Table S1. Results of the two-way analysis of variance of decay *k* values, regardless of the litter type, with interacting effects between pool and depth of incubation, and of the Tukey HSD posthoc test performed to differentiate depths of incubation. Asterisks show relationships with p-values (P) < 0.05. Depths with different level letters are statistically different at a significance level of 5% ($P < 0.05$).

Factor	df	Sum of squares	Mean square	F	*P*		Depths	*P*
Depth	2	0.020	0.010	8.936	0.002*		Surface-Bottom	0.002*
Pool	5	0.005	0.001	0.864	0.524		Surface-Sediments	0.020*
Depth:Pool	10	0.004	0.000	0.320	0.965		Bottom-Sediments	0.544
Residuals	18	0.020	0.001					
							Depth	Level
							Surface	A
							Bottom	B
							Sediments	B

Table S2. Results of the analysis of variance and of the Tukey HSD posthoc test of *Typha latifolia* decay *k* values in relation to depth of incubation. Asterisks show relationships with p-values (P) < 0.05. Depths with different level letters are statistically different at a significance level of 5% ($P < 0.05$).

Factor	df	Sum of squares	Mean square	F	*P*		Depths	*P*
Depth	2	0.317	0.106	78.28	<0.001*		Surface-Bottom	0.011*
Residuals	16	0.022	0.001				Surface-Sediments	0.005*
							Bottom-Sediments	0.979
							Depth	Level
							Surface	A
							Bottom	B
							Sediments	B

Table S3. Results of the analysis of variance and of the Tukey HSD posthoc test of *Sphagnum capillifolium* decay *k* values in relation to depth of incubation. Depths with different level letters are statistically different at a significance level of 5% ($P < 0.05$).

Factor	df	Sum of squares	Mean square	F	*P*		Depths	*P*
Depth	2	0.003	0.001	2.471	0.1		Surface-Bottom	-
Residuals	16	0.006	0.001				Surface-Sediments	-
							Bottom-Sediments	-
							Depth	Level
							Surface	A
							Bottom	A
							Sediments	A

Table S4. Results of the two-way analysis of variance of decay *k* values with interacting effects between litter species and depth of incubation, and of the Tukey HSD posthoc test performed to differentiate depths of incubation. Asterisks show relationships with p-values (P) < 0.05. Systems with different level letters are statistically different at a significance level of 5% ($P < 0.05$).

Factor	df	Sum of squares	Mean square	F	*P*		Depths	*P*
Species	1	0.006	0.005	11.779	0.002*		Surface-Bottom	<0.001*
Depth	2	0.020	0.010	20.804	<0.001*		Surface-Sediments	<0.001*
Species:Depth	2	0.009	0.004	8.8114	0.001*		Bottom-Sediments	0.248
Residuals	30	0.015	0.000					
							Depth	Level
							Surface	A
							Bottom	B
							Sediments	B

Table S5. Results of the generalized linear models (GLMs) with gamma distribution of the decay *k* values in relation to depth of incubation and final litter chemistry for both *Typha latifolia* and *Sphagnum capillifolium* after 27 months of incubation in the pools of the Grande plée Bleue peatland. Asterisks show relationships with p-values (P) < 0.05.

	Typha latifolia					*Sphagnum capillifolium*			
Coefficients	Estimate	Std. error	t	*P*		Estimate	Std. error	t	*P*
(Intercept)	0.127	0.125	10.169	<0.001*		0.079	0.008	9.522	<0.001*
Depth	-0.001	0.001	-4.722	<0.001*		-0.001	0.001	-1.987	0.064
(Intercept)	0.216	0.026	8.251	<0.001*		0.110	0.030	3.683	0.002*
C:N	-0.002	0.001	-5.623	<0.001*		-0.001	0.001	-1.480	0.158
(Intercept)	0.174	0.041	4.231	<0.001*		-0.107	-0.030	3.557	0.003*
C:P	-0.001	-0.001	-2.218	0.041*		-0.001	0.001	-1.354	0.195
(Intercept)	-0.016	0.034	-0.474	0.642		0.064	0.043	1.494	0.155
N:P	0.003	0.001	2.928	0.001*		0.001	0.001	0.080	0.938
(Intercept)	-2.396	1.071	-2.237	0.040*		0.414	0.629	0.659	0.519
$\delta^{13}C$	-0.093	0.040	-2.316	0.034*		0.012	0.023	0.552	0.589
(Intercept)	0.107	0.013	8.422	<0.001*		0.107	0.034	3.176	0.006*
$\delta^{15}N$	0.013	0.006	2.239	0.040*		0.005	0.004	1.196	0.249
(Intercept)	-0.225	0.224	-1.006	0.329		0.155	0.130	1.188	0.252
1420:1090	0.589	0.419	1.407	0.179		-0.203	0.303	-0.670	0.513
(Intercept)	-0.217	0.095	-2.290	0.036*		0.026	0.087	0.304	0.765
1510:1090	0.725	0.231	3.141	0.006*		0.168	0.352	0.476	0.640
(Intercept)	-0.232	0.092	-2.518	0.023*		0.063	0.093	0.681	0.506
1630:1090	0.529	0.156	3.389	0.003*		0.009	0.178	0.049	0.962
(Intercept)	-0.202	0.206	-0.979	0.342		0.191	0.126	1.524	0.147
1720:1090	0.525	0.372	1.413	0.177		-0.262	0.264	-0.990	0.337

Table S6. Results of the generalized linear models (GLMs) with gamma distribution of the percentage of litter mass remaining at the surface (upper table) and the bottom (bottom table) of the pools with water chemistry measured at each retrieving time. Asterisks show relationships with p-values (P) < 0.05

Pool surface	*Typha latifolia*					*Sphagnum capillifolium*			
Coefficients	Estimate	Std. error	t	*P*		Estimate	Std. error	t	*P*
(Intercept)	0.931	0.784	1.188	0.249		0.945	0.550	1.719	0.101
pH	-0.078	0.150	-0.520	0.609		-0.067	0.107	-0.626	0.539
DOC	0.015	0.020	0.763	0.454		0.013	0.014	0.922	0.367
TN	0.035	0.124	0.284	0.780		0.103	0.091	1.132	0.271
TP	0.001	0.001	0.337	0.740		0.001	0.001	0.509	0.616
NO_3	0.001	0.005	0.670	0.511		-0.001	0.004	-0.082	0.936
NH_4	-0.001	0.001	-0.474	0.641		-0.001	0.001	-1.607	0.124
PO_4	-0.013	0.005	-2.345	0.030*		-0.008	0.004	-2.131	0.045*
A_{254}	-0.421	0.490	-0.858	0.401		-0.380	0.352	-1.079	0.293
SUVA	-0.061	0.120	0.516	0.612		0.061	0.087	0.708	0.487

Pool bottom	*Typha latifolia*					*Sphagnum capillifolium*			
Coefficients	Estimate	Std. error	t	*P*		Estimate	Std. error	t	*P*
(Intercept)	0.921	0.389	2.371	0.028*		0.701	0.405	1.733	0.098
pH	-0.071	0.075	-0.945	0.356		0.032	0.079	0.406	0.698
DOC	0.015	0.010	1.530	0.142		0.006	0.010	0.614	0.546
TN	0.007	0.063	0.104	0.918		-0.090	0.067	-1.346	0.193
TP	0.001	0.001	0.732	0.472		0.001	0.001	0.600	0.555
NO_3	0.002	0.003	0.630	0.536		0.003	0.003	1.274	0.217
NH_4	-0.001	0.001	-0.590	0.562		0.001	0.001	0.620	0.542
PO_4	-0.004	0.003	-1.547	0.138		-0.002	0.003	-0.496	0.626
A_{254}	-0.440	0.239	-1.842	0.080		-0.158	0.255	-0.620	0.542
SUVA	-0.089	0.059	1.503	0.149		0.034	0.063	0.546	0.591

Figure S1. Changes in *Sphagnum capillifolium* (blue) and *Typha latifolia* (orange) chemistry after 27 months in relation to position of incubation in the pools (surface, at the bottom, and in the sediments, all pools together) and pool depth category (<1 m, ~ 1 m, and > 1.5 m, regardless of depth of incubation). Boxes show the median and the 25th and 75th percentiles of the distributions, and whiskers show the 10th and 90th percentiles. Colored dots on the Y-axes of the graphs show the initial chemistry of the litter.