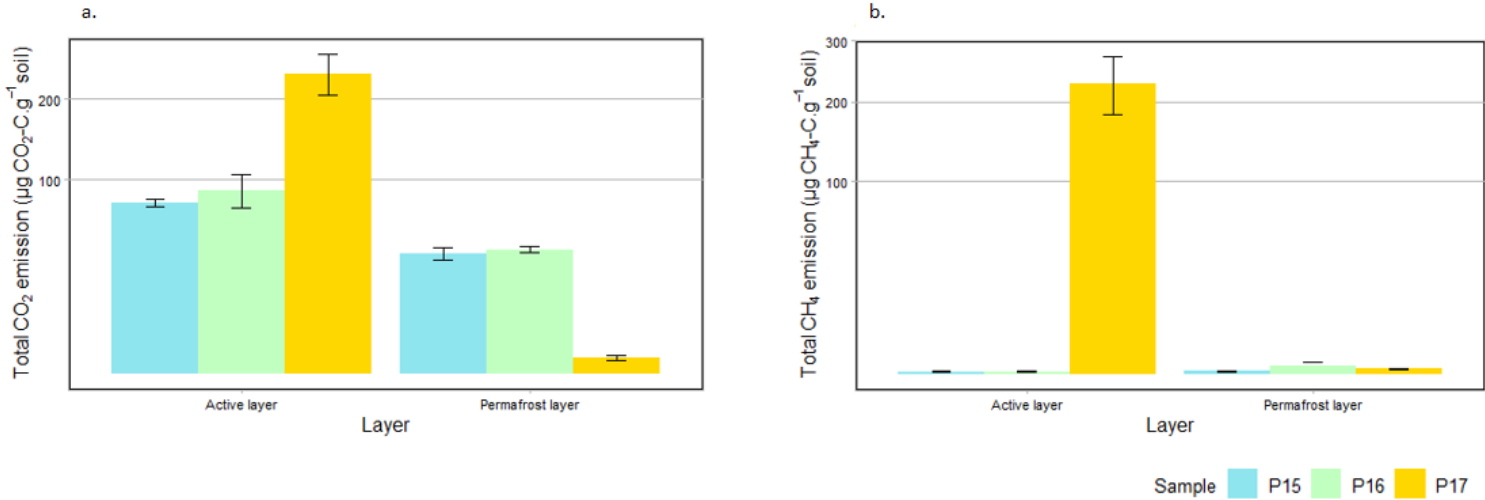


Supplementary Table 1: Description of the samples used for the study and their environment. Sample taken at a shallower depth than the other samples due to oxidation marks (*). Short sample IDs are in brackets.

<i>Sample ID</i>	<i>Depth (cm)</i>	<i>Active layer depth (cm)</i>	<i>Layer</i>	<i>Landscape position</i>	<i>Soil description</i>	<i>Vegetation</i>
<i>KUR18-P15-YED-4</i> <i>(P15-A)</i>	38-45	45	Active	Upland	compact silt, gray, with brown organic inclusions	Mosses, sedges, lichen and some grasses
<i>KUR18-P15-YED-7</i> <i>(P15-F)</i>	79-84	45	Permafrost	Upland	ataxitic ice structure, silt gray	Mosses, sedges, lichen and some grasses
<i>KUR18-P16-SLO-3</i> <i>(P16-A)</i>	7-14*	70	Active	Slope	silt, brown with roots, organic rich, slightly sandy, compact	Salix
<i>KUR18-P16-SLO-7</i> <i>(P16-F)</i>	100-105	70	Permafrost	Slope	structureless to micro-lenticular, silt, gray-brown	Salix
<i>KUR18-P17-FLO-2</i> <i>(P17-A)</i>	28-35	36	Active	Floodplain	organic rich silt with roots	Salix and mosses
<i>KUR18-P17-FLO-7</i> <i>(P17-F)</i>	76-81	36	Permafrost	Floodplain	sand, mix of gray and brown layers, almost no visible ice	Salix and mosses

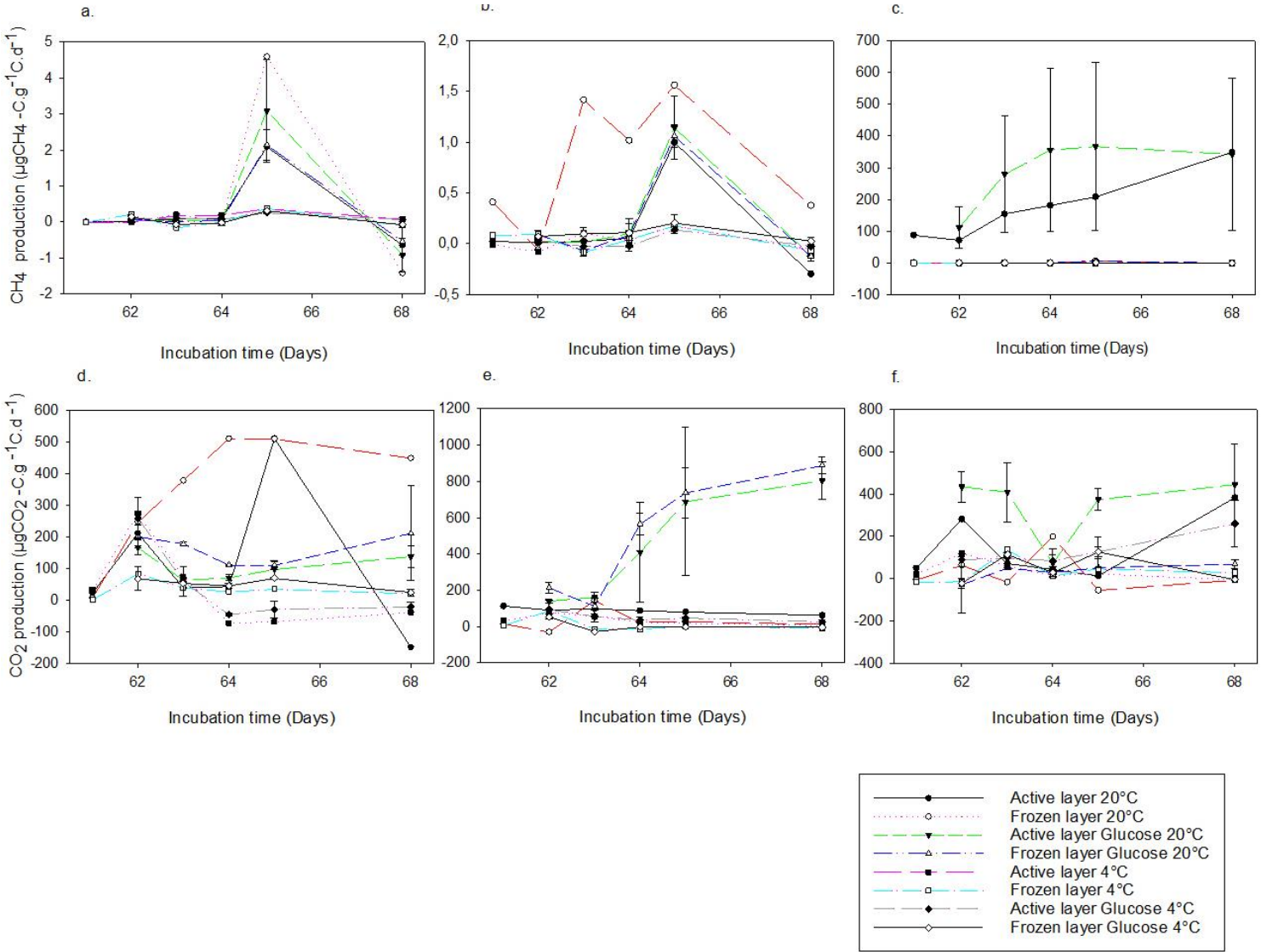
Supplementary Figure 1: Cumulative emissions of CO₂ (a.) and CH₄ (b.) per gram soil after 61 days of incubation



Supplementary Table 2: Comparison of floodplain total CH₄ emissions between our study (P17) and incubation results of Herbst (2022) (P19, P24 and P25). Samples were incubated at 20°C for 61 days (P17) and 68 days (P19, P24, P25).

<i>Samples</i>	<i>P17</i>	<i>P19</i>	<i>P24</i>	<i>P25</i>
<i>Mean Total CH₄ emissions (μg CH₄-C .gC⁻¹) (n = 3) [Active layer]</i>	6539.022 ± 1299.21	149.23 ± 35.79	38.15 ± 2.88	0.62 ± 0.69
<i>Mean Total CH₄ emissions (μg CH₄-C .gC⁻¹) (n = 3) [Frozen layer]</i>	42.533 ± 15.79	72.39 ± 15.17	34.66 ± 5.17	0.16 ± 0.07

Supplementary Figure 2: Gas production after glucose injection at 4 °C and 20 °C between 61 and 67 days of incubation. The glucose injections were carried out on days 61 and 64. CH₄ production of (a.) P15, (b.) P16, and (c.) P17 and CO₂ production of (d.) P15, (e.) P16, and (f.) P17. Error bars show the deviation from the mean ± standard error (n=3). Note differing scales between cores.



Supplementary Table 3: Characteristics of the samples for qPCR analysis. (*) indicates that DNA concentration is very low, explaining the absence of results for qPCR. () DNA extraction was run twice and twice the DNA concentration was below detection threshold.**

<i>Sample</i>	<i>Weight (g)</i>	<i>Weight (g)</i>	<i>DNA concentration (ng/μL)</i>
<i>A-PI5-A*</i>	0.228		0.09
<i>A-PI5-F**</i>	0.293	0.276	
<i>A-PI6-A</i>	0.189		1.01
<i>A-PI6-F</i>	0.221		1.08
<i>A-PI7-A</i>	0.232		3.39
<i>A-PI7-F**</i>	0.26	0.248	
<i>C-PI5-A.1.20</i>	0.255		0.186
<i>C-PI5-F.1.20*</i>	0.229		0.057
<i>C-PI6-A.1.20</i>	0.217		0.578
<i>C-PI6-F.1.20</i>	0.233		1.95
<i>C-PI7-A.1.20</i>	0.248		1.79
<i>C-PI7-F.1.20*</i>	0.246		0.089
<i>C-PI5-A.1.4</i>	0.227		0.71
<i>C-PI5-F.1.4**</i>	0.231	0.227	
<i>C-PI6-A.1.4</i>	0.228		1.22
<i>C-PI6-F.1.4</i>	0.244		0.229
<i>C-PI7-A.1.4</i>	0.22		4.94
<i>C-PI7-F.1.4*</i>	0.22		0.069
<i>D-PI6-A.1.20</i>	0.223		0.997
<i>D-PI7-A.1.20</i>	0.271		1.6
<i>D-PI6-A.1.4</i>	0.26		1.47
<i>D-PI7-A.1.4</i>	0.249		5.54
<i>G-PI6-A.2.20</i>	0.25		0.998
<i>G-PI7-A.2.20</i>	0.261		2.63
<i>G-PI6-A.2.4</i>	0.249		0.636
<i>G-PI7-A.2.4</i>	0.264		5.53