

Supplementary Table 1. Data used to construct geochemical profiles of porewater, solid-phase compounds, and dissolved gases in Lake Joux sediments for Figure 2 panels A to M.

Average depth (cm)	PO ₄ ³⁻ (μM)	NO ₃ ⁻ (μM)	H ₂ S (μM)	SO ₄ ²⁻ (μM)	N (%)	P (mg kg ⁻¹)	AVS (μg kg ⁻¹)	CRS (μg kg ⁻¹)	DIC (mM)	δ ¹³ C _{DIC} (‰)	δ ¹³ C _{org} (‰)	TOC (%)	TIC (%)	C/N	CH ₄ (μM)	δ ¹³ CH ₄ (‰)	δ _{org-CH₄} (‰)
0.50	0.62	27.07	4.08	4.42	0.75	1229.34	139.62	334.71	2.78	-12.18	-18.31	16.52	12.42	22.00	253.03	-82.06	69.4
4.50	0.89	27.88	8.16	2.33	0.65	1445.48	329.03	510.58	3.27	-10.75	-16.72	15.70	12.94	24.31	345.03	-81.97	71.1
7.50	0.73	17.93	12.24	0.47	0.74	1295.17	400.37	364.92	3.40	-8.02	-14.76	15.59	25.92	20.95	812.62	-84.25	75.9
10.50	0.74	4.96	4.08	0.74	0.35	999.67	418.40	429.68	3.60	-5.25	-10.76	7.30	32.87	21.05	798.00	-83.97	79.9
13.50	0.35	2.28	2.04	0.65	0.39	859.18	338.78	322.41	3.70	-4.05	-11.92	10.50	36.90	26.92	807.31	-83.70	78.3
16.50	0.20	0.00	2.04	0.60	0.32	1027.04	213.39	353.98	4.02	-3.07	-13.57	6.87	39.53	21.68	927.00	-82.79	75.5
19.50	0.00	0.00	4.08	0.35	0.21	2612.27	0.00	157.99	4.23	-0.50	-14.11	8.14	34.28	38.75	1129.39	-83.62	75.9
22.50	0.13	0.00	4.08	0.58	0.23	1899.51	0.00	81.66	3.97	0.10	-18.10	8.22	33.10	35.75	1111.00	-83.59	71.5
25.50	0.00	0.00	6.12	0.56	0.28	1936.08	0.00	42.00	3.71	-1.33	-19.95	9.86	19.90	35.65	1410.16	-83.99	69.9
28.50	0.15	0.00	2.04	0.44	0.32	1431.63	0.00	124.83	4.98	0.44	-18.22	11.01	16.76	34.04	1487.00	-84.33	72.2
31.50	0.15	0.00	8.16	0.45	0.38	1603.06	0.00	82.76	5.91	-10.77	-20.14	15.52	11.76	40.49	1654.57	-83.90	69.6
34.50	0.15	0.00	4.08	3.96	0.97	1315.55	111.59	100.98	2.83	-6.05	-16.68	13.96	19.12	14.45	1723.00	-83.86	73.3
37.50	0.12	0.00	4.08	1.01	0.90	1961.04	141.59	52.72	3.52	-4.95	-24.23	13.30	23.61	14.77	1730.21	-83.26	64.4
40.50	0.12	0.00	14.28	0.52	0.67	2283.19	205.33	102.94	3.68	-3.10	-26.50	13.47	25.43	20.20	1756.00	-83.46	62.1
43.50	0.14	1.00	6.12	0.51	0.63	2193.88	214.76	178.76	4.33	-3.62	-28.22	11.32	25.71	17.94	1760.32	-83.23	60.0

Supplementary Table 2. Data used to construct geochemical profiles of porewater, solid-phase compounds, and dissolved gases in Lake Joux sediments for Figure 2 panel N.

1		2		3		4		5		6		7	
Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM	Depth (cm)	O ₂ μM
-0.28	223.83	-0.30	211.59	-0.28	310.15	-0.30	256.90	-0.30	285.12	-0.30	248.88	-0.30	294.01
-0.26	240.42	-0.25	226.74	-0.23	310.05	-0.25	287.28	-0.28	278.81	-0.28	247.20	-0.28	297.23
-0.24	243.66	-0.20	242.15	-0.18	308.52	-0.20	273.05	-0.25	252.27	-0.25	244.91	-0.25	297.00
-0.22	242.58	-0.15	245.68	-0.13	297.39	-0.15	221.05	-0.23	235.40	-0.23	243.75	-0.23	295.86
-0.20	240.82	-0.13	235.24	-0.10	281.51	-0.10	222.66	-0.20	234.35	-0.20	244.58	-0.20	294.78
-0.18	239.05	-0.10	221.43	-0.08	259.85	-0.05	201.02	-0.18	240.73	-0.18	247.60	-0.18	293.95
-0.15	238.31	-0.08	202.40	-0.05	233.39	-0.03	188.97	-0.15	245.70	-0.15	252.06	-0.15	293.13
-0.13	236.77	-0.05	179.19	-0.03	201.16	0.00	157.27	-0.13	252.98	-0.13	256.43	-0.13	292.90
-0.10	232.23	-0.03	153.76	0.00	163.34	0.03	136.82	-0.10	259.70	-0.10	256.84	-0.10	289.65
-0.08	223.94	0.00	129.38	0.03	121.32	0.05	112.96	-0.08	259.99	-0.08	251.03	-0.08	282.55
-0.05	209.83	0.03	114.24	0.05	79.29	0.08	100.25	-0.05	250.86	-0.05	235.30	-0.05	269.44
-0.03	189.74	0.05	100.63	0.08	52.49	0.10	88.69	-0.03	231.46	-0.03	211.40	-0.03	249.35
0.00	161.92	0.07	83.63	0.10	26.09	0.13	78.01	0.00	202.24	0.00	181.65	0.00	228.56
0.03	129.79	0.09	73.76	0.13	3.99	0.15	60.45	0.03	169.17	0.03	158.79	0.03	210.74
0.05	95.46	0.11	48.12	0.15	-0.03	0.18	49.24	0.05	134.00	0.05	135.37	0.05	187.24
0.08	62.33	0.13	31.51	0.17	0.12	0.20	45.01	0.08	114.83	0.08	115.17	0.08	170.12
0.10	37.66	0.15	24.17	0.19	-0.05	0.23	42.31	0.10	94.06	0.10	98.44	0.10	152.97
0.12	22.58	0.17	17.34	0.21	0.50	0.25	38.14	0.13	72.98	0.13	81.39	0.13	131.26
0.14	8.97	0.19	10.86	0.23	0.28	0.27	29.28	0.15	48.95	0.15	60.69	0.15	116.88
0.16	0.47	0.21	6.09	0.25	-0.23	0.29	24.22	0.18	26.27	0.18	42.65	0.18	105.11
0.18	0.00	0.23	1.89	0.27	-0.01	0.31	21.36	0.20	11.10	0.20	26.99	0.20	81.23
0.20	0.00	0.25	0.13	0.29	-0.44	0.33	17.23	0.23	0.78	0.23	13.85	0.23	65.09

[illegible]

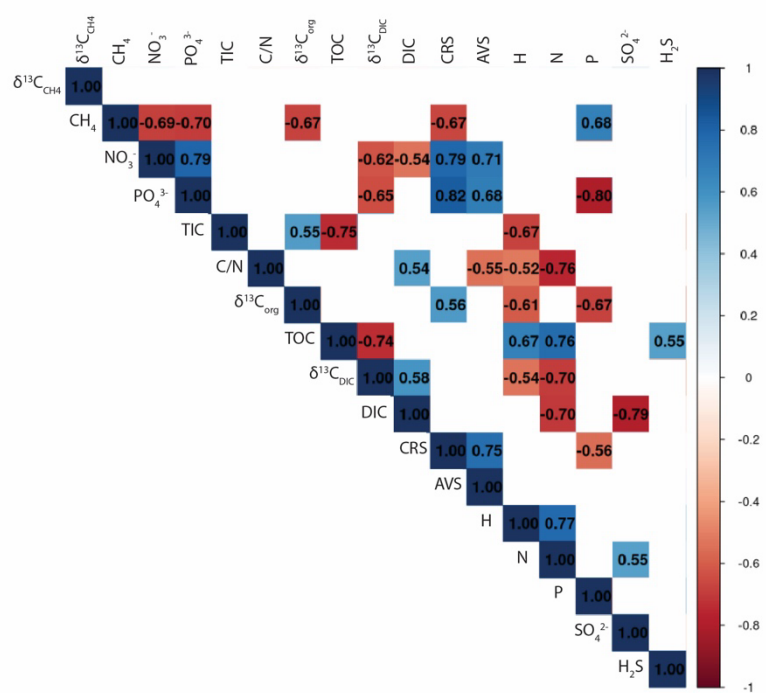


Figure S1 - Co-correlation matrix of Spearman pairwise correlation coefficients calculated on a z-scored matrix of environmental variables.

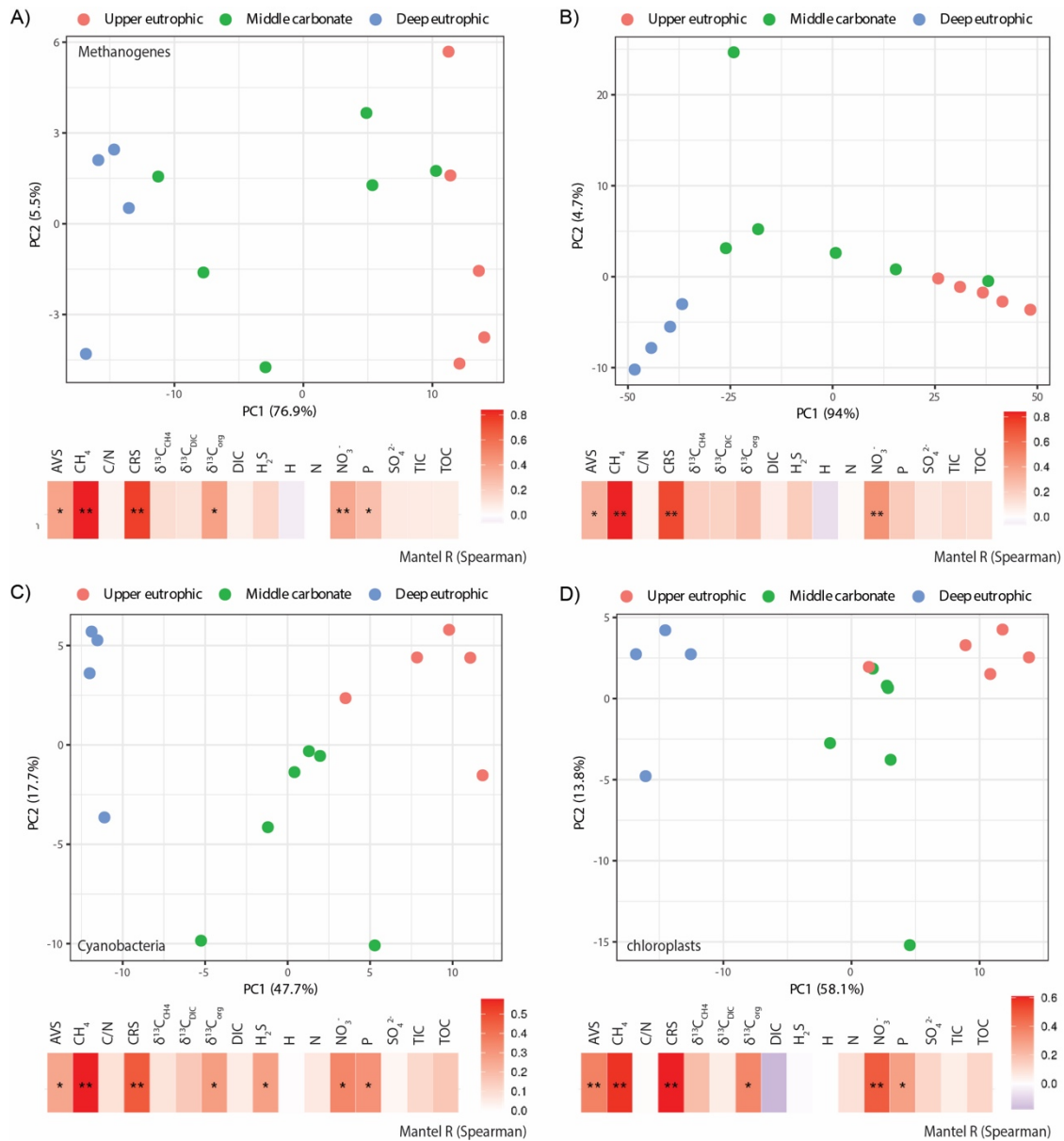


Figure S2 - Principal component ordination of centered log ratio (CLR) transformed 16S rRNA gene amplicon data for specific microbial subpopulations, based on an Aitchson distances for which oversaturated distances were corrected and smoothed using LMDist and mantel tests results (Spearman's rank correlation) of subcommunity dissimilarity (corrected and smoothed Aitchinson distance) and environmental parameters (z-scored). P-values were adjusted for multiple testing using the false discovery rate (FDR) method. ** $p \leq 0.01$; * $p \leq 0.05$. (A) Methanogenes. (B) MOB. (C) Cyanobacteria. (D) chloroplasts.