The effect of a short oxygen exposure period on algal biomass degradation and methane release from eutrophic and oligotrophic lake sediments

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Supplemental information

Table S1. Methane emission from the slurry experiments.

Total methane emission

Oligotrophic sediments			**Eutrophic sediments**		
	$[CH_4]^a$	Standard deviation		$[CH_4]^b$	Standard deviation
Permanently anoxic, algae	1893	178	Permanently anoxic, algae	4063	68
1 week oxic, algae	1497	147	3 week oxic, algae	2576	105
3 week oxic, algae	1186	81			
Permanently anoxic, control	211	108	Permanently anoxic, control	2127	293
1 week oxic, control	23	25	3 week oxic, control	1367	162
3 week oxic, control	19	7			

a. Concentration in headspace in □M after 28 weeks (constant since 14 weeks)

b. Concentration in headspace in □M after 24 weeks

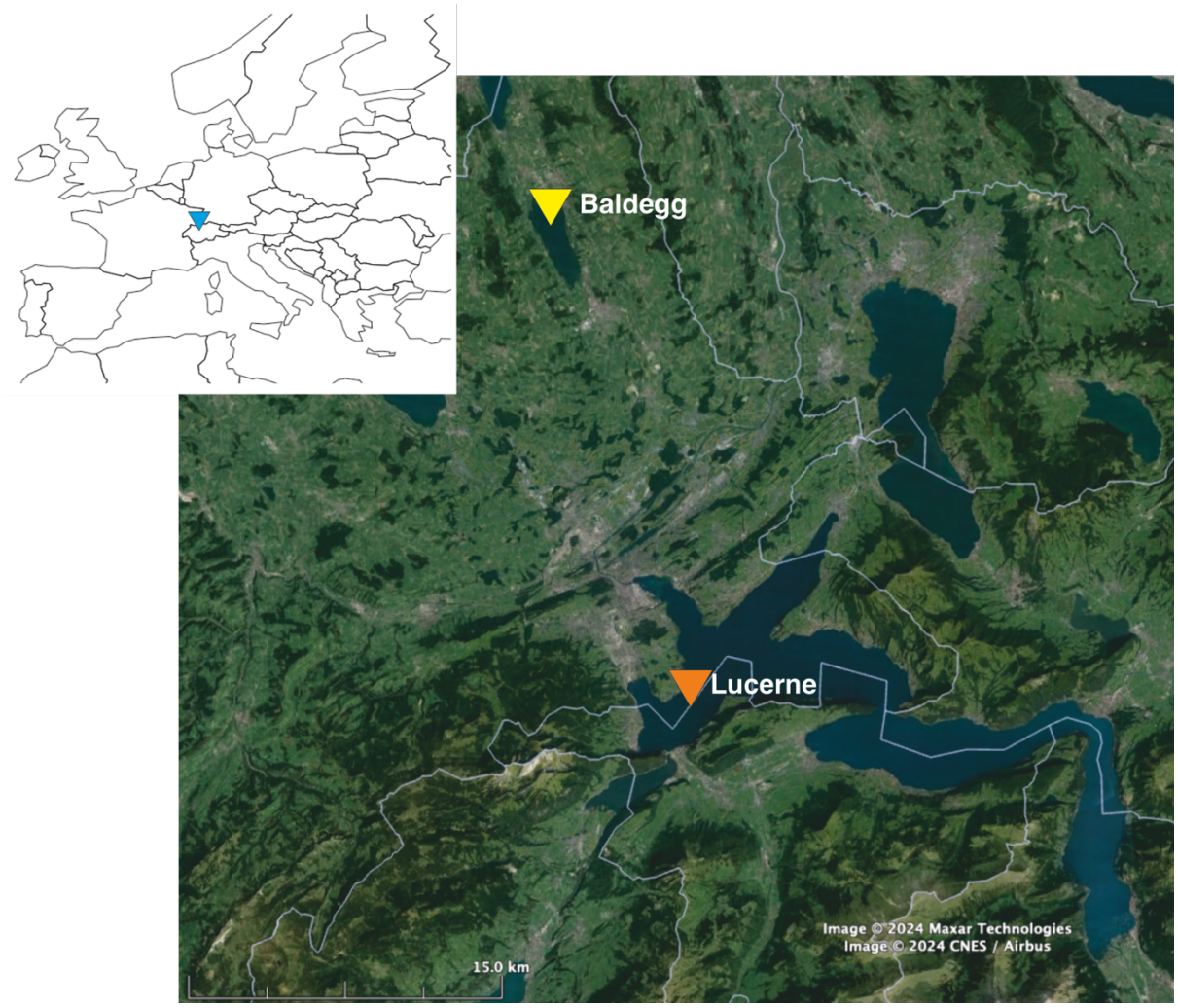

Fig. S1. Map of the surroundings and location of the study sites: Oligotrophic Lake Lucerne (orange) and eutrophic Lake Baldegg (yellow) in Switzerland, central Europe (blue marker on overview map).

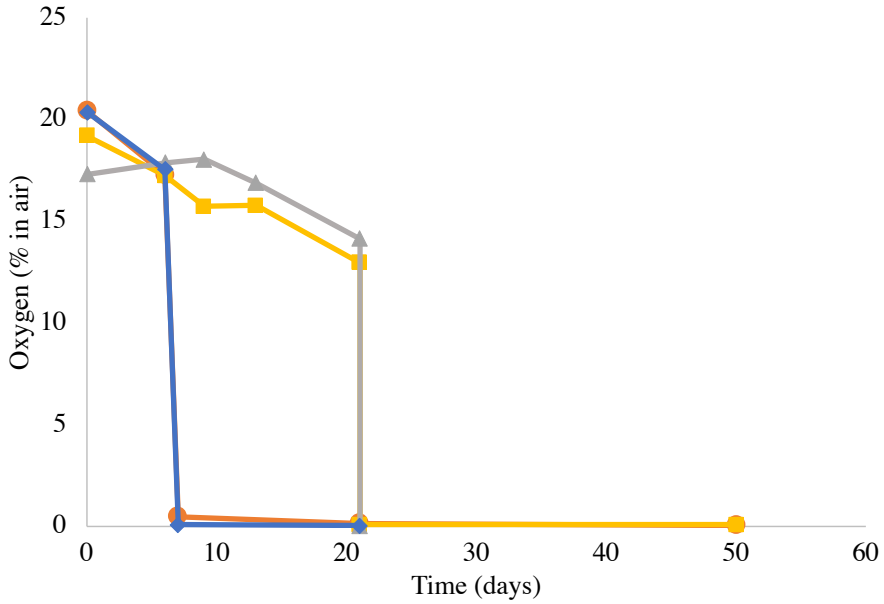

Fig. S2. Oxygen concentration (in % of ambient air) in the slurry experiments. Blue and orange: two replicate bottles of the 1-week oxygen exposure experiment. Yellow and grey: two replicates of the 3-week oxygen exposure experiment.

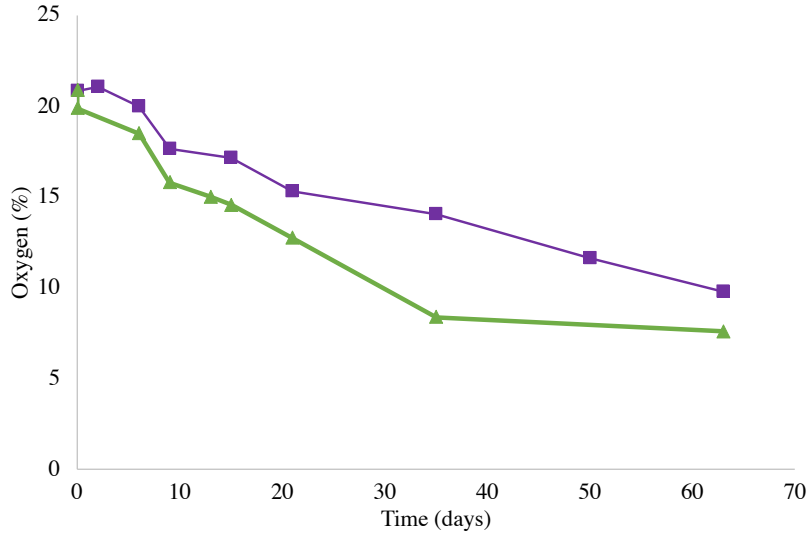

Fig. S3. Oxygen concentration (in % of gas headspace) in the whole core oxic experiments. Green: oxic algal biomass addition experiment, purple: oxic control experiment.

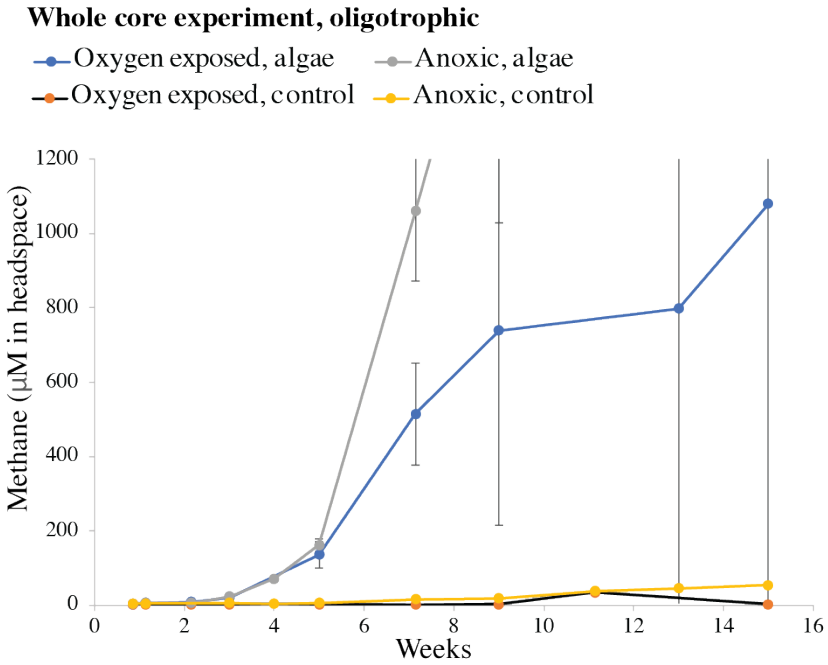

Fig. S4. Cut-out image of Fig. 3, highlighting the lower part of the y-axis.

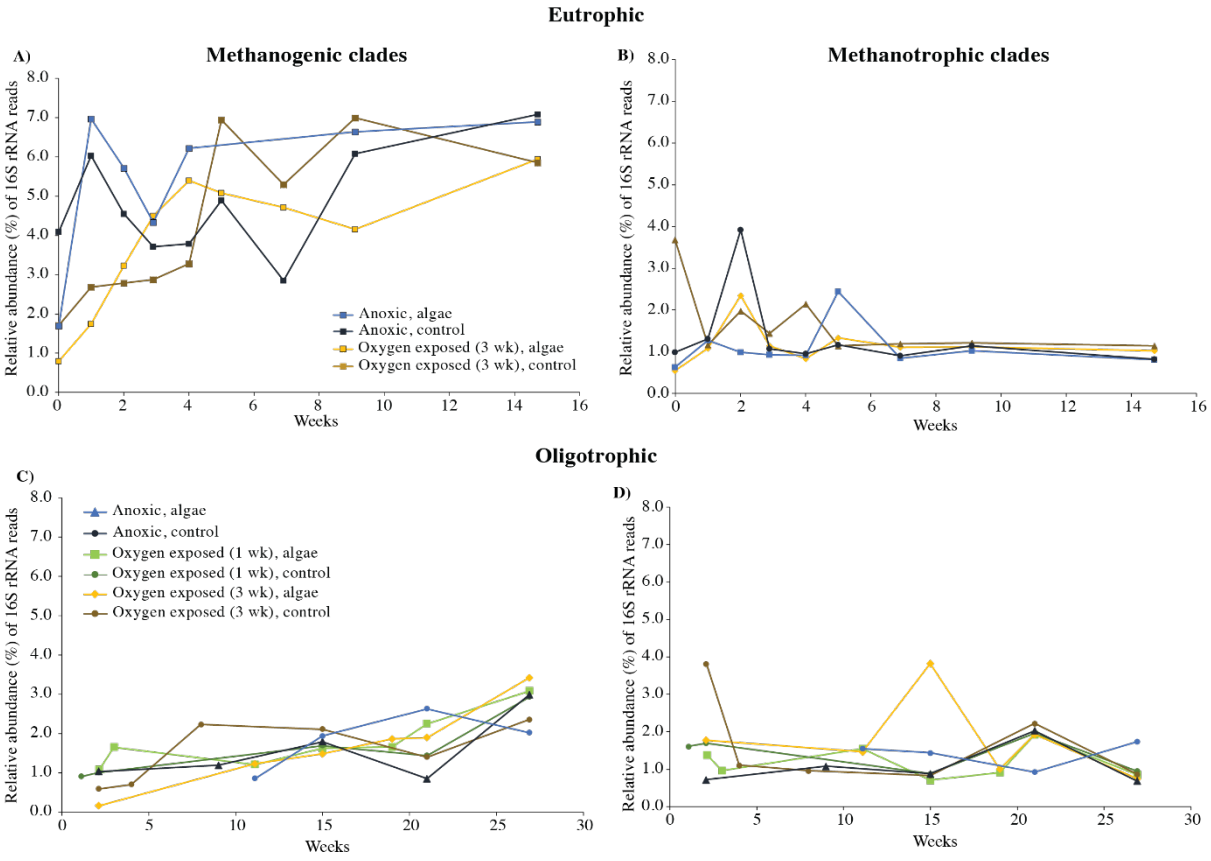

Fig. S5. Relative abundance of OTUs assigned to known methanogenic (A; eutrophic, C; oligotrophic) and methanotrophic (B; eutrophic, D; oligotrophic) clades, in the slurry experiments. Note that the oxic experiments received additional sediments, of the 5 – 15 cm depth interval, after the initiation of the anoxic conditions, after 1 or 3 weeks.

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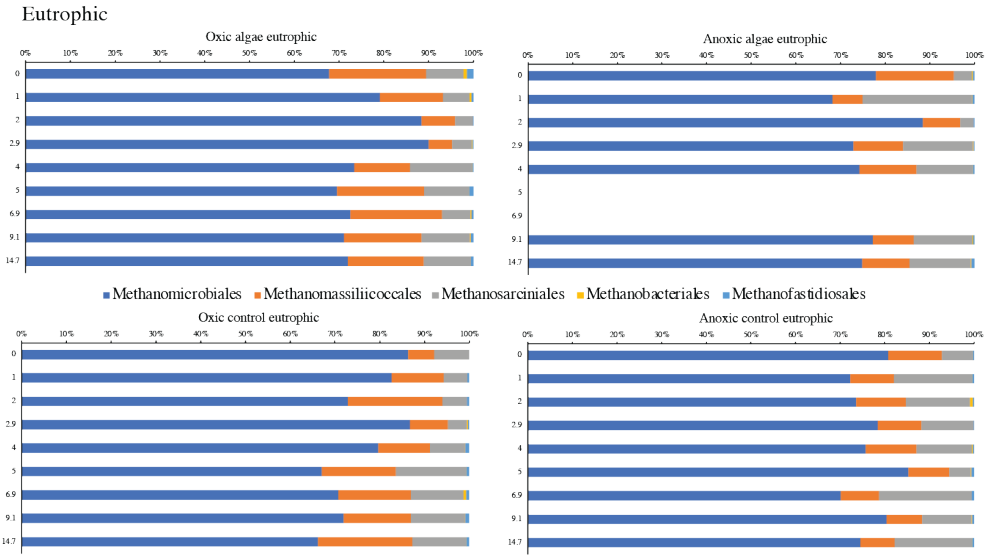
Eutrophic
Oxic algae eutrophic
Anoxic algae eutrophic
Methanomicrobiales
Methanomassiliicoccales
Methanosarciniales
Methanobacteriales
Methanofastidiosales
Oxic control eutrophic
Anoxic control eutrophic

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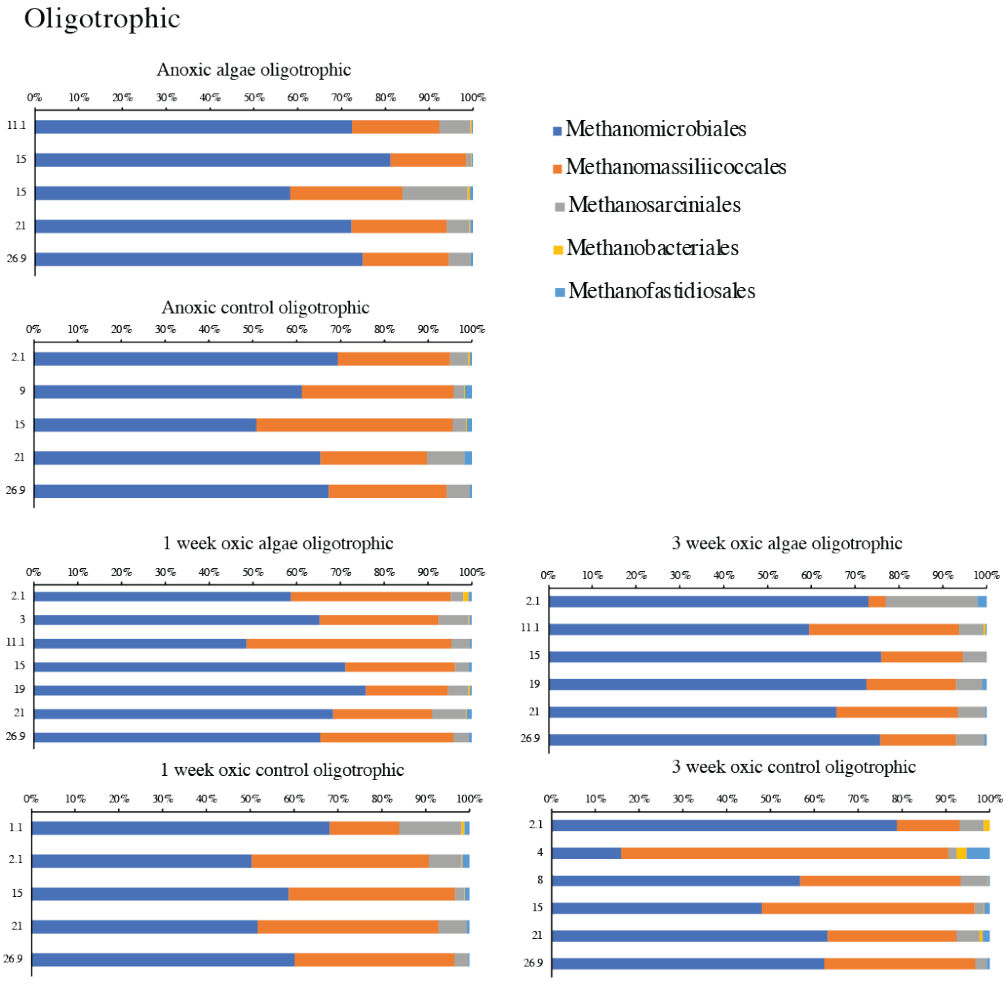
Oligotrophic
Anoxic algae oligotrophic
Methanomicrobiales
Methanomassiliicoccales
Methanosarciniales
Methanobacteriales
Methanofastidiosales
Anoxic control oligotrophic
1 week oxic algae oligotrophic
3 week oxic algae oligotrophic
1 week oxic control oligotrophic
3 week oxic control oligotrophic

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Fig. S6. Distribution of OTUs assigned to methanogenic orders over the five most abundant orders for both the eutrophic and oligotrophic experiments. The y-axis shows the time in weeks since the start of the experiment.

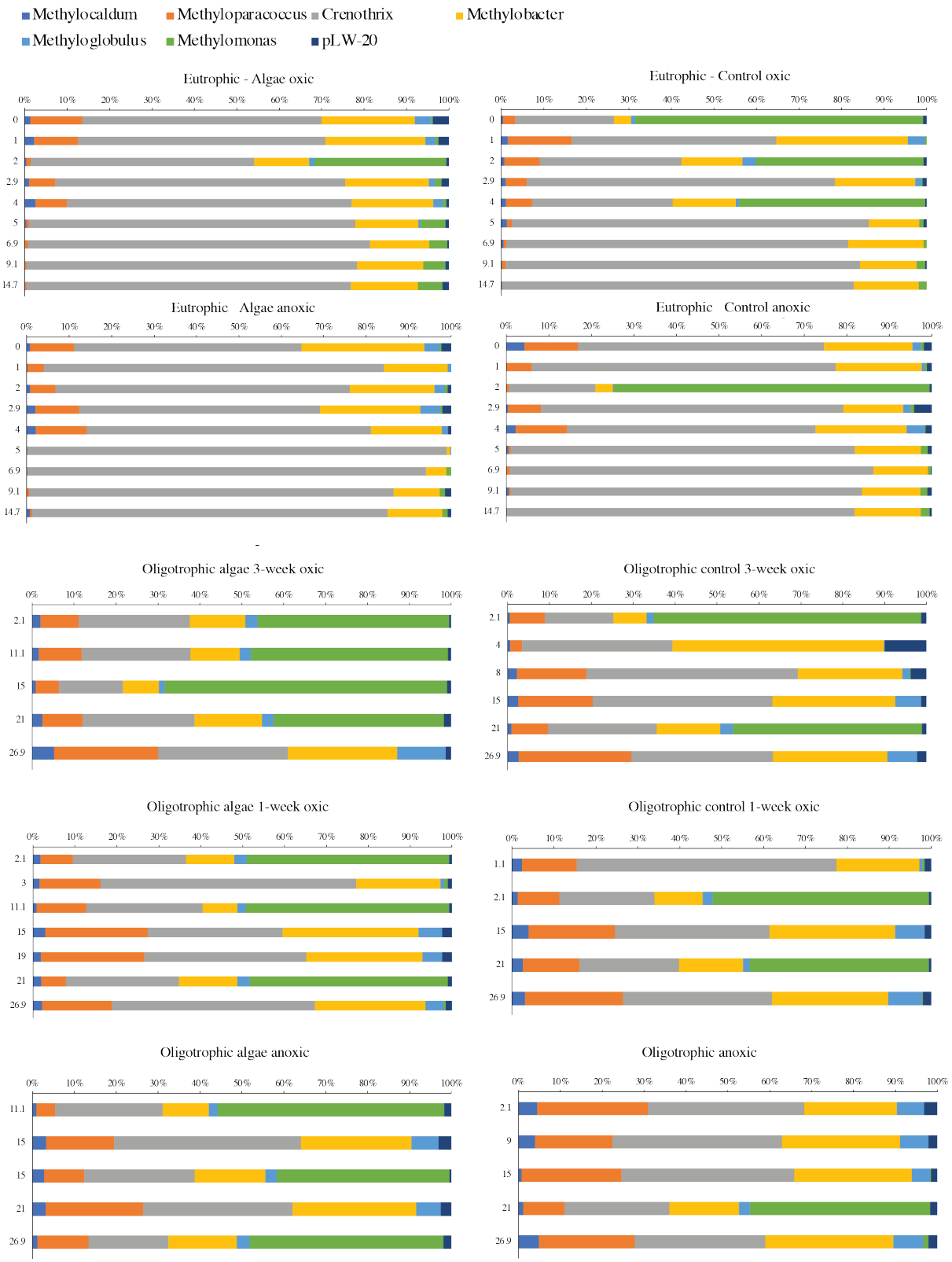


Fig. S7. Distribution of OTUs assigned to methanotrophic orders over the most abundant orders for both the eutrophic and oligotrophic experiments. The y-axis shows the time in weeks since the start of the experiment.

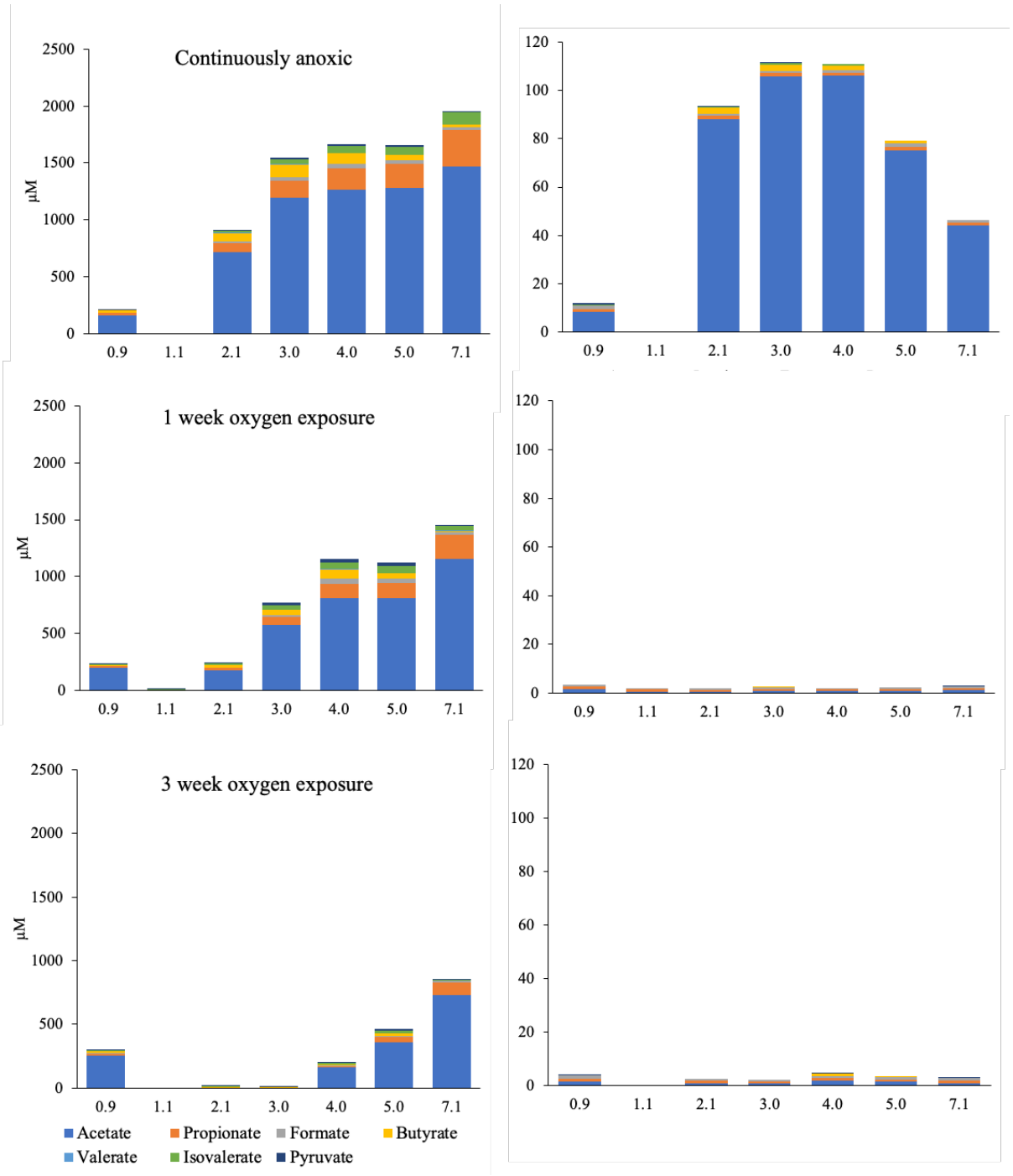
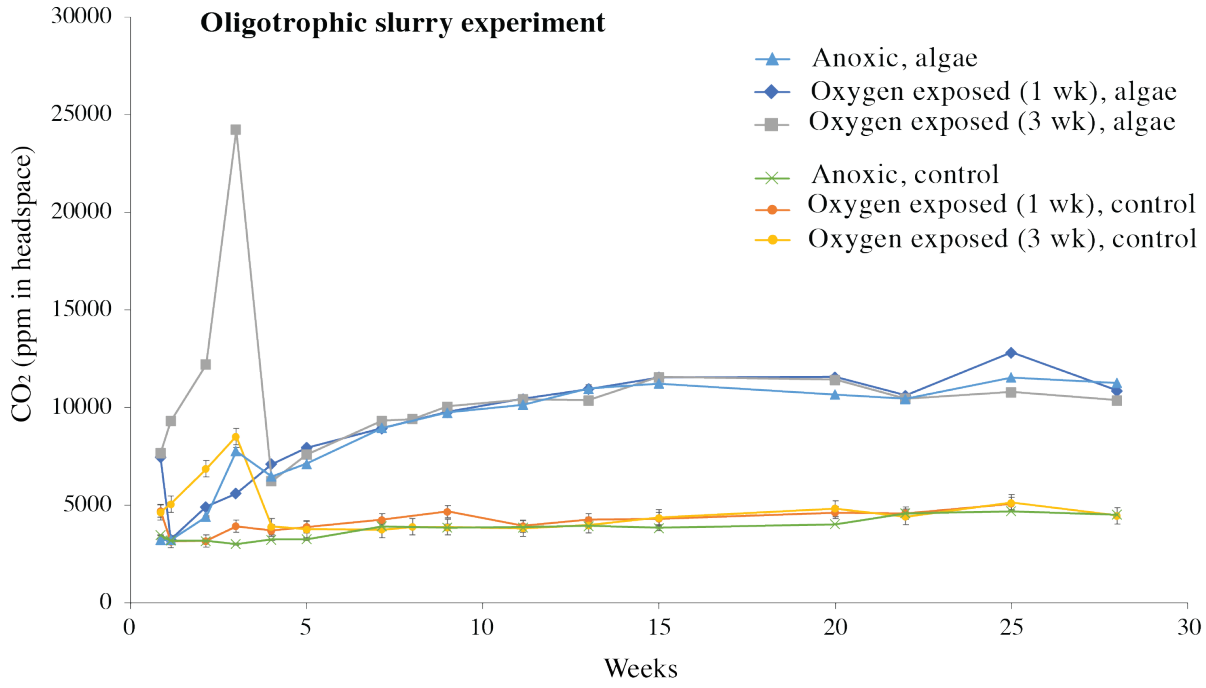


Fig. S8. Volatile fatty acid (VFA) concentrations in the oligotrophic incubations under different oxygen regimes, with algal biomass (left) and control (right) conditions.



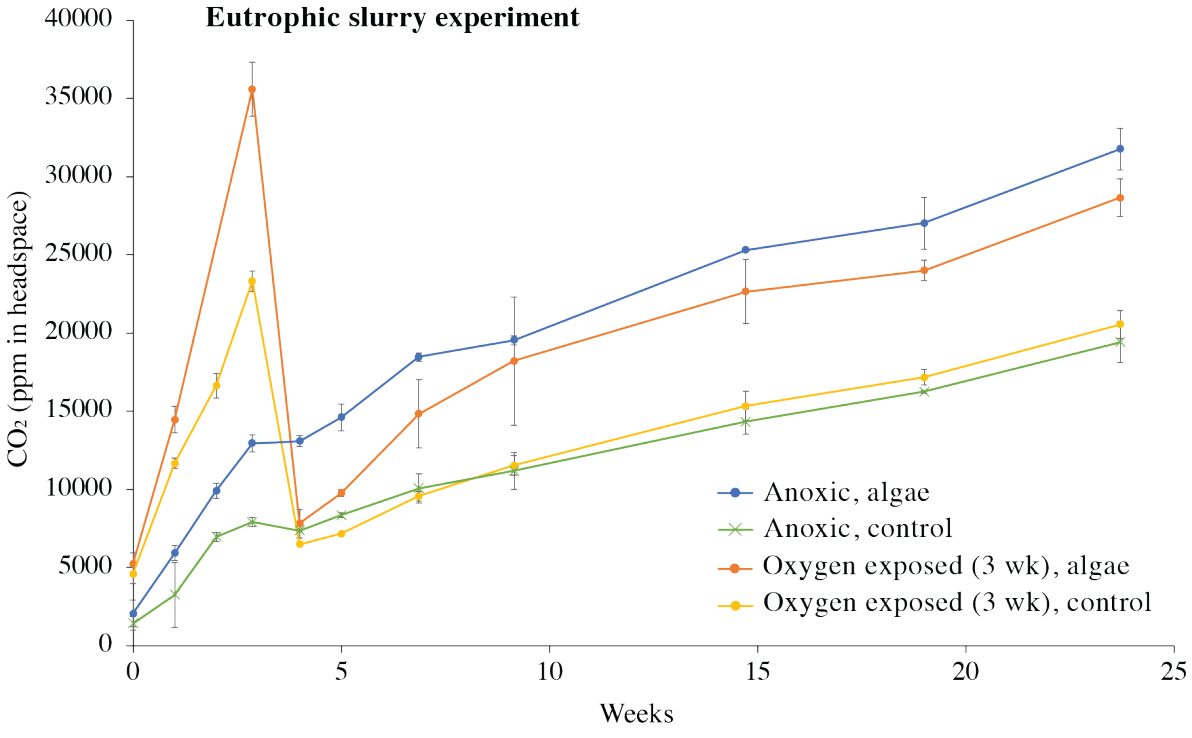


Fig. S9. CO_2 concentrations in the headspace of the slurry experiments. The sudden drop is caused by the flushing of the headspace with N_2 at the oxic-anoxic switch after 3 weeks.

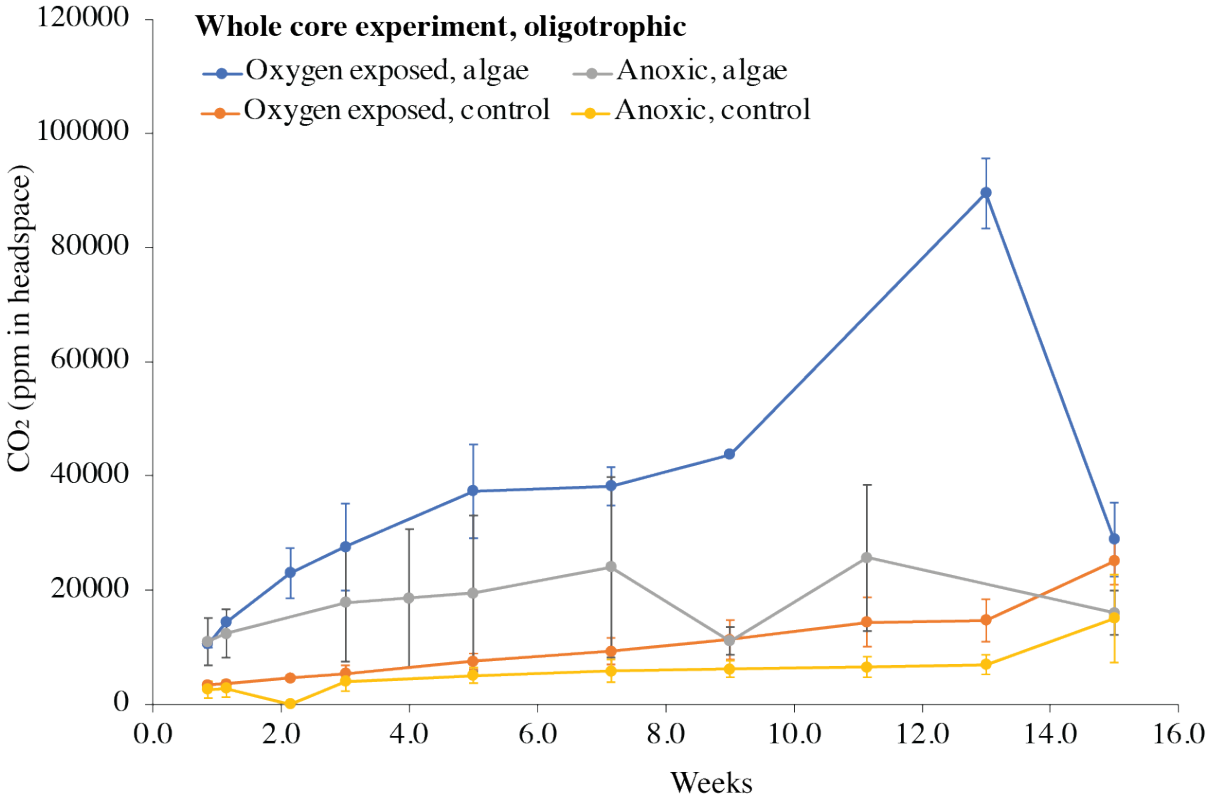


Fig. S10. CO_2 concentrations in the headspace of the whole core experiments.