

Supplementary Materials: Water CO₂ emissions monitoring in a Romanian peri-urban wetland to enhance GHGs reporting

György Deák ^{1,2}, Natalia Enache ^{1,2*}, Lucian Laslo ¹, Monica Matei ¹, Madalina Georgiana Boboc ¹ and Cristina Ileana Covaliu Mierla ³

Table S1. Monthly mean Temperature (°C) and Pressure (kPa) from daily recorded data.

| Season | Month | Temperature (°C) | | 95% Confidence interval (°C) | | Pressure (kPa) | | 95% Confidence interval (kPa) | |
|--------|-----------|------------------|--------|------------------------------|-------------|----------------|------|-------------------------------|-------------|
| | | Mean | SD | Lower limit | Upper limit | Mean | SD | Lower limit | Upper limit |
| Winter | December | 2.7232 | 3.0360 | 1.6082 | 3.8382 | 1011.31 | 9.47 | 1007.83 | 1014.78 |
| | January | 0.7252 | 2.9791 | −0.3689 | 1.8193 | 1009.61 | 7.07 | 1007.01 | 1012.21 |
| | February | 3.7996 | 2.3116 | 2.9047 | 4.6945 | 1008.74 | 7.15 | 1006.11 | 1011.37 |
| Spring | March | 3.9029 | 4.8424 | 2.1245 | 5.6813 | 1014.92 | 9.27 | 1011.51 | 1018.33 |
| | April | 11.3740 | 4.0260 | 9.8708 | 12.8772 | 1003.04 | 6.71 | 1000.57 | 1005.51 |
| | May | 18.5268 | 3.5991 | 17.2050 | 19.8486 | 1007.79 | 4.56 | 1006.11 | 1009.46 |
| Summer | June | 23.5633 | 2.1664 | 22.7544 | 24.3722 | 1004.89 | 3.37 | 1003.65 | 1006.13 |
| | July | 27.0652 | 2.7561 | 26.0530 | 28.0774 | 1005.43 | 3.14 | 1004.28 | 1006.58 |
| | August | 26.5155 | 1.7021 | 25.8904 | 27.1406 | 1002.57 | 2.99 | 1001.47 | 1003.67 |
| Autumn | September | 18.6887 | 3.3483 | 17.4385 | 19.9389 | 1004.03 | 5.70 | 1001.94 | 1006.13 |
| | October | 14.5345 | 2.5193 | 13.6092 | 15.4598 | 1013.16 | 4.96 | 1011.34 | 1014.98 |
| | November | 8.7577 | 3.8043 | 7.3373 | 10.1781 | 1008.55 | 8.93 | 1005.27 | 1011.84 |

Table S2. Extrapolated mean CO₂ emissions in each location, based on models derived from data obtained using EGM-5 and Injection Kit methods.

| Location | Month | EGM-5 (g m ⁻² d ⁻¹) | | | | Injection Kit (g m ⁻² d ⁻¹) | | | | Confidence coefficient |
|----------|-----------|--------------------------------------------|-------|-------------------------|-------------|----------------------------------------------------------------|-------|-------------------------|-------------|------------------------|
| | | CO ₂ emissions | | 95% Confidence interval | | CO ₂ emissions (g m ⁻² d ⁻¹) | | 95% Confidence interval | | |
| | | Mean | SD | Lower limit | Upper limit | Mean | SD | Lower limit | Upper limit | |
| A | January | 2.184 | 0.536 | 2.171 | 2.197 | 1.207 | 0.020 | 1.200 | 1.215 | 64.4% |
| | February | 0.605 | 0.507 | 0.602 | 0.608 | 0.773 | 0.009 | 0.769 | 0.776 | 65.6% |
| | March | 4.572 | 0.604 | 4.534 | 4.610 | 5.484 | 0.125 | 5.438 | 5.530 | 64.4% |
| | April | 5.122 | 0.587 | 5.089 | 5.154 | 4.121 | 0.070 | 4.095 | 4.147 | 64.4% |
| | May | 8.777 | 0.636 | 8.727 | 8.827 | 6.722 | 0.104 | 6.684 | 6.760 | 65.4% |
| | June | 21.744 | 0.671 | 21.680 | 21.808 | 13.085 | 0.103 | 13.047 | 13.123 | 64.4% |
| | July | 14.059 | 0.650 | 14.004 | 14.114 | 5.914 | 0.063 | 5.891 | 5.937 | 64.4% |
| | August | 20.683 | 0.618 | 20.640 | 20.727 | 14.810 | 0.084 | 14.779 | 14.841 | 64.4% |
| | September | 4.997 | 0.571 | 4.970 | 5.023 | 10.615 | 0.150 | 10.560 | 10.670 | 64.4% |
| | October | 2.981 | 0.536 | 2.968 | 2.994 | 1.733 | 0.021 | 1.725 | 1.740 | 64.4% |
| | November | 1.346 | 0.523 | 1.338 | 1.355 | 1.742 | 0.030 | 1.731 | 1.753 | 67.6% |
| | December | 2.201 | 0.540 | 2.186 | 2.216 | 1.922 | 0.035 | 1.910 | 1.935 | 66.4% |
| B | January | 0.860 | 0.014 | 0.855 | 0.865 | 0.787 | 0.013 | 0.782 | 0.792 | 65.4% |
| | February | 0.854 | 0.010 | 0.850 | 0.858 | 0.770 | 0.009 | 0.767 | 0.774 | 65.6% |
| | March | 0.905 | 0.021 | 0.897 | 0.912 | 0.773 | 0.018 | 0.766 | 0.779 | 64.4% |
| | April | 0.974 | 0.017 | 0.968 | 0.981 | 0.924 | 0.016 | 0.918 | 0.930 | 64.4% |

| | | | | | | | | | | |
|---|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| C | May | 1.241 | 0.019 | 1.234 | 1.248 | 1.262 | 0.019 | 1.255 | 1.270 | 65.4% |
| | June | 2.501 | 0.020 | 2.493 | 2.508 | 2.285 | 0.018 | 2.278 | 2.291 | 64.4% |
| | July | 3.473 | 0.037 | 3.459 | 3.486 | 2.448 | 0.026 | 2.438 | 2.458 | 64.4% |
| | August | 1.903 | 0.108 | 1.864 | 1.943 | 3.322 | 0.019 | 3.315 | 3.329 | 64.4% |
| | September | 1.147 | 0.016 | 1.141 | 1.153 | 1.080 | 0.015 | 1.074 | 1.086 | 64.4% |
| | October | 0.614 | 0.007 | 0.612 | 0.617 | 0.778 | 0.009 | 0.774 | 0.781 | 64.4% |
| | November | 0.548 | 0.009 | 0.545 | 0.552 | 0.718 | 0.012 | 0.067 | 0.076 | 67.6% |
| | December | 0.374 | 0.007 | 0.372 | 0.377 | 0.266 | 0.005 | 0.265 | 0.268 | 65.4% |
| | January | 0.214 | 0.004 | 0.212 | 0.215 | 0.166 | 0.003 | 0.165 | 0.167 | 64.4% |
| | February | 0.794 | 0.010 | 0.791 | 0.798 | 0.542 | 0.007 | 0.540 | 0.545 | 65.6% |
| | March | 0.960 | 0.022 | 0.952 | 0.968 | 0.658 | 0.015 | 0.652 | 0.663 | 65.6% |
| | April | 0.941 | 0.016 | 0.935 | 0.947 | 0.737 | 0.012 | 0.732 | 0.741 | 64.4% |
| | May | 1.702 | 0.026 | 1.692 | 1.711 | 1.231 | 0.019 | 1.224 | 1.238 | 65.4% |
| | June | 2.081 | 0.016 | 2.075 | 2.087 | 1.416 | 0.011 | 1.412 | 1.420 | 64.4% |
| | July | 2.021 | 0.022 | 2.013 | 2.029 | 1.694 | 0.018 | 1.688 | 1.701 | 64.4% |
| | August | 2.153 | 0.012 | 2.148 | 2.157 | 1.771 | 0.010 | 1.767 | 1.775 | 64.4% |
| | September | 0.864 | 0.012 | 0.860 | 0.869 | 1.301 | 0.018 | 1.294 | 1.308 | 64.4% |
| | October | 0.847 | 0.010 | 0.843 | 0.851 | 0.547 | 0.006 | 0.545 | 0.550 | 65.4% |
| | November | 0.331 | 0.006 | 0.329 | 0.333 | 0.384 | 0.006 | 0.382 | 0.386 | 66.5% |
| | December | 0.828 | 0.015 | 0.822 | 0.834 | 0.809 | 0.015 | 0.803 | 0.814 | 66.4% |

Table S3. Pearson correlation and linear regression coefficient of EGM-5 and water quality parameters.

| Location | Variable | r | R ² |
|----------|-------------|----------|----------------|
| Total | pH | −0.682** | 0.466 |
| | ORP | 0.716** | 0.513 |
| A | pH | −0.820** | 0.836 |
| | ORP | 0.700** | 0.710 |
| | Chlorophyll | 0.813** | 0.834 |
| | DO% | 0.741** | 0.740 |
| | DO mg/l | 0.748** | 0.750 |
| | pH | −0.619** | 0.631 |
| B | Chlorophyll | 0.681** | 0.691 |
| | CDOM | 0.539* | 0.838 |
| | DO mg/l | −0.588* | 0.658 |
| | pH | −0.910** | 0.829 |
| | ORP | 0.854** | 0.730 |
| C | Chlorophyll | 0.946** | 0.895 |
| | DO % | 0.897** | 0.805 |
| | Turbidity | −0.955** | 0.911 |
| | Salinity | −0.513* | 0.577 |
| | DO mg/l | 0.692** | 0.866 |

* Correlation is significant at the 0.05 level (1-tailed).

** Correlation is significant at the 0.01 level (1-tailed).

Table S4. Pearson correlation and linear regression coefficient of Injection Kit and water quality parameters.

| Location | Variable | r | R ² |
|-------------------------------------------------------------|-------------|----------|----------------|
| Total | pH | -0.66 | 0.436 |
| | DO % | 0.606* | 0.368 |
| A | pH | -0.672* | 0.680 |
| | Chlorophyll | 0.632* | 0.639 |
| | DO % | 0.510* | 0.544 |
| | DO mg/l | 0.737* | 0.753 |
| B | pH | -0.734 | 0.752 |
| | Chlorophyll | -0.662* | 0.638 |
| | pH | -0.765** | 0.876 |
| | ORP | 0.634* | 0.711 |
| C | Chlorophyll | -0.775** | 0.820 |
| | DO % | 0.808** | 0.838 |
| | Turbidity | -0.822** | 0.852 |
| | DO mg/l | 0.696** | 0.699 |
| * Correlation is significant at the 0.05 level (1-tailed). | | | |
| ** Correlation is significant at the 0.01 level (1-tailed). | | | |