0.221** | 0.212 | 0.208 | 0.199 |
|  | [O3] mean | ppb | 48.5 | 46.2 | 44.7 | 46.8 | 43.5 | **53.8** | **38.1** | 45.9 |
|  | [O3] max, average of daily max | ppb | 76.0 | 72.7 | 74.4 | 77.8 | 67.0 | **82.9** | **63.2** | 73.4 |
|  |  |  |  |  |  |  |  |  |  |  |
| AUTUMN | T mean | °C | 15.2 | 14.4 | 14.6 | ***12.4*** | **16.4** | 15.6 | 15.6 | 14.9 |
|  | T max, average of daily max | °C | 18.3 | 18.1 | 18.2 | ***16.3*** | **20.0** | 18.8 | 19.5 | 18.5 |
|  | T min, average of daily min | °C | 12.3 | 11.1 | 11.2 | ***8.9*** | **13.0** | 12.5 | 12.0 | 11.6 |
|  | Rainfall | mm | 290 | 280 | ***175*** | 183 | 219 | **385** | 207 | 248 |
|  | Rainfall below canopy | mm | - | - | - | - | ***64*** | **163** | 98 | 108 |
|  | PAR | kJ m-2 d-1 | 67 | 69 | 70 | *64* | **72** | ***64*** | 68 | 68 |
|  | RH mean | % | 83.7 | 81.4 | ***75.0*** | **90.1** | 86.0 | 88.9 | 83.4 | 84.1 |
|  | RH min, average of daily min | % | 62.9 | 60.2 | ***56.0*** | **75.7** | 69.0 | 72.8 | 62.3 | 65.6 |
|  | VPD mean | kPa | 0.34 | 0.36 | **0.54** | ***0.19*** | 0.35 | 0.29 | 0.42 | 0.36 |
|  | VPD max, average of daily max | kPa | 0.87 | 0.91 | **1.09** | ***0.54*** | 0.89 | 0.76 | 1.06 | 0.87 |
|  | SWC, average | m3H2O /m3soil | 0.268 | 0.263 | ***0.224*** | 0.252 | 0.253 | 0.282 | **0.304** | 0.264 |
|  | SWC, min | m3H2O /m3soil | 0.206 | 0.210 | ***0.187*** | 0.189 | 0.205 | 0.203 | **0.212** | 0.202 |
|  | [O3] mean | ppb | 18.8 | 20.4 | 18.8 | 16.8 | 19.7 | **23.9** | ***15.6*** | 19.1 |
|  | [O3] max, average of daily max | ppb | 33.4 | 38.2 | 33.2 | 38.7 | 37.5 | **41.4** | ***31.1*** | 36.2 |
|  |  |  |  |  |  |  |  |  |  |  |
| WINTER | T mean | °C | 3.8 | 5.9 | 4.6 | ***3.4*** | 3.7 | 5.4 | **6.1** | 4.7 |
|  | T max, average of daily max | °C | ***6.6*** | 8.0 | 7.5 | 6.8 | ***6.6*** | 9.2 | **9.4** | 7.7 |
|  | T min, average of daily min | °C | 1.1 | **4.0** | 1.8 | ***0.7*** | 1.1 | 1.8 | 3.0 | 1.9 |
|  | Rainfall | mm | 229 | **396** | 165 | 109 | ***100*** | 159 | 235 | **199** |
|  | Rainfall below canopy | mm | - | - | - | - | ***14*** | **107** | 77 | 66 |
|  | PAR | kJ m-2 d-1 | 34 | ***28*** | 31 | 34 | 31 | **37** | 32 | 32 |
|  | RH mean | % | 88.6 | 88.0 | ***84.9*** | **95.6** | 89.5 | 85.2 | 86.7 | 88.4 |
|  | RH min, average of daily min | % | 73.9 | 75.9 | 71.2 | **86.9** | 75.4 | ***65.7*** | 71.9 | 74.4 |
|  | VPD mean | kPa | 0.11 | 0.12 | 0.15 | ***0.05*** | 0.09 | **0.17** | 0.16 | 0.12 |
|  | VPD max, average of daily max | kPa | 0.28 | 0.28 | 0.32 | ***0.14*** | 0.25 | **0.45** | 0.39 | 0.30 |
|  | SWC, average | m3H2O /m3soil | 0.275 | 0.293 | ***0.266*** | 0.291 | 0.316 | 0.319 | **0.325** | 0.298 |
|  | SWC, min | m3H2O /m3soil | 0.258 | 0.230 | ***0.229*** | 0.269 | 0.307 | 0.301 | **0.310** | 0.272 |
|  | [O3] mean | ppb | 8.9 | 9.1 | 8.2 | 6.8 | 7.6 | **9.8** | ***6.8*** | 8.2 |
|  | [O3] max, average of daily max | ppb | 18.0 | 17.3 | 17.1 | 19.4 | 16.2 | **22.4** | ***15.8*** | 18.0 |
|  |  |  |  |  |  |  |  |  |  |  |
| **YEAR** |  |  | **2013** | **2014** | **2015** | **2017** | **2018** | **2019** | **2020** | **Overall** |
|  | T mean | °C | 14.0 | 14.0 | 14.9 | ***13.5*** | 14.9 | 15.1 | **15.2** | 14.5 |
|  | T max | °C | 35.1 | ***33.3*** | **36.5** | 35.6 | 34.5 | 36.3 | 36.0 | 36.5 |
|  | T min | °C | **-3.3** | -4.4 | -5.6 | -5.1 | ***-5.9*** | -4.7 | -3.4 | -5.9 |
|  | Rainfall | mm | 1176 | **1187** | 598 | ***525*** | 797 | 882 | 812 | 854 |
|  | Rainfall below canopy | mm | - | - | - | - | 209 | 385 | 368 | 321 |
|  | PAR | kJ m-2 d-1 | 101 | 100 | **103** | 100 | 96 | ***94*** | 96 | 99 |
|  | RH mean | % | 78.8 | 74.0 | ***67.9*** | **82.9** | 80.6 | 79.9 | 75.2 | 77.0 |
|  | RH min | % | 10.3 | 12.8 | ***6.1*** | **19.5** | 18.9 | 13.4 | 11.0 | 6.1 |
|  | VPD mean | kPa | 0.52 | 0.55 | **0.80** | ***0.40*** | 0.50 | 0.51 | 0.62 | 0.56 |
|  | VPD max | kPa | 3.86 | 4.32 | **4.84** | ***2.76*** | 3.62 | 3.94 | 3.65 | 4.84 |
|  | SWC, average | m3H2O /m3soil | 0.270 | 0.250 | ***0.240*** | 0.249 | 0.268 | **0.286** | 0.277 | 0.263 |
|  | [O3] mean | ppb | 27.0 | 26.4 | 25.9 | 25.9 | 25.1 | **32.0** | ***23.5*** | 26.5 |
|  | [O3] max, average of daily max | ppb | 103.2 | 110.5 | 115.6 | 109.7 | 98.4 | **144.7** | ***90.3*** | 144.7 |
|  |  |  |  |  |  |  |  |  |  |  |
|  | AOT40 (1 Apr-30 Sep) | ppm h | 24.40 | 23.92 | 25.95 | 31.93 | 21.69 | **40.82** | ***20.89*** | 27.09 |
|  | AOT40 d+z0 (1 Apr-30 Sep) | ppm h | 18.94 | 20.35 | 19.18 | 20.79 | ***14.72*** | **36.09** | 18.04 | 21.16 |
|  | POD1ECOSYS (1 Apr-30 Sep) | mmol m-2 | 21.89 | 25.13 | ***17.77*** | 31.17 | **37.08** | 31.97 | 19.59 | 26.37 |
|  | POD0ECOSYS (1 Apr-30 Sep) | mmol m-2 | 31.16 | 34.39 | ***26.58*** | 40.17 | **45.98** | 41.28 | 29.09 | 35.52 |