

**Tab.S1** Summary of the input data for the ALT modeling. Volumetric contents of mineral soil, water and ice, organic matter and air-filled pore space are shown for each soil core and the deeper underground of the respective study area. Furthermore, each soil horizon is characterized by a short description.

lower boundary (m)	mineral (Vol %)	water / ice (Vol %)	organic (Vol %)	pore space (Vol %)	Further information on soil texture / composition
<b>KOL-1-R</b> (12-P-1607-1), Pokhodsk / Kolyma Delta (monitoring site) / polygon ridge; ALT 0.37 m					
0.15	2.0	64.2	5.8	92.2	vegetation cover, peat, medium decomposed, brown, unfrozen
0.35	50.5	45.9	1.4	48.1	peaty silty fine-sand, brownish, unfrozen
0.54	48.2	50.9	0.9	50.9	silty fine-sand, frozen
0.80	5.8	89.1	5.1	89.1	grey silty fine sand, horizontal peat layers, frozen
1.15	24.4	72.7	2.9	72.7	grey silty fine sand, horizontal peat layers, frozen
<b>KOL-1-C</b> (12-P-1707-1), Pokhodsk / Kolyma Delta (monitoring site) / polygon center, ALT 0.45 m					
0.45	2.8	91.6	5.7	91.6	peat, water- saturated, brown, unfrozen
1.10	6.5	89.4	4.1	89.4	peaty silty fine-sand, frozen
1.37	12.8	85.0	2.1	85.0	silty fine-sand, frozen
<b>KOL-3-R</b> (12-P-1907-1), Pokhodsk / Kolyma Delta (near monitoring) / polygon ridge, ALT 0.3 m					
0.30	3.5	92.2	4.3	92.2	peat, vegetation, unfrozen
0.45	36.9	61.7	1.3	61.7	peaty silty fine-sand, frozen
0.70	14.4	81.4	4.3	81.4	peaty silty fine-sand, frozen
0.85	1.8	98.0	0.3	98.0	ice lens (band)
0.95	39.1	60.1	0.8	60.1	silty fine-sand
3.00	0.0	100.0	0.0	100.0	ice wedge
<b>KOL-3-C</b> (12-P-1907-2), Pokhodsk / Kolyma Delta (near monitoring) / polygon center, ALT 0.41 m					
0.05	0.65	97.27	2.08	97.27	vegetation cover, water saturated
0.35	2.4	88.6	4.9	92.8	peat, unfrozen
0.85	4.1	91.1	4.9	91.1	peat, frozen
1.05	7.0	90.6	2.2	90.9	peaty silty fine-sand
1.30	15.8	82.5	1.7	82.5	silty fine-sand
<b>KOL-4-R</b> (12-P-2107-1; Pokhodsk / Kolyma Delta / polygon ridge; ALT 0.25 m					
0.10	5.5	39.1	23.0	71.5	peat not compacted, weakly decomposed, grey-brown
0.25	24.0	54.2	3.2	72.9	peat, brown
0.45	16.5	76.6	6.9	76.6	peaty sand, light-brown
0.70	7.4	83.9	2.9	89.7	peaty silty fine-sand, alternate bedded
1.18	5.5	92.5	2.0	92.5	silty peat, brown

<b>KOL-4-C</b> (12-P-2107-2), Pokhodsk / Kolyma Delta / polygon center; ALT 0.43 m					
0.30	15.6	81.2	3.2	81.2	peat weakly decomposed, unfrozen
0.60	6.7	88.6	4.7	88.6	peat weakly decomposed,
0.80	1.2	97.3	1.4	97.3	silty peat, brownish grey
1.12	3.7	95.0	1.4	95.0	silty peat, brownish grey
<b>KOL-5</b> (12-P-2707-1), Pokhodsk / Kolyma floodplain, Pokhodskaya Channel / lowermost level, no polygon; ALT 0.45 m					
0.15	11.8	86.3	1.9	86.3	peaty clayish silty fine-sand, unfrozen, water saturated
0.75	35.2	62.4	2.4	62.4	peaty clayish silty fine-sand
1.08	15.1	83.6	1.4	83.6	alternate bedding of gray clayish silt and plant detritus layers
<b>KOL-7</b> (12-P-3007-1), Pokhodsk / Lake shore near Pokhodsk / no polygon; ALT 0.45 m					
0.4	19.7	76.9	3.4	76.9	peaty silty sand, brown, unfrozen
0.7	14.0	80.0	6.1	80.0	peaty silty sand, brown
1.37	28.1	69.6	2.4	69.6	silty sand, gray, plant fragments, peat inclusions
<b>deeper underground</b>					
89	50	25	25	25	flood plain/deltaic deposits (Holocene)
399	48	10	2	40	Tertiary sands and gravels
500	99	1	0	0	bedrock
				500	permafrost thickness (m)
				-8	permafrost temperature (°C)
<b>IND-1-R</b> (LHC 11 j18,80), Kytalyk / Alas /polygon ridge; ALT 0.20 m					
0.16	1.0	75.4	23.6	75.4	peat, unfrozen
0.36	18.8	63.2	18.0	63.2	silty peat, frozen
105.5	4.2	76.0	19.9	76.0	peat, frozen
<b>deeper underground</b>					
5	50.0	25.0	25.0	25	flood plain / thermokarst deposits
15	31.4	67.3	1.2	67.3	Yedoma
65	48	10	2	40	Tertiary sands and gravels
500	99	1	0	1	bedrock
				500	permafrost thickness (m)
				-10	permafrost temperature (°C)
<b>LEN-1-R</b> , Samoylov Island, Lena Delta, polygon ridge; ALT 0.26 m					
0.30	25.0	53.4	1.2	73.9	
0.40	55.9	41.9	2.2	41.9	
1.00	40.8	54.6	4.6	54.6	
<b>LEN-1-C</b> , Samoylov Island, Lena Delta, polygon center; ALT 0.23 m					

0.23	7.8	36.9	0.9	91.3	
0.81	45.1	48.2	3.0	48.2	
deeper underground					
15	30	60	10	60	deltaic deposits (Holocene)
1000	48	10	2	40	sandy to silty river deposits.
				200	permafrost thickness (m)
				-9	permafrost temperature (°C)