Table 1 Statistical parameters of water quality and values of nitrogen and oxygen isotopes of every samples in the Xixi Wetland.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| site | month | t | DO | pH | EC | TN | NO- 3 | NO- 2 | NH+ 4 |  | DOC | Cl- | Na+ |  | δ15N | δ18O |
| ℃ | mg·L-1 | μs·cm-1 | mgN·L-1 | | | |  | mg·L-1 | | |  | ‰ | |
| W1 | 2018.03 | 14.0±0.0 | 6.8±0.0 | 7.48±0.02 | 159.0±0.3 | 4.14±0.01 | 2.02±0.02 | 0.08±0.01 | 0.24±0.01 |  | 15.45±0.03 | 10.43±0.02 | 9.07±0.01 |  |  |  |
|  | 2018.04 | 19.7±0.0 | 3.1±0.0 | 7.36±0.05 | 232.0±0.1 | 3.08±0.01 | 1.39±0.01 | 0.14±0.00 | 0.65±0.00 |  | 2.48±0.04 | 15.25±0.01 | 16.51±0.04 |  |  |  |
|  | 2018.05 | 24.8±0.0 | 4.6±0.0 | 7.33±0.01 | 197.2±0.5 | 1.75±0.04 | 0.99±0.01 | 0.10±0.01 | 0.66±0.01 |  | 5.61±0.01 | 10.88±0.03 | 11.88±0.02 |  |  |  |
|  | 2018.06 | 30.0±0.0 | 6.2±0.0 | 7.44±0.03 | 352.0±0.1 | 2.83±0.02 | 1.25±0.01 | 0.14±0.00 | 0.61±0.01 |  | 6.20±0.02 | 11.71±0.05 | 16.91±0.05 |  |  |  |
|  | 2018.07 | 29.8±0.0 | 3.2±0.1 | 7.46±0.01 | 229.0±0.4 | 2.15±0.01 | 1.18±0.03 | 0.10±0.00 | 0.01±0.00 |  | 12.42±0.05 | 13.40±0.01 | 14.10±0.04 |  | 5.8±0.4 | 3.6±0.2 |
|  | 2018.08 | 29.3±0.0 | 3.2±0.0 | 7.71±0.01 | 288.0±0.3 | 2.46±0.01 | 0.71±0.01 | 0.11±0.01 | 0.64±0.01 |  | 16.42±0.06 | 15.19±0.04 | 16.71±0.03 |  |  |  |
|  | 2018.09 | 25.5±0.0 | 2.5±0.0 | 7.37±0.02 | 214.0±0.1 | 2.48±0.02 | 0.56±0.01 | 0.07±0.02 | 0.70±0.01 |  | 2.19±0.01 | 8.50±0.02 | 11.18±0.02 |  |  |  |
|  | 2018.10 | 20.6±0.0 | 3.7±0.0 | 7.37±0.02 | 248.0±0.2 | 1.78±0.03 | 0.77±0.04 | 0.09±0.01 | 0.43±0.01 |  | 4.89±0.03 | 17.74±0.02 | 19.79±0.05 |  |  |  |
|  | 2018.11 | 15.3±0.0 | 4.8±0.1 | 7.28±0.04 | 235.0±0.1 | 2.23±0.02 | 1.23±0.01 | 0.07±0.01 | 0.60±0.02 |  | 4.75±0.02 | 21.24±0.06 | 14.06±0.04 |  |  |  |
|  | 2018.12 | 11.5±0.0 | 4.3±0.0 | 7.33±0.01 | 297.0±0.1 | 4.16±0.01 | 2.15±0.02 | 0.17±0.01 | 1.37±0.01 |  | 2.88±0.02 | 21.96±0.04 | 23.88±0.03 |  | 5.8±0.4 | 10.7±0.2 |
|  | 2019.01 | 9.6±0.0 | 7.0±0.0 | 7.69±0.04 | 182.0±0.3 | 2.98±0.01 | 0.42±0.01 | BDL | 0.20±0.00 |  | 3.33±0.01 | 9.51±0.02 | 9.00±0.02 |  |  |  |
|  | 2019.02 | 9.8±0.0 | 6.3±0.0 | 7.70±0.02 | 215.0±0.1 | 3.96±0.01 | 2.68±0.01 | 0.07±0.01 | 0.41±0.01 |  | 4.10±0.02 | 8.22±0.01 | 6.37±0.01 |  |  |  |
| W2 | 2018.03 | 14.5±0.1 | 7.2±0.0 | 7.47±0.01 | 158.4±0.5 | 4.27±0.01 | 1.95±0.01 | 0.11±0.01 | 0.40±0.02 |  | 17.62±0.03 | 10.40±0.08 | 9.09±0.02 |  |  |  |
|  | 2018.04 | 20.5±0.0 | 6.5±0.0 | 7.44±0.04 | 158.3±0.1 | 4.36±0.02 | 1.37±0.03 | 0.10±0.00 | 0.11±0.00 |  | 1.03±0.02 | 8.31±0.01 | 9.04±0.03 |  |  |  |
|  | 2018.05 | 21.4±0.0 | 6.0±0.0 | 7.36±0.01 | 161.4±0.1 | 1.66±0.03 | 1.16±0.01 | 0.07±0.01 | 0.10±0.01 |  | 21.36±0.05 | 9.37±0.03 | 9.88±0.03 |  |  |  |
|  | 2018.06 | 27.3±0.0 | 3.2±0.0 | 7.24±0.01 | 252.0±0.2 | 2.84±0.01 | 1.36±0.01 | 0.08±0.00 | 0.28±0.01 |  | 7.88±0.03 | 8.67±0.04 | 11.93±0.04 |  |  |  |
|  | 2018.07 | 29.9±0.0 | 4.8±0.0 | 7.78±0.03 | 259.0±0.0 | 1.86±0.02 | 1.14±0.02 | 0.08±0.00 | BDL |  | 12.39±0.01 | 10.81±0.05 | 12.40±0.03 |  | 6.8±0.4 | 3.0±0.2 |
|  | 2018.08 | 31.0±0.0 | 4.2±0.0 | 7.77±0.02 | 290.0±0.4 | 2.21±0.01 | 0.56±0.00 | 0.07±0.00 | 0.65±0.01 |  | 15.79±0.06 | 12.09±0.02 | 13.99±0.06 |  |  |  |
|  | 2018.10 | 22.0±0.0 | 6.0±0.0 | 7.57±0.02 | 194.2±0.4 | 1.67±0.03 | 0.44±0.01 | 0.04±0.01 | 0.10±0.00 |  | 3.17±0.02 | 9.40±0.05 | 10.70±0.02 |  |  |  |
|  | 2018.11 | 17.5±0.0 | 6.0±0.0 | 7.56±0.01 | 241.0±0.3 | 1.61±0.02 | 1.42±0.01 | 0.14±0.01 | 0.16±0.01 |  | 3.91±0.01 | 27.92±0.03 | 18.75±0.05 |  |  |  |
|  | 2018.12 | 11.4±0.0 | 7.0±0.0 | 7.44±0.01 | 212.0±0.7 | 3.64±0.01 | 2.45±0.01 | 0.08±0.01 | 0.27±0.01 |  | 1.16±0.01 | 22.28±0.01 | 5.52±0.02 |  | 4.7±0.4 | 8.4±0.2 |
|  | 2019.01 | 11.4±0.0 | 7.5±0.0 | 7.57±0.02 | 137.8±0.2 | 3.05±0.01 | 0.96±0.01 | 0.02±0.00 | 0.13±0.00 |  | 4.44±0.02 | 6.22±0.02 | 4.94±0.01 |  |  |  |
|  | 2019.02 | 9.2±0.0 | 7.6±0.0 | 7.75±0.01 | 160.1±0.2 | 3.46±0.03 | 2.65±0.01 | 0.03±0.01 | 0.20±0.02 |  | 1.94±0.01 | 6.61±0.04 | 6.10±0.02 |  |  |  |
| W3 | 2018.03 | 15.8±0.0 | 7.3±0.0 | 7.55±0.02 | 156.0±0.2 | 4.59±0.02 | 1.88±0.01 | 0.11±0.02 | BDL |  | 14.19±0.03 | 10.63±0.03 | 9.39±0.03 |  |  |  |
|  | 2018.04 | 20.5±0.0 | 6.8±0.0 | 7.52±0.04 | 156.1±0.7 | 2.28±0.05 | 1.35±0.00 | 0.07±0.01 | 0.11±0.00 |  | 1.48±0.04 | 8.19±0.02 | 8.52±0.04 |  |  |  |
|  | 2018.05 | 21.6±0.0 | 5.8±0.0 | 7.37±0.01 | 159.2±0.1 | 2.41±0.02 | 1.06±0.01 | 0.06±0.00 | 0.06±0.01 |  | 4.36±0.01 | 9.29±0.01 | 9.57±0.03 |  |  |  |
|  | 2018.06 | 26.3±0.0 | 2.4±0.1 | 7.22±0.01 | 205.0±0.3 | 2.63±0.01 | 0.60±0.01 | 0.33±0.01 | BDL |  | 23.29±0.04 | 6.35±0.02 | 11.20±0.04 |  |  |  |
|  | 2018.07 | 28.6±0.0 | 5.7±0.0 | 7.93±0.03 | 218.0±0.5 | 2.39±0.01 | 1.42±0.02 | 0.09±0.00 | 0.03±0.01 |  | 13.07±0.01 | 11.49±0.06 | 11.78±0.02 |  | 5.6±0.4 | 1.6±0.2 |
|  | 2018.08 | 30.8±0.0 | 3.5±0.0 | 7.87±0.04 | 241.0±0.1 | 2.59±0.02 | 1.22±0.01 | 0.08±0.01 | 0.11±0.01 |  | 13.00±0.03 | 16.25±0.04 | 16.58±0.02 |  |  |  |
|  | 2018.09 | 25.7±0.0 | 4.4±0.0 | 7.55±0.02 | 154.8±04 | 1.77±0.01 | 0.59±0.01 | 0.05±0.00 | BDL |  | 2.37±0.01 | 8.83±0.01 | 10.62±0.05 |  |  |  |
|  | 2018.10 | 21.5±0.1 | 5.3±0.0 | 7.61±0.01 | 196.6±0.2 | 1.83±0.03 | 0.80±0.01 | 0.08±0.01 | 0.12±0.01 |  | 4.36±0.02 | 16.99±0.03 | 19.31±0.02 |  |  |  |
|  | 2018.11 | 17.0±0.0 | 6.2±0.0 | 7.50±0.04 | 239.0±0.1 | 1.77±0.01 | 1.26±0.03 | 0.07±0.01 | 0.13±0.00 |  | 2.79±0.04 | 26.70±0.05 | 18.17±0.06 |  |  |  |
|  | 2018.12 | 11.4±0.0 | 6.7±0.0 | 7.46±0.05 | 209.0±0.1 | 3.56±0.01 | 2.33±0.02 | 0.08±0.01 | 0.38±0.00 |  | 1.33±0.01 | 21.39±0.02 | 9.03±0.02 |  | 4.5±0.4 | 13.7±0.2 |
|  | 2019.01 | 11.0±0.0 | 8.3±0.0 | 7.54±0.03 | 135.6±0.2 | 2.79±0.02 | 1.86±0.00 | 0.03±0.00 | 0.17±0.02 |  | 2.44±0.01 | 10.34±0.01 | 9.37±0.02 |  |  |  |
|  | 2019.02 | 9.2±0.0 | 8.7±0.0 | 7.78±0.04 | 153.7±0.5 | 3.56±0.01 | 2.55±0.01 | 0.03±0.00 | 0.17±0.01 |  | 2.55±0.01 | 6.25±0.01 | 5.75±0.01 |  |  |  |
| W4 | 2018.03 | 15.1±0.0 | 6.9±0.0 | 7.50±0.01 | 175.0±0.3 | 3.98±0.02 | 1.89±0.04 | 0.08±0.01 | 0.14±0.01 |  | 13.32±0.02 | 12.09±0.03 | 10.40±0.02 |  |  |  |
|  | 2018.04 | 19.9±0.0 | 5.1±0.1 | 7.30±0.04 | 184.1±0.1 | 5.27±0.03 | 1.34±0.02 | 0.10±0.02 | 0.09±0.02 |  | 1.87±0.01 | 13.86±0.05 | 14.52±0.04 |  |  |  |
|  | 2018.05 | 25.5±0.0 | 5.5±0.1 | 7.32±0.02 | 175.9±0.1 | 1.76±0.01 | 0.98±0.01 | 0.07±0.00 | 0.07±0.00 |  | 6.70±0.02 | 9.72±0.02 | 10.15±0.02 |  |  |  |
|  | 2018.06 | 29.6±0.0 | 6.0±0.0 | 7.50±0.01 | 196.1±0.4 | 2.52±0.01 | 0.76±0.00 | 0.06±0.00 | BDL |  | 7.10±0.03 | 8.73±0.01 | 11.22±0.02 |  |  |  |
|  | 2018.07 | 30.1±0.0 | 2.3±0.0 | 7.31±0.03 | 214.0±0.3 | 1.71±0.01 | 0.53±0.01 | 0.06±0.00 | 0.26±0.01 |  | 13.88±0.03 | 8.02±0.03 | 12.98±0.04 |  | 6.8±0.4 | 3.6±0.2 |
|  | 2018.08 | 30.0±0.0 | 4.3±0.0 | 7.74±0.02 | 256.0±0.4 | 1.95±0.02 | 0.84±0.00 | 0.08±0.01 | 0.14±0.01 |  | 13.71±0.04 | 11.48±0.07 | 13.10±0.05 |  |  |  |
|  | 2018.09 | 25.7±0.0 | 3.4±0.0 | 7.32±0.02 | 168.0±0.2 | 2.02±0.04 | 1.06±0.01 | 0.10±0.01 | 0.18±0.00 |  | 3.04±0.01 | 11.42±0.03 | 14.62±0.03 |  |  |  |
|  | 2018.10 | 21.2±0.0 | 4.4±0.0 | 7.28±0.02 | 231.0±0.4 | 1.61±0.01 | 0.91±0.02 | 0.09±0.00 | 0.14±0.00 |  | 3.78±0.02 | 21.24±0.04 | 15.94±0.02 |  |  |  |
|  | 2018.11 | 15.4±0.0 | 4.7±0.0 | 7.34±0.01 | 200.0±0.1 | 1.85±0.03 | 1.15±0.00 | 0.12±0.00 | 0.26±0.00 |  | 3.56±0.02 | 19.83±0.01 | 22.14±0.03 |  |  |  |
|  | 2018.12 | 11.8±0.0 | 5.3±0.0 | 7.43±0.04 | 225.0±0.5 | 3.21±0.02 | 2.29±0.03 | 0.09±0.01 | 0.28±0.01 |  | 2.72±0.01 | 23.85±0.02 | 11.34±0.04 |  | 5.1±0.4 | 7.2±0.2 |
|  | 2019.01 | 9.4±0.0 | 7.3±0.0 | 7.64±0.02 | 147.9±0.1 | 2.50±0.02 | 0.23±0.01 | BDL | 0.17±0.01 |  | 1.89±0.03 | 9.65±0.03 | 9.10±0.02 |  |  |  |
|  | 2019.02 | 9.8±0.0 | 7.0±0.0 | 7.89±0.03 | 172.7±0.5 | 3.74±0.01 | 2.54±0.01 | 0.04±0.00 | 0.36±0.01 |  | 2.22±0.01 | 7.91±0.02 | 7.56±0.02 |  |  |  |
| W5 | 2018.03 | 13.8±0.0 | 6.7±0.0 | 7.23±0.01 | 184.1±0.2 | 3.81±0.01 | 1.89±0.02 | 0.07±0.01 | 0.67±0.00 |  | 24.83±0.05 | 12.72±0.02 | 10.93±0.03 |  | 4.5±0.4 | 5.9±0.2 |
|  | 2018.04 | 24.4±0.0 | 5.3±0.0 | 7.38±0.02 | 201.0±0.1 | 4.94±0.01 | 1.27±0.00 | 0.09±0.00 | 0.52±0.00 |  | 1.34±0.01 | 13.82±0.03 | 14.76±0.01 |  | 5.9±0.4 | 4.6±0.2 |
|  | 2018.05 | 24.8±0.0 | 2.6±0.1 | 7.14±0.01 | 185.2±0.3 | 1.78±0.02 | 0.91±0.00 | 0.08±0.01 | 0.33±0.01 |  | 5.45±0.03 | 10.73±0.04 | 11.25±0.03 |  | 5.4±0.4 | 5.7±0.2 |
|  | 2018.06 | 30.9±0.0 | 3.0±0.0 | 7.27±0.01 | 217.0±0.3 | 2.00±0.02 | 0.52±0.02 | 0.12±0.01 | BDL |  | 7.37±0.02 | 10.56±0.01 | 12.75±0.04 |  | 6.4±0.4 | 6.7±0.2 |
|  | 2018.07 | 30.7±0.0 | 1.7±0.1 | 7.34±0.03 | 223.0±0.2 | 2.06±0.01 | 0.82±0.03 | 0.08±0.01 | 0.25±0.01 |  | 16.49±0.02 | 13.39±0.01 | 14.28±0.05 |  | 7.2±0.4 | 3.0±0.2 |
|  | 2018.08 | 29.1±0.0 | 1.0±0.0 | 7.56±0.03 | 263.0±0.2 | 1.07±0.01 | 0.12±0.01 | 0.03±0.01 | 0.50±0.01 |  | 13.84±0.06 | 13.55±0.02 | 14.48±0.02 |  | 7.7±0.4 | 6.5±0.2 |
|  | 2018.09 | 25.0±0.1 | 1.8±0.0 | 7.31±0.05 | 194.1±0.3 | 1.42±0.03 | 0.31±0.02 | 0.09±0.00 | 0.45±0.00 |  | 1.45±0.01 | 18.07±0.03 | 21.10±0.07 |  | 5.9±0.4 | 4.7±0.2 |
|  | 2018.10 | 20.7±0.0 | 3.9±0.0 | 7.61±0.04 | 187.4±0.1 | 1.53±0.02 | 0.36±0.01 | 0.04±0.01 | 0.19±0.01 |  | 2.46±0.02 | 8.35±0.05 | 10.16±0.02 |  | 6.6±0.4 | 5.0±0.2 |
|  | 2018.11 | 15.5±0.0 | 4.7±0.0 | 7.61±0.01 | 244.0±0.2 | 1.97±0.01 | 1.26±0.01 | 0.06±0.00 | 0.19±0.00 |  | 4.02±0.03 | 26.61±0.04 | 25.85±0.03 |  | 7.6±0.4 | 8.4±0.2 |
|  | 2018.12 | 11.1±0.0 | 4.6±0.0 | 7.42±0.02 | 235.0±0.2 | 2.89±0.01 | 2.04±0.00 | 0.07±0.01 | 0.22±0.01 |  | 2.33±0.01 | 23.29±0.01 | 10.10±0.02 |  | 7.8±0.4 | 5.4±0.2 |
|  | 2019.01 | 9.1±0.0 | 6.9±0.0 | 7.62±0.02 | 175.0±0.1 | 3.26±0.02 | 1.45±0.01 | 0.02±0.01 | 0.19±0.02 |  | 1.55±0.01 | 10.75±0.03 | 9.87±0.02 |  | 4.7±0.4 | 7.1±0.2 |
|  | 2019.02 | 8.8±0.0 | 5.5±0.1 | 7.86±0.01 | 197.8±0.1 | 2.40±0.01 | 1.29±0.04 | 0.06±0.00 | 0.55±0.02 |  | 7.32±0.02 | 13.79±0.02 | 12.42±0.03 |  | 5.8±0.4 | 8.1±0.2 |
| W6 | 2018.03 | 14.1±0.0 | 6.6±0.0 | 7.52±0.01 | 162.1±0.3 | 4.91±0.02 | 2.22±0.01 | 0.08±0.00 | 0.60±0.00 |  | 17.71±0.04 | 14.40±0.07 | 14.84±0.04 |  | 5.3±0.4 | 6.5±0.2 |
|  | 2018.04 | 23.9±0.0 | 5.5±0.0 | 7.39±0.01 | 189.1±0.1 | 4.77±0.02 | 1.33±0.00 | 0.11±0.00 | 0.07±0.00 |  | 2.11±0.02 | 12.06±0.03 | 12.63±0.03 |  | 5.2±0.4 | 4.1±0.2 |
|  | 2018.05 | 25.2±0.0 | 5.0±0.0 | 7.23±0.03 | 166.1±0.4 | 2.03±0.03 | 1.04±0.02 | 0.07±0.01 | 0.07±0.01 |  | 4.79±0.01 | 9.18±0.01 | 9.67±0.02 |  | 5.2±0.4 | 4.4±0.2 |
|  | 2018.06 | 31.1±0.0 | 5.0±0.0 | 7.30±0.04 | 187.8±0.5 | 1.58±0.02 | 0.84±0.02 | 0.04±0.01 | BDL |  | 6.48±0.04 | 8.62±0.02 | 11.22±0.03 |  | 5.7±0.4 | 7.1±0.2 |
|  | 2018.07 | 30.5±0.0 | 3.2±0.0 | 7.46±0.02 | 212.0±0.4 | 1.80±0.01 | 0.60±0.01 | 0.06±0.00 | 0.06±0.01 |  | 10.11±0.01 | 13.60±0.04 | 14.10±0.04 |  | 6.2±0.4 | 2.4±0.2 |
|  | 2018.08 | 30.6±0.0 | 3.1±0.0 | 7.50±0.01 | 214.0±0.3 | 1.53±0.02 | 0.39±0.00 | 0.03±0.02 | BDL |  | 11.58±0.03 | 8.67±0.01 | 9.38±0.02 |  | 6.4±0.4 | 4.8±0.2 |
|  | 2018.09 | 26.4±0.0 | 3.1±0.0 | 7.24±0.03 | 169.5±0.0 | 1.36±0.04 | 0.55±0.00 | 0.05±0.01 | 0.02±0.01 |  | 4.10±0.01 | 16.50±0.03 | 19.50±0.02 |  | 7.2±0.4 | 4.5±0.2 |
|  | 2018.10 | 21.1±0.0 | 4.5±0.1 | 7.55±0.04 | 187.6±0.5 | 1.80±0.01 | 0.85±0.03 | 0.07±0.01 | 0.13±0.01 |  | 4.23±0.02 | 19.24±0.02 | 14.50±0.03 |  | 7.0±0.4 | 2.3±0.2 |
|  | 2018.11 | 14.9±0.0 | 3.8±0.0 | 7.45±0.04 | 217.0±0.2 | 1.26±0.01 | 0.79±0.01 | 0.08±0.00 | 0.19±0.00 |  | 4.11±0.03 | 22.83±0.05 | 24.98±0.05 |  | 9.0±0.4 | 6.0±0.2 |
|  | 2018.12 | 10.5±0.0 | 5.3±0.0 | 7.46±0.02 | 205.0±0.3 | 2.10±0.02 | 1.41±0.00 | 0.08±0.01 | 0.16±0.00 |  | 3.66±0.01 | 22.17±0.04 | 21.50±0.04 |  | 7.2±0.4 | 9.1±0.2 |
|  | 2019.01 | 8.3±0.0 | 8.0±0.0 | 7.45±0.01 | 178.4±0.1 | 2.02±0.02 | 1.45±0.01 | 0.02±0.00 | 0.09±0.01 |  | 2.16±0.03 | 16.76±0.05 | 16.60±0.05 |  | 5.3±0.4 | 9.2±0.2 |
|  | 2019.02 | 8.6±0.0 | 7.3±0.0 | 7.68±0.03 | 134.3±0.1 | 1.89±0.03 | 1.18±0.02 | 0.03±0.01 | 0.12±0.00 |  | 6.71±0.01 | 10.16±0.04 | 10.13±0.02 |  | 5.1±0.4 | 12.0±0.2 |
| W7 | 2018.03 | 14.2±0.0 | 7.3±0.0 | 7.51±0.04 | 157.3±0.2 | 4.27±0.02 | 1.97±0.01 | 0.08±0.01 | 0.44±0.01 |  | 16.20±0.05 | 10.81±0.01 | 9.41±0.01 |  | 4.8±0.4 | 4.5±0.2 |
|  | 2018.04 | 24.0±0.0 | 6.0±0.0 | 7.54±0.04 | 176.5±0.2 | 5.15±0.01 | 1.45±0.01 | 0.10±0.00 | 0.29±0.00 |  | 1.57±0.04 | 10.36±0.02 | 11.34±0.05 |  | 4.5±0.4 | 3.9±0.2 |
|  | 2018.05 | 24.0±0.0 | 4.7±0.0 | 7.29±0.01 | 163.5±0.2 | 2.50±0.01 | 1.12±0.01 | 0.08±0.01 | BDL |  | 4.79±0.01 | 9.28±0.03 | 9.64±0.02 |  | 5.4±0.4 | 3.8±0.2 |
|  | 2018.06 | 29.9±0.0 | 4.6±0.0 | 7.29±0.02 | 204.0±0.1 | 1.47±0.01 | 0.34±0.03 | BDL | 0.14±0.02 |  | 8.33±0.03 | 13.17±0.01 | 10.97±0.05 |  | 5.1±0.4 | 6.2±0.2 |
|  | 2018.07 | 30.6±0.1 | 4.2±0.0 | 7.62±0.01 | 213.0±0.3 | 2.30±0.01 | 0.76±0.01 | 0.09±0.01 | 0.03±0.01 |  | 12.84±0.05 | 12.96±0.02 | 13.97±0.03 |  | 6.7±0.4 | 3.3±0.2 |
|  | 2018.08 | 30.4±0.0 | 1.9±0.0 | 7.48±0.05 | 211.0±0.3 | 1.19±0.01 | 0.37±0.00 | 0.05±0.02 | 0.26±0.00 |  | 18.78±0.06 | 10.34±0.01 | 11.40±0.02 |  | 5.9±0.4 | 5.5±0.2 |
|  | 2018.09 | 25.4±0.0 | 3.0±0.0 | 7.36±0.02 | 165.0±0.5 | 2.06±0.05 | 0.83±0.00 | 0.07±0.02 | 0.08±0.01 |  | 2.15±0.01 | 10.08±0.03 | 12.18±0.02 |  | 5.8±0.4 | 1.6±0.2 |
|  | 2018.10 | 20.5±0.1 | 4.6±0.0 | 7.52±0.03 | 200.0±0.4 | 1.76±0.02 | 0.98±0.01 | 0.09±0.00 | 0.21±0.00 |  | 5.42±0.03 | 21.33±0.05 | 24.12±0.04 |  | 7.5±0.4 | 1.1±0.2 |
|  | 2018.11 | 15.9±0.0 | 5.2±0.0 | 7.48±0.02 | 247.0±0.5 | 1.77±0.02 | 1.34±0.00 | 0.11±0.01 | 0.19±0.02 |  | 4.14±0.02 | 29.61±0.04 | 26.91±0.03 |  | 8.4±0.4 | 6.7±0.2 |
|  | 2018.12 | 11.1±0.0 | 5.3±0.0 | 7.42±0.04 | 227.0±0.8 | 3.63±0.02 | 2.26±0.01 | 0.06±0.01 | 0.31±0.00 |  | 2.50±0.01 | 21.66±0.03 | 8.64±0.01 |  | 6.7±0.4 | 3.3±0.2 |
|  | 2019.01 | 9.2±0.0 | 7.0±0.0 | 7.45±0.02 | 148.4±0.3 | 2.86±0.01 | 2.02±0.02 | 0.02±0.00 | 0.20±0.00 |  | 6.32±0.03 | 11.76±0.03 | 10.55±0.03 |  | 3.7±0.4 | 7.9±0.2 |
|  | 2019.02 | 8.4±0.0 | 7.9±0.0 | 7.75±0.01 | 169.8±0.1 | 2.11±0.02 | 1.44±0.02 | 0.04±0.00 | 0.11±0.01 |  | 2.77±0.01 | 10.23±0.01 | 7.67±0.02 |  | 5.0±0.4 | 11.0±0.2 |
| W8 | 2018.03 | 14.1±0.0 | 6.9±0.0 | 7.54±0.03 | 153.4±0.4 | 4.35±0.03 | 1.98±0.01 | 0.10±0.01 | 0.26±0.02 |  | 4.23±0.01 | 10.74±0.02 | 9.29±0.02 |  |  |  |
|  | 2018.04 | 24.0±0.0 | 6.7±0.0 | 7.50±0.03 | 156.8±0.4 | 5.33±0.01 | 1.40±0.01 | 0.08±0.01 | 0.07±0.01 |  | 1.41±0.02 | 8.34±0.04 | 9.18±0.04 |  |  |  |
|  | 2018.05 | 23.0±0.0 | 6.4±0.1 | 7.36±0.01 | 158.8±0.1 | 1.89±0.03 | 1.10±0.03 | 0.08±0.00 | BDL |  | 4.36±0.04 | 9.46±0.02 | 9.65±0.02 |  |  |  |
|  | 2018.06 | 28.7±0.0 | 2.2±0.0 | 7.28±0.02 | 215.0±0.1 | 2.93±0.01 | 0.03±0.01 | 0.11±0.02 | 0.28±0.01 |  | 5.14±0.01 | 9.23±0.01 | 11.81±0.03 |  |  |  |
|  | 2018.07 | 29.8±0.0 | 3.9±0.0 | 7.67±0.01 | 238.0±0.3 | 2.32±0.01 | 0.58±0.00 | 0.07±0.01 | 0.04±0.00 |  | 10.37±0.03 | 11.57±0.03 | 17.17±0.02 |  | 6.3±0.4 | 3.7±0.2 |
|  | 2018.08 | 30.3±0.0 | 1.5±0.0 | 7.60±0.01 | 279.0±0.5 | 2.90±0.02 | 1.30±0.01 | 0.10±0.01 | 0.60±0.01 |  | 12.57±0.05 | 11.81±0.01 | 12.62±0.03 |  |  |  |
|  | 2018.10 | 21.2±0.0 | 5.5±0.0 | 7.56±0.03 | 184.8±0.4 | 1.82±0.01 | 1.00±0.01 | 0.10±0.00 | 0.16±0.00 |  | 5.18±0.01 | 21.03±0.02 | 23.20±0.05 |  |  |  |
|  | 2018.11 | 16.7±0.0 | 5.7±0.0 | 7.47±0.05 | 244.0±0.3 | 1.82±0.03 | 1.31±0.00 | 0.04±0.00 | 0.15±0.00 |  | 3.17±0.02 | 26.70±0.02 | 17.07±0.03 |  |  |  |
|  | 2018.12 | 11.4±0.0 | 7.4±0.1 | 7.44±0.02 | 210.0±0.4 | 3.52±0.02 | 2.25±0.02 | 0.10±0.01 | 0.56±0.01 |  | 8.04±0.01 | 21.38±0.04 | 23.36±0.02 |  | 5.4±0.4 | 9.3±0.2 |
|  | 2019.01 | 10.7±0.1 | 7.6±0.0 | 7.48±0.04 | 138.1±0.1 | 2.80±0.02 | 1.49±0.00 | 0.02±0.01 | 0.20±0.01 |  | 2.94±0.04 | 9.13±0.02 | 8.09±0.02 |  |  |  |
|  | 2019.02 | 9.5±0.0 | 7.0±0.0 | 7.88±0.02 | 165.0±0.4 | 3.57±0.01 | 2.67±0.02 | 0.04±0.00 | 0.34±0.01 |  | 2.16±0.03 | 7.04±0.01 | 6.60±0.01 |  |  |  |
| W9 | 2018.03 | 15.0±0.0 | 6.8±0.0 | 7.38±0.01 | 383.0±0.5 | 1.03±0.04 | 0.44±0.01 | 0.06±0.00 | 0.37±0.00 |  | 27.13±0.04 | 18.04±0.05 | 21.38±0.03 |  |  |  |
|  | 2018.04 | 21.3±0.0 | 3.6±0.0 | 7.25±0.01 | 414.0±0.4 | 3.57±0.01 | 0.14±0.01 | 0.09±0.02 | 0.18±0.02 |  | 3.79±0.01 | 16.70±0.02 | 23.86±0.01 |  |  |  |
|  | 2018.05 | 28.1±0.0 | 4.0±0.0 | 7.38±0.03 | 419.0±0.4 | 0.70±0.03 | BDL | BDL | 0.13±0.01 |  | 9.03±0.02 | 14.89±0.04 | 21.82±0.02 |  |  |  |
|  | 2018.06 | 25.1±0.0 | 0.6±0.0 | 7.12±0.03 | 527.0±0.3 | 0.61±0.01 | BDL | 0.09±0.01 | BDL |  | 8.64±0.01 | 9.56±0.03 | 16.00±0.01 |  |  |  |
|  | 2018.07 | 27.6±0.0 | 0.8±0.0 | 7.12±0.02 | 486.0±0.2 | 0.70±0.02 | 0.13±0.01 | 0.10±0.01 | 0.03±0.00 |  | 25.44±0.05 | 8.84±0.02 | 13.60±0.04 |  | 5.1±0.4 | 6.2±0.2 |
|  | 2018.08 | 27.6±0.0 | 0.1±0.0 | 7.49±0.04 | 505.0±0.1 | 0.40±0.02 | 0.04±0.03 | BDL | BDL |  | 19.97±0.07 | 7.27±0.02 | 11.31±0.03 |  |  |  |
|  | 2018.09 | 24.2±0.0 | 0.5±0.0 | 7.21±0.01 | 348.0±0.6 | 0.55±0.01 | 0.08±0.01 | 0.04±0.01 | 0.05±0.01 |  | 0.31±0.02 | 12.29±0.01 | 15.89±0.04 |  |  |  |
|  | 2018.10 | 18.4±0.0 | 1.4±0.1 | 7.33±0.03 | 320.0±0.1 | 0.78±0.01 | 0.05±0.00 | 0.11±0.00 | 0.23±0.00 |  | 3.43±0.01 | 9.18±0.02 | 8.70±0.02 |  |  |  |
|  | 2018.11 | 15.0±0.0 | 0.9±0.0 | 7.24±0.03 | 508.0±0.1 | 0.75±0.01 | 0.06±0.00 | 0.18±0.02 | 0.29±0.01 |  | 2.18±0.03 | 10.67±0.02 | 17.61±0.03 |  |  |  |
|  | 2018.12 | 13.0±0.0 | 1.4±0.0 | 7.09±0.03 | 472.0±0.4 | 0.95±0.03 | 0.18±0.01 | 0.13±0.00 | 0.20±0.01 |  | 5.27±0.03 | 10.75±0.02 | 9.85±0.02 |  | 6.1±0.4 | 10.3±0.2 |
|  | 2019.01 | 10.8±0.0 | 3.1±0.0 | 7.29±0.02 | 480.0±0.2 | 0.69±0.01 | 0.14±0.01 | 0.06±0.01 | 0.16±0.00 |  | 1.50±0.02 | 13.10±0.02 | 15.41±0.03 |  |  |  |
|  | 2019.02 | 10.1±0.0 | 2.8±0.0 | 7.63±0.04 | 353.0±0.1 | 0.97±0.02 | 0.62±0.02 | 0.09±0.01 | 0.12±0.01 |  | 2.72±0.01 | 11.04±0.02 | 13.61±0.04 |  |  |  |
| W10 | 2018.03 | 15.1±0.0 | 7.3±0.0 | 7.17±0.06 | 165.2±0.2 | 4.85±0.02 | 2.06±0.01 | 0.09±0.02 | 2.69±0.02 |  | 13.49±0.04 | 10.94±0.03 | 10.25±0.04 |  |  |  |
|  | 2018.04 | 21.0±0.0 | 5.3±0.0 | 7.48±0.01 | 191.3±0.5 | 5.59±0.03 | 1.79±0.03 | 0.14±0.00 | 0.29±0.01 |  | 2.21±0.01 | 12.88±0.01 | 13.70±0.01 |  |  |  |
|  | 2018.05 | 25.3±0.0 | 6.0±0.0 | 7.43±0.04 | 169.3±0.7 | 2.21±0.01 | 1.09±0.04 | 0.08±0.00 | 0.09±0.01 |  | 6.21±0.03 | 10.51±0.02 | 10.90±0.03 |  |  |  |
|  | 2018.06 | 27.4±0.1 | 3.8±0.0 | 7.23±0.02 | 201.0±0.2 | 2.72±0.01 | 1.21±0.01 | 0.15±0.01 | 0.06±0.00 |  | 6.62±0.02 | 9.43±0.01 | 11.56±0.03 |  |  |  |
|  | 2018.07 | 29.6±0.0 | 3.8±0.0 | 7.55±0.03 | 235.0±0.2 | 2.26±0.01 | 1.11±0.00 | 0.09±0.01 | 0.17±0.00 |  | 10.52±0.05 | 11.39±0.03 | 15.75±0.04 |  | 6.2±0.4 | 2.5±0.2 |
|  | 2018.08 | 30.1±0.0 | 4.0±0.0 | 7.74±0.02 | 254.0±0.3 | 2.28±0.01 | 0.84±0.00 | 0.07±0.00 | 0.22±0.00 |  | 11.73±0.02 | 11.37±0.02 | 16.67±0.03 |  |  |  |
|  | 2018.09 | 24.5±0.0 | 3.5±0.0 | 7.43±0.01 | 190.4±0.4 | 2.59±0.03 | 0.98±0.01 | 0.06±0.00 | 0.32±0.02 |  | 1.55±0.01 | 9.75±0.03 | 18.40±0.05 |  |  |  |
|  | 2018.10 | 20.5±0.0 | 5.2±0.0 | 7.58±0.02 | 188.4±0.2 | 1.91±0.02 | 1.04±0.03 | 0.11±0.01 | 0.23±0.01 |  | 4.48±0.02 | 21.89±0.05 | 24.19±0.02 |  |  |  |
|  | 2018.11 | 16.2±0.0 | 5.6±0.0 | 7.60±0.04 | 249.0±0.2 | 2.15±0.02 | 1.26±0.00 | 0.07±0.00 | 0.25±0.02 |  | 3.41±0.01 | 26.24±0.04 | 28.65±0.03 |  |  |  |
|  | 2018.12 | 11.7±0.0 | 7.1±0.0 | 7.22±0.02 | 224.0±0.1 | 3.80±0.01 | 1.58±0.02 | 0.08±0.01 | 0.32±0.00 |  | 3.33±0.02 | 14.54±0.02 | 5.93±0.02 |  | 5.7±0.4 | 9.9±0.2 |
|  | 2019.01 | 10.8±0.0 | 8.6±0.0 | 7.62±0.05 | 136.4±0.5 | 2.26±0.01 | 0.48±0.00 | BDL | 0.29±0.01 |  | 1.55±0.02 | 9.54±0.02 | 8.81±0.01 |  |  |  |
|  | 2019.02 | 9.9±0.0 | 7.0±0.0 | 7.81±0.02 | 178.8±0.4 | 3.88±0.02 | 2.76±0.01 | 0.04±0.01 | 0.34±0.01 |  | 2.50±0.04 | 10.91±0.03 | 4.78±0.02 |  |  |  |

BDL: Below the detection limit.

Table 2 Concentrations of NO- 3, NO- 2, NH+ 4, N2O and values of nitrogen and oxygen isotopes of samples in the laboratory experiment.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| bottle | t | NO- 3 | NO- 2 | NH+ 4 | N2O | δ15N | δ18O |
| h | mgN·L-1 | | | cm3·m-3 | ‰ | |
| A | 0 | 0.77±0.00 | BDL | 0.13±0.01 | BDL | 4.6±0.4 | 10.0±0.2 |
|  | 4 | 0.73±0.02 | 0.01±0.00 | 0.15±0.00 | 0.52±0.02 | 5.7±0.4 | 10.5±0.2 |
|  | 8 | 0.61±0.01 | 0.03±0.00 | 0.15±0.00 | 2.55±0.02 | 6.8±0.4 | 10.0±0.2 |
|  | 12 | 0.55±0.00 | 0.02±0.00 | 0.19±0.00 | 15.20±0.02 | 5.6±0.4 | 9.9±0.2 |
|  | 16 | 0.47±0.01 | 0.05±0.01 | 0.19±0.00 | 24.46±0.02 | 6.9±0.4 | 10.9±0.2 |
|  | 20 | 0.32±0.00 | 0.07±0.00 | 0.15±0.00 | 3.28±0.02 | 6.6±0.4 | 9.5±0.2 |
|  | 24 | 0.24±0.01 | 0.05±0.00 | 0.09±0.01 | 6.31±0.02 | 7.1±0.4 | 13.5±0.2 |
|  | 28 | 0.23±0.01 | 0.06±0.00 | 0.14±0.01 | 32.77±0.02 | 7.3±0.4 | 10.0±0.2 |
|  | 32 | 0.19±0.01 | 0.03±0.01 | 0.14±0.00 | 24.51±0.02 | 7.7±0.4 | 9.6±0.2 |
|  | 36 | 0.17±0.00 | 0.02±0.00 | 0.16±0.01 | 25.23±0.02 | 8.0±0.4 | 11.1±0.2 |
|  |  |  |  |  |  |  |  |
| B | 0 | 0.79±0.02 | BDL | 0.17±0.01 | BDL |  |  |
|  | 4 | 0.74±0.00 | BDL | 0.14±0.00 | 0.23±0.02 |  |  |
|  | 8 | 0.62±0.01 | 0.02±0.00 | 0.16±0.00 | 1.20±0.02 |  |  |
|  | 12 | 0.52±0.01 | 0.03±0.00 | 0.15±0.01 | 3.88±0.02 |  |  |
|  | 16 | 0.36±0.01 | 0.08±0.00 | 0.15±0.00 | 6.62±0.02 |  |  |
|  | 20 | 0.28±0.01 | 0.05±0.01 | 0.18±0.00 | 8.99±0.02 |  |  |
|  | 24 | 0.25±0.00 | 0.05±0.00 | 0.12±0.01 | 18.21±0.02 |  |  |
|  | 28 | 0.22±0.00 | 0.02±0.00 | 0.13±0.01 | 3.58±0.02 |  |  |
|  | 32 | 0.21±0.01 | 0.03±0.00 | 0.15±0.00 | 23.98±0.02 |  |  |
|  | 36 | 0.16±0.01 | 0.02±0.00 | 0.14±0.00 | 4.79±0.02 |  |  |

BDL: Below the detection limit.