Supplementary Information to

Seasonally variable interactions between dissolved organic matter and mineral particles in an agricultural river

Marloes Groeneveld*, Dolly Kothawala and Lars J. Tranvik

Department of Ecology and Genetics/Limnology, Uppsala University, Uppsala, Sweden
*Corresponding author: marloes.groeneveld@ebc.uu.se, ORCiD: 0000-0003-4505-4224

Fig. S1 Long-term monitoring data for a) turbidity (N=109), b) TOC (N=313), c) absorbance at 420 nm (N=654), d) specific absorbance at 420 nm (N=313) based on TOC, obtained between 1965 and 2018 at Fyrisån Klastorp (Miljödata-MVM 2020). Seasonal trends are visualised by generalised additive models (blue lines).

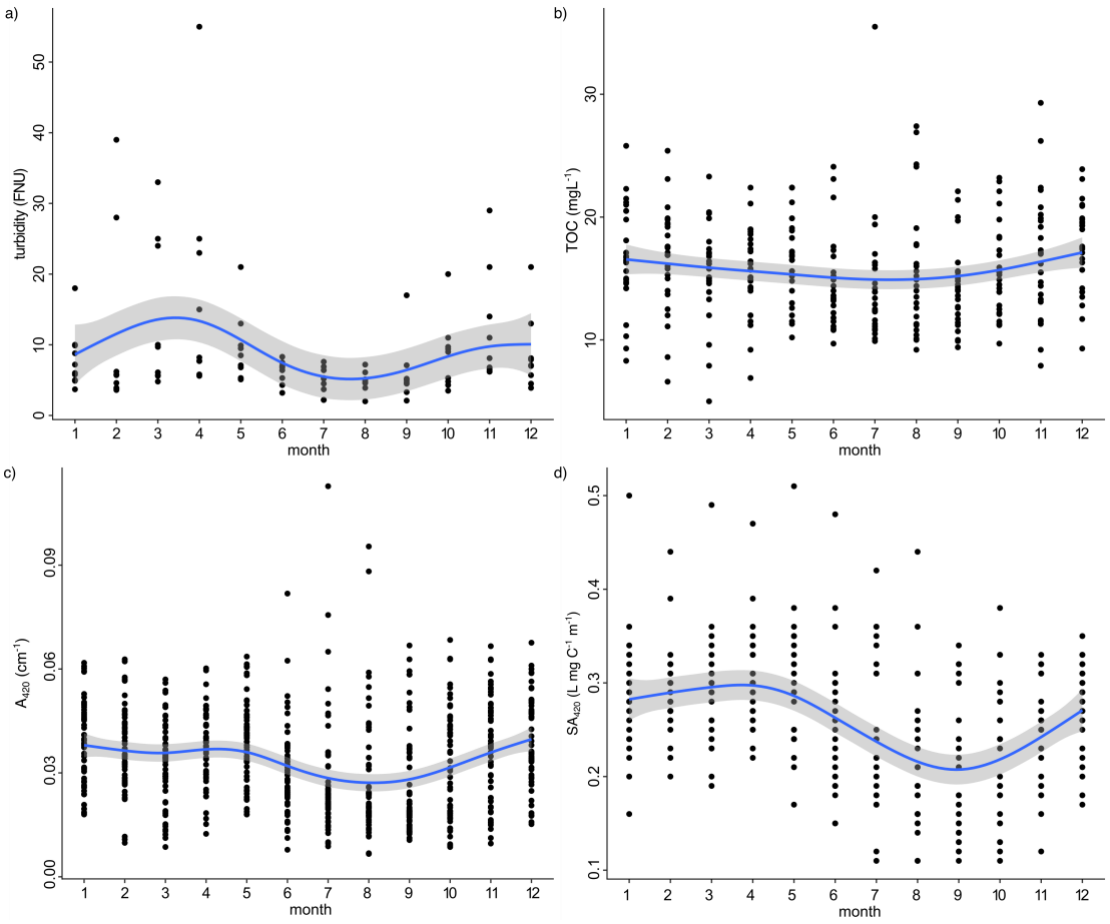
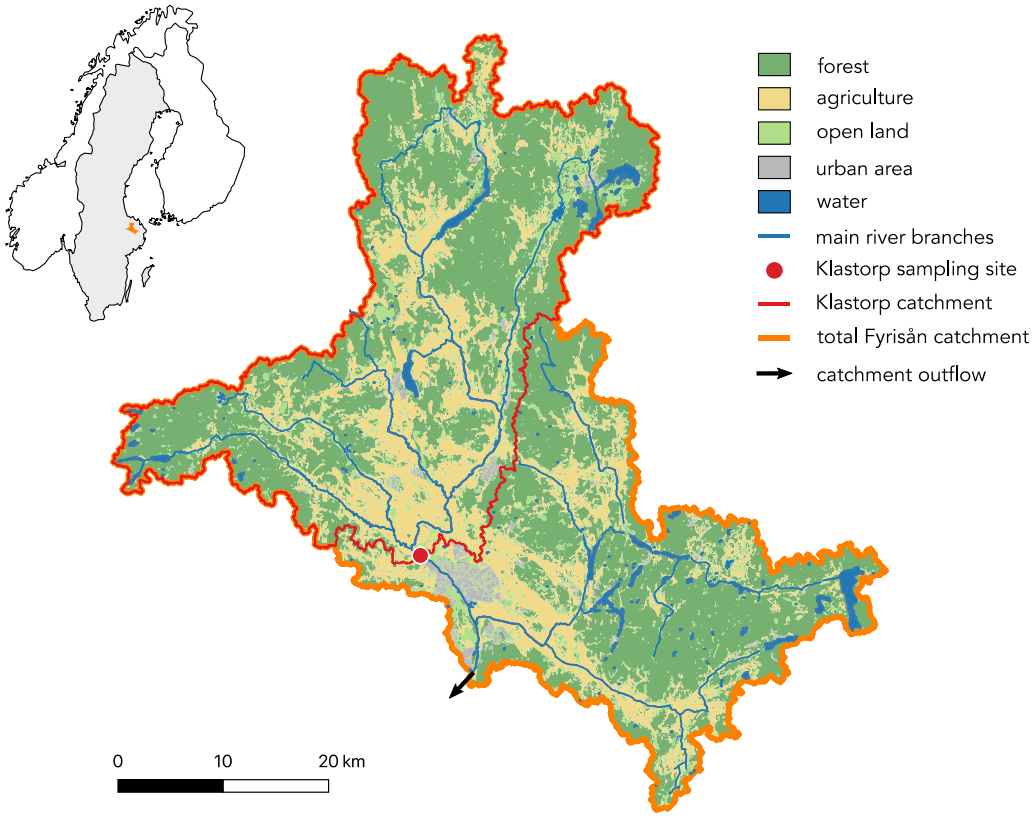


Fig. S2 Map of the Fyrisån catchment, including the subcatchment with sampling site at Klastorp as the outflow. The insert shows the location of the catchment (orange) in Sweden (grey).



Supplementary text: The effect of sample storage

Samples were taken monthly but the adsorption experiments were performed once every three months, meaning that out of three consecutive samples, the first sample was stored for two months, the second sample was stored for one month, and the third sample did not experience any storage. To test the effect of storage on DOC quantity and DOM quality, measured one sample (F11, sampled in February 2018) twice: immediately after sampling and after two months of storage at 4°C in the dark. For the DOC, we measured 20.5 mgL^{-1} immediately after sampling and 20.8 mgL^{-1} after two months of storage. This difference is not significant (paired t-test on three replicate measurements) and can be due to small differences in the calibration curves made on each of the respective measurement days. A few optical parameters were analysed in the same way, summarized in the table below. For reference, the difference in the parameters before and after the adsorption treatment are also included. From this, we conclude that storage did not significantly impact DOC and DOM quality. Differences in the measured parameters after sampling and storage were approximately an order of magnitude smaller than the treatment effect on the parameters.

Table S1 Assessment of the storage effect

Parameter	After sampling	After storage	Paired t-test	Storage difference	Adsorption difference
DOC (mgL^{-1})	20.5 ± 0.9	20.8 ± 1.2	p = 0.74	0.3	8.3
FI	1.3482 ± 0.0014	1.3646 ± 0.0078	p = 0.05	0.0164	0.1065
HIX	16.0065 ± 0.1837	15.6713 ± 0.0042	p = 0.70	0.3351	4.7969
FRESH	0.5441 ± 0.0016	0.5493 ± 0.0042	p = 0.23	0.0051	0.0878
A250/365	4.8666 ± 0.0008	4.7978 ± 0.0628	p = 0.20	0.0688	1.3286

Table S2 PLS variables and their influence on the projection (VIP) with corresponding standard error.

Variable	**Abbreviation**	**VIP**	**SE**
% DOC adsorbed	ΔDOC%	-	-
weighted sum of cations	cations	1.71	0.48
DOC concentration	DOC	1.07	0.55
temperature	T°C	1.07	0.38
specific UV absorbance at 254 nm	$SUVA_{254}$	1.07	0.47
weighted sum of anions	anions	0.99	0.78
fluorescence index	FI	0.95	0.23
absorbance integrated between 250-600 nm	A_{tot}	0.94	0.34
absorbance at 420 nm	A_{420}	0.94	0.30
pH	pH	0.94	0.71
emission wavelength of the maximum fluorescence intensity in peak A area	peakA_WL	0.93	0.31
mean discharge in 30 days prior to sampling	Q_{30}	0.91	0.79
250/365 absorbance ratio	$R_{250.365}$	0.90	0.25
spectral slope	S_R	0.90	0.22
conductivity	Conductivity	0.89	1.08
freshness index	FRESH	0.89	0.21
humification index	HIX	0.89	0.34
maximum fluorescence intensity in peak A area	peakA_I	0.89	0.28
POC/PN ratio	CN	0.80	0.50