Supplement of

Enhanced bioavailability of dissolved organic matter (DOM) in human-disturbed streams in Alpine fluvial networks

Thibault Lambert et al.

Correspondence to: Thibault Lambert (thibault.lambert@unil.ch)

The copyright of individual parts of the supplement might differ from the article licence.
**Figure S1** – Example of time-course of DOC concentration during incubations. Symbols represent measurements (with standard deviation based on triplicates) and the line the first order exponential decay model providing the $k$ value. Results from the model are then used to calculate the size of the STRC and LTRC pools (see text for details).

**Figure S2** – Spectral loadings of the PARAFAC components identified in our study sites.
**Figure S3** – Evolution of the average molecular weight of DOM during incubations. Numbers refer to sampling site.
Figure S4 – Relationships between the relative proportion of C5 component and Strahler order in the Lake Geneva Basin.
### Table S1 – Dataset on biogeochemical data collected on tributaries of the Lake Geneva in November 2018 and March 2019.

| Site            | Date      | Chla (µg L⁻¹) | BR (mmolC m⁻³ d⁻¹) | DOC (mg L⁻¹) | $S_R$ | $F_{\text{Max}}$ - C¹ (R.U) | $F_{\text{Max}}$ - C² (R.U) | $F_{\text{Max}}$ - C³ (R.U) | $F_{\text{Max}}$ - C⁴ (R.U) | $F_{\text{Max}}$ - C⁵ (R.U) | $F_{\text{Max}}$ - C⁶ (R.U) | $F_{\text{Max}}$ - C⁷ (R.U) | $F_{\text{Max}}$ - C⁸ (R.U) | SRP (µg L⁻¹) | DIN (mg L⁻¹) |
|-----------------|-----------|---------------|--------------------|--------------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|-------------|
| 1 - La Combe    | 12/11/2018| 0.20          | 8.5                | 0.7           | 0.67 | 0.03            | 0.03            | 0.03            | 0.03            | 0.00            | 0.00            | 0.00            | 0.00            | 0.8            | 1.5          |
| 2 - Le Boiron   | 13/11/2018| 0.34          | 3.8                | 2.4           | 0.79 | 0.21            | 0.21            | 0.14            | 0.12            | 0.04            | 0.08            | 0.08            | 0.04            | 2.7            | 0.9          |
| 3 - Le Grand Curbit | 13/11/2018| 1.00          | 17.4               | 3.5           | 0.88 | 0.25            | 0.27            | 0.20            | 0.20            | 0.11            | 0.32            | 0.27            | 0.12            | 23.4           | 4.4          |
| 4 - La Venoge   | 13/11/2018| 4.12          | 21.3               | 3.5           | 0.86 | 0.27            | 0.25            | 0.23            | 0.20            | 0.11            | 0.32            | 0.27            | 0.12            | 23.4           | 4.4          |
| 5 - La Mèbre    | 13/11/2018| 5.83          | 31.6               | 4.2           | 0.95 | 0.32            | 0.28            | 0.24            | 0.18            | 0.07            | 0.42            | 0.39            | 0.33            | 28.3           | 1.3          |
| 6 - La Sorge    | 13/11/2018| 1.23          | 49.3               | 3.0           | 1.04 | 0.26            | 0.17            | 0.14            | 0.11            | 0.07            | 0.34            | 0.36            | 0.26            | 34.0           | 0.6          |
| 7 - La Dranse   | 14/11/2018| 2.46          | 2.6                | 0.9           | 0.75 | 0.05            | 0.05            | 0.04            | 0.04            | 0.02            | 0.04            | 0.04            | 0.02            | 0.5            | 0.7          |
| 8 - Le Rhône    | 14/11/2018| 0.75          | 15.0               | 0.9           | 0.77 | 0.04            | 0.04            | 0.04            | 0.04            | 0.02            | 0.04            | 0.04            | 0.04            | 1.4            | 0.8          |
| 9 - La Veveysye | 14/11/2018| 0.85          | 10.2               | 2.2           | 0.82 | 0.23            | 0.19            | 0.13            | 0.11            | 0.04            | 0.13            | 0.08            | 0.04            | 0.7            | 0.3          |
| 10 - La Paudèze| 14/11/2018| 1.37          | 29.5               | 5.9           | 0.90 | 0.31            | 0.43            | 0.43            | 0.35            | 0.27            | 0.60            | 0.57            | 0.27            | 16.1           | 1.3          |
| 11 - La Combe   | 05/03/2019| 1.36          | 4.4                | 1.8           | 0.69 | 0.07            | 0.06            | 0.05            | 0.05            | 0.02            | 0.05            | 0.04            | 0.03            | 0.9            | 1.6          |
| 12 - Le Boiron  | 07/03/2019| 2.95          | 17.2               | 3.7           | 0.74 | 0.32            | 0.28            | 0.19            | 0.16            | 0.05            | 0.12            | 0.09            | 0.03            | 12.7           | 4.0          |
| 13 - Le Grand Curbit | 07/03/2019| 3.43          | 16.3               | 4.1           | 0.80 | 0.35            | 0.28            | 0.19            | 0.17            | 0.06            | 0.16            | 0.15            | 0.07            | 15.4           | 2.7          |
| 14 - La Venoge  | 07/03/2019| 3.34          | 15.8               | 3.2           | 0.75 | 0.24            | 0.18            | 0.15            | 0.13            | 0.07            | 0.16            | 0.12            | 0.06            | 11.6           | 4.2          |
| 15 - La Mèbre   | 07/03/2019| 54.93         | 28.2               | 3.7           | 0.88 | 0.34            | 0.20            | 0.14            | 0.12            | 0.09            | 0.27            | 0.20            | 0.12            | 26.4           | 1.9          |
| 16 - La Sorge   | 07/03/2019| 13.28         | 22.4               | 2.7           | 0.91 | 0.21            | 0.11            | 0.08            | 0.06            | 0.20            | 0.15            | 0.12            | 12.9           | 1.1          |
| 17 - La Dranse  | 06/03/2019| 3.77          | 14.8               | 2.0           | 0.81 | 0.08            | 0.07            | 0.05            | 0.05            | 0.02            | 0.05            | 0.04            | 0.03            | 2.1            | 0.8          |
| 18 - Le Rhône   | 06/03/2019| 1.83          | 11.0               | 1.7           | 0.83 | 0.06            | 0.05            | 0.05            | 0.06            | 0.04            | 0.04            | 0.05            | 0.04            | 10.0           | 1.2          |
| 19 - La Veveysye| 06/03/2019| 2.01          | 10.5               | 3.2           | 0.79 | 0.28            | 0.23            | 0.15            | 0.13            | 0.05            | 0.09            | 0.05            | 0.05            | 2.1            | 0.6          |
| 20 - La Paudèze| 06/03/2019| 4.79          | 11.1               | 4.4           | 0.82 | 0.17            | 0.29            | 0.29            | 0.21            | 0.19            | 0.33            | 0.33            | 0.15            | 6.1            | 8.8          |
Table S2 – Results from degradation experiments including the total amount of DOC consumed (BDOC) and parameters derived from the first-order exponential decay model (see text for details).

| Site                  | Date       | BDOC (mg L$^{-1}$) | k (mgC d$^{-1}$) | STRC (mg L$^{-1}$) | LTRC (mg L$^{-1}$) |
|-----------------------|------------|--------------------|-----------------|-------------------|-------------------|
| 1 - La Combe          | 12/11/2018 | 0.188              | 0.071           | 0.004             | 0.184             |
| 2 - Le Boiron         | 13/11/2018 | 0.682              | 0.085           | 0.314             | 0.368             |
| 3 - Le Grand Curbit   | 13/11/2018 | 0.468              | 0.165           | 0.265             | 0.203             |
| 4 - La Venoge         | 13/11/2018 | 1.058              | 0.134           | 0.590             | 0.468             |
| 5 - La Mèbre          | 13/11/2018 | 1.563              | 0.241           | 1.173             | 0.390             |
| 6 - La Sorge          | 13/11/2018 | 1.041              | 0.260           | 0.781             | 0.260             |
| 7 - La Dranse         | 14/11/2018 | 0.208              | 0.115           | 0.105             | 0.103             |
| 8 - Le Rhône          | 14/11/2018 | 0.294              | 0.014           | 0.080             | 0.214             |
| 9 - La Veveyse        | 14/11/2018 | 0.217              | 0.156           | 0.126             | 0.090             |
| 10 - La Paudèze       | 14/11/2018 | 2.310              | 0.203           | 1.311             | 0.999             |
| 1 - La Combe          | 05/03/2019 | 0.615              | 0.019           | 0.149             | 0.466             |
| 2 - Le Boiron         | 07/03/2019 | 1.244              | 0.058           | 0.474             | 0.770             |
| 3 - Le Grand Curbit   | 07/03/2019 | 1.210              | 0.126           | 0.359             | 0.851             |
| 4 - La Venoge         | 07/03/2019 | 1.133              | 0.137           | 0.439             | 0.794             |
| 5 - La Mèbre          | 07/03/2019 | 1.649              | 0.154           | 0.604             | 1.045             |
| 6 - La Sorge          | 07/03/2019 | 1.269              | 0.100           | 0.615             | 0.654             |
| 7 - La Dranse         | 06/03/2019 | 1.169              | 0.075           | 0.489             | 0.679             |
| 8 - Le Rhône          | 06/03/2019 | 0.888              | 0.119           | 0.473             | 0.415             |
| 9 - La Veveyse        | 06/03/2019 | 0.892              | 0.014           | 0.191             | 0.701             |
| 10 - La Paudèze       | 06/03/2019 | 1.581              | 0.146           | 0.879             | 0.702             |