

Supplement of

Seasonal and spatial variations of dissolved organic matter biodegradation along the aquatic continuum in the southern taiga bog complex, Western Siberia

Table S1. Primary data on chemistry of water during experiments (average of 3 replicates ± 1 SD), together with microbial counts.

Water sampling date	Location	Time, day	TBC, *10 ⁶ cell/ml	pH	ЭЛ-ТЬ (μS*cm ⁻¹)	DOC, mg/L	SUVA ₂₅₄	E 365/470	E 254/436	E 250/365	E 280/350
3rd August 2020	Open fen	0	-	3.76	44.1	41.7±0.04	3.56±0.1	6.9	24.9	6.3	3.21
		2	-	-	-	40.4±0.7	3.56±0.1	-	-	-	-
		7	-	-	-	43.2±0.5	3.4±0.1	-	-	-	-
		14	-	-	-	43.6±0.28	3.39±0	-	-	-	-
		28	-	-	-	43.5±0.2	3.35±0.1	-	-	-	-
	Forest	0	-	4.37	38.6	78.7±3.62	4.8±0.2	4.0	11.6	4.2	2.55
		2	-	-	-	74.9±0.2	4.7±0	-	-	-	-
		7	-	-	-	77.6±0.4	4.5±0.1	-	-	-	-
		14	-	-	-	78±1	4.5±0.1	-	-	-	-
		28	-	-	-	79.9±0.4	4.5±0	-	-	-	-
	Kluch River	0	-	6.1	94.8	83.6±1.8	4.8±0.1	4.6	13.4	4.6	2.67
		2	-	-	-	74.4±1.6	4.5±0.1	-	-	-	-
		7	-	-	-	75.5±0.6	4.4±0.1	-	-	-	-
		14	-	-	-	76.2±1	4.3±0.1	-	-	-	-
		28	-	-	-	75.5±0.3	4.2±0.3	-	-	-	-
	Bakchar River	0	-	7.54	306	53.6±1.2	4.2±0.2	5.5	17.6	5.4	2.93
		2	-	-	-	50.4±0.2	4.2±0	-	-	-	-
		7	-	-	-	51.2±1.1	4.1±0.1	-	-	-	-
		14	-	-	-	51.5±0.2	4±0.1	-	-	-	-
		28	-	-	-	51.3±1	4±0.1	-	-	-	-
15th October 2020	Open fen	0	1.70E+07	3.94	56.9	56.6±0.1	2.45±0.2	7.50	29.41	6.83	3.37
		2	-	5.3	39.8	54.5±3	2.8±0	5.3	20.6	6.1	3.2
		7	-	5.2	37.6	51.5±1.6	2.9±0.1	5.6	22.1	6.3	3.2
		14	-	5.2	40.6	51±0.6	3±0.1	5.2	20.9	6.1	3.2
		28	-	5.1	41.0	52.5±1.5	3±0	6.2	23.5	6.2	3.2
	Forest	0	2.65E+07	4.62	44.5	64.5±0.1	4.02±0.1	5.38	16.26	4.81	2.74
		2	-	5.3	36.7	62.7±2.4	4.2±0.4	4.9	14.0	4.5	2.6
		7	-	5.6	39.8	58.7±2	4.7±0.1	4.8	13.7	4.5	2.6
		14	-	5.5	39.2	58.1±0.3	4.6±0.06	4.9	13.9	4.4	2.6
		28	-	5.64	38.63	58±0.85	4.82±0.1	4.47	12.81	4.28	2.58
	Tall ryam	0	1.19E+07	4.48	43.5	64.4±0.1	3.73±0.1	5.54	16.54	4.85	2.76
		2	-	4.7	37.9	60.8±3.6	4±0.2	4.8	14.2	4.6	2.7
		7	-	4.70	38.27	57.8±0.46	4.22±0.2	4.91	14.66	4.61	2.69
		14	-	5.0	38.9	57.5±0.2	4.1±0.1	5.0	14.6	4.6	2.7
		28	-	4.9	40.1	58.3±0.8	4.3±0.1	5.1	14.8	4.5	2.7
	Kluch River	0	5.50E+06	7.08	335	43.9±0.1	3.73±0.1	6.53	22.34	6.04	3.17
		2	-	8.4	329.0	43±0.6	3.6±0.1	6.4	21.1	5.8	3.1
		7	-	8.4	330.5	43.2±0.6	3.8±0.1	5.8	19.2	5.6	3.0
		14	-	8.3	333.5	43.4±0.6	3.7±0.1	6.7	20.8	5.8	3.1
		28	-	8.4	341.0	43±0.8	3.8±0.1	6.1	20.2	5.7	3.1
	Bakchar River	0	4.38E+06	7.8	580.0	23.2±1.5	3.4±0.1	8.6	29.7	7.0	3.6
		2	-	8.7	579.3	21.4±0.8	3.3±0.2	6.9	24.1	6.3	3.4
		7	-	8.6	582.0	20.4±0.6	3.4±0	6.4	23.5	6.3	3.5
		14	-	8.6	587.7	21.9±1	3.2±0.2	8.4	26.2	6.5	3.5
		28	-	8.6	595.7	21.1±0.5	3.4±0	6.5	23.9	6.2	3.5
20th May 2020	Open fen	0	1.6E+06	5.7	49.3	45.4±0.1	3.4±0	5.4	18.8	5.7	3.1
		2	-	6.0	48.4	44.3±0.1	3.4±0	4.8	17.8	5.7	3.1
		7	-	6.1	48.9	35.3±0.1	4.2±0	5.5	18.6	5.6	3.0

		14	-	6.8	50.6	33.7±0.1	4.4±0	5.8	19.8	5.7	3.1
		21	-	6.9	61.3	41.7±0.1	8±0	4.0	11.5	4.3	2.6
		28	-	6.8	43.3	42.3±0.1	3.5±0	4.7	16.2	5.4	3.0
	Forest	0	1.3E+06	4.1	37.2	58.7±1.2	4.4±0.2	5.6	15.7	4.6	2.7
		2	-	5.8	35.8	60.1±2.3	4.4±0.1	4.8	13.4	4.5	2.6
		7	-	6.0	38.9	50.7±0.4	6±0	5.1	14.0	4.5	2.6
		14	-	5.4	35.5	50±3.1	5.3±0.4	6.0	15.6	4.6	2.6
		21	-	6.7	38.1	59.5±0.7	4.8±0.1	4.7	12.7	4.3	2.5
		28	-	7.0	40.1	59.7±0.6	4.7±0	4.7	13.0	4.3	2.6
		0	-	3.9	44.5	59.3±0.1	4.7±0.1	5.7	15.8	4.7	2.7
	Tall ryam	2	-	5.2	37.0	62.2±0.1	4.4±0.1	5.6	15.6	4.7	2.7
		7	-	4.7	37.9	57.4±0.1	5.7±0.1	5.0	14.1	4.6	2.7
		14	-	4.8	37.4	55.9±0.1	5±0.1	5.9	15.6	4.6	2.7
		21	-	5.4	38.6	59.6±0.1	4.8±0.1	5.0	13.7	4.4	2.6
		28	-	5.1	38.2	62.9±0.1	4.5±0.1	5.0	14.2	4.5	2.7
		0	1.1E+06	7.6	82.5	66.4±0.1	4.7±0.1	4.9	13.6	4.6	2.7
	Kluch River	2	-	6.2	73.3	61.1±0.1	5.3±0.1	5.1	13.8	4.6	2.7
		7	-	6.8	82.3	58.2±0.1	5.3±0.1	4.9	13.5	4.5	2.6
		14	-	8.0	81.4	53.4±0.1	6±0.1	5.0	13.7	4.6	2.7
		21	-	7.6	82.2	61±0.1	4±0	5.1	15.9	5.0	2.8
		28	-	7.7	87.3	64.3±0.1	5.3±0	4.4	12.5	4.5	2.6
		0	1.9E+06	6.4	226	50.6±0.6	4.4±0.1	5.1	15.5	5.0	2.9
	Bakchar River	2	-	7.4	238	50±0.2	4.2±0.1	5.2	15.2	5.0	2.8
		7	-	6.3	235.5	45±1	4.72±0.1	4.8	14.6	5.0	2.8
		14	-	8.2	240.5	38.5±0	4.74±0.1	6.1	16.9	5.1	2.9
		21	-	7.9	246	46.4±0.9	4.8±0.1	4.8	14.7	5.0	2.8
		28	-	7.9	246.5	47.4±0.2	4.8±0.1	5.1	14.8	4.9	2.8

Table S2. Statistical differences in physico-chemical parameters and UV-visible absorbance data between the seasons for each water sampling location. The *p-values* are determined by Kruskal–Wallis test (1st line) and Mann–Whitney U test (2nd line) for each parameter. Note that in August only DOC, SUVA₂₅₄ and normalized molecular weight (WAMW) are present. Red indicates significant *p-values* (i.e. < 0.05).

Parameter	Open fen			Forest			Tall ryam	Kluch River			Bakchar River		
	May – Aug	May– Oct.	Aug. – Oct.	May – Aug	May– Oct.	Aug. – Oct.	May– Oct.	May – Aug	May– Oct.	Aug. – Oct.	May – Aug	May–Oct.	Aug. – Oct.
Cond ($\mu\text{S cm}^{-1}$)		p=0.003			p=0.51		p=0.53		p=0.0001			p=0.00001	
pH		p=0.03			p=0.13		p=0.31		p=0.0001			p=0.00006	
DOC (mg L ⁻¹)	H=14.9; p=0.001			H=11.4; p=0.003			p=0.015	H=31,7; p=0.00001			H=34,8; p=0.00001		
	p=0.35	p=0.005	p=0.001	p=0.0001	p=0.49	p=0.0001		p=0.00001	p=0.001	p=0.00001	p=0.00001	p=0.00001	p=0.00001
SUVA ₂₅₄ (L mgC ⁻¹ m ⁻¹)	H=14.8; p=0.001			H=3.45; p=0.18			p=0.007	H=24,5; p=0.00001			H=34,9; p=0.00001		
	p=0.85	p=0.005	p=0.001					p=0.0003	p=0.001	p=0.00001	p=0.00001	p=0.00001	p=0.00001
TBC (cell mL ⁻¹)		p=0.007			p=0.001		p=0.001		p=0.008			p=0.01	
E250:E365		p=0.005			p=0.40		p=0.41		p=0.0001			p=0.00001	
E254:E436		p=0.002			p=0.84		p=0.92		p=0.0001			p=0.00001	
WAMW, Da	H=17.6; p=0.0002			H=17.6; p=0.0002			p=0.008	H=24; p=0.00001			H=31,6; p=0.00001		
	p=0.004	p=0.005	p=0.001	p=0.002	p=0.20	p=0.0001		p=0.03	p=0.0001	p=0.00001	p=0.005	p=0.00001	p=0.00001
S ₂₇₅₋₂₉₅		p=0.81			p=0.011		p=0.007		p=0.0001			p=0.00001	
S ₃₅₀₋₄₀₀		p=0.005			p=0.93		p=0.92		p=0.001			p=0.0001	
S _R		p=0.005			p=0.01		p=0.008		p=0.0001			p=0.00001	

Table S3. The DOC rates removal at 28 day of incubation (R_{DOC28}), *p-values* and R^2 coefficients along the aquatic continuum by season on the total period of incubation. Red indicates significant *p-values* (i.e. < 0.05).

Season	Location	R_{DOC28} (mg C L ⁻¹ d ⁻¹)	<i>p-value</i>	R^2
May	Open fen	0.26 ± 0.03	0.043	0.43
	Forest	0.25 ± 0.1	0.003	0.59
	Tall ryam	0.138 ± 0.01	0.69	0.016
	Kluch River	0.13 ± 0.01	0.81	0.01
	Bakchar River	0.09 ± 0.05	0.44	0.06
August	Open fen	0.22 ± 0.05	0.003	0.76
	Forest	0.15 ± 0.08	0.014	0.41
	Kluch River	0.05 ± 0.004	0.044	0.35
	Bakchar River	0.12 ± 0.05	0.001	0.59
October	Open fen	0.11 ± 0.08	0.043	0.49
	Forest	0.21 ± 0.02	0.002	0.55
	Tall ryam	0.1 ± 0.01	0.16	0.19
	Kluch River	0.01 ± 0.005	0.65	0.021
	Bakchar River	0.01 ± 0.002	0.7	0.01

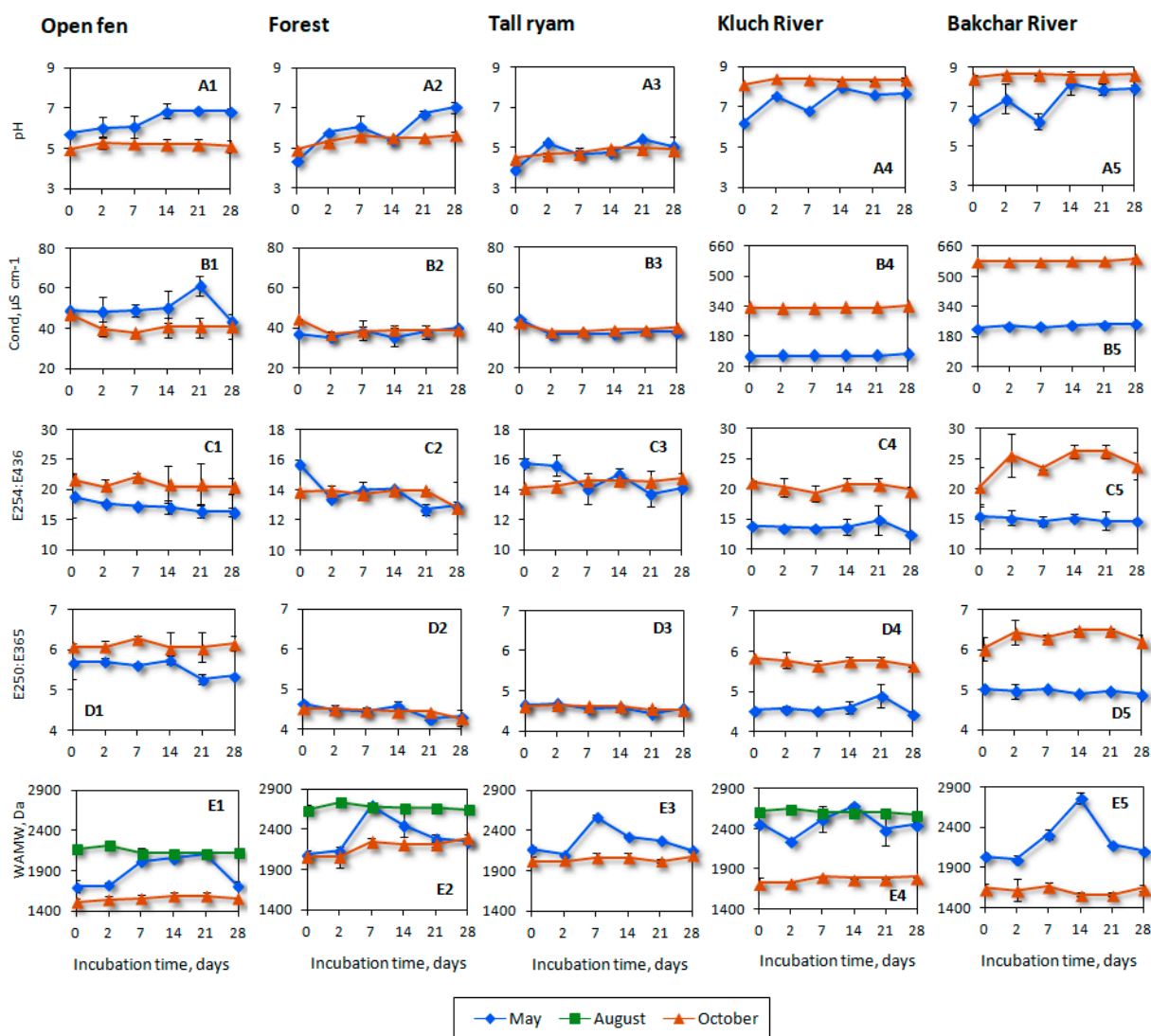


Figure S1. Evolution of pH (A), specific conductivity (B), E254:E436 (C), E250:E365 (D) ratios, and WAMW (E) along the aquatic continuum by season during incubation time. The error bars are ± 1 SD of the triplicates unless within the symbol size.

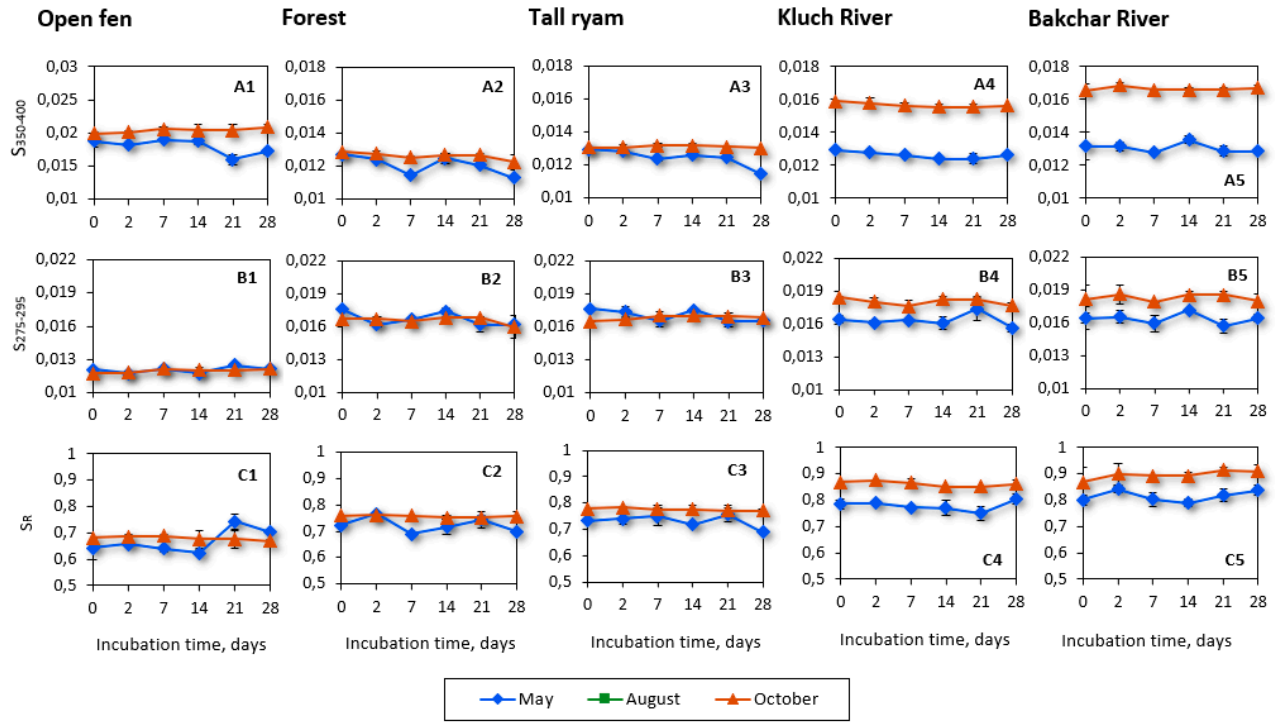


Figure S2. Evolution of spectral ratios $S_{275-295}$ (A) and $S_{350-400}$ (B) as well as the slope ratio S_R , equaled to $S_{275-295}/S_{350-400}$ (C) along the aquatic continuum by season during incubation time. The error bars are ± 1 SD of the triplicates unless within the symbol size.