Supplement of

Large Herbivores Affecting Permafrost - Impacts of Grazing on Permafrost Soil Carbon Storage in Northeastern Siberia

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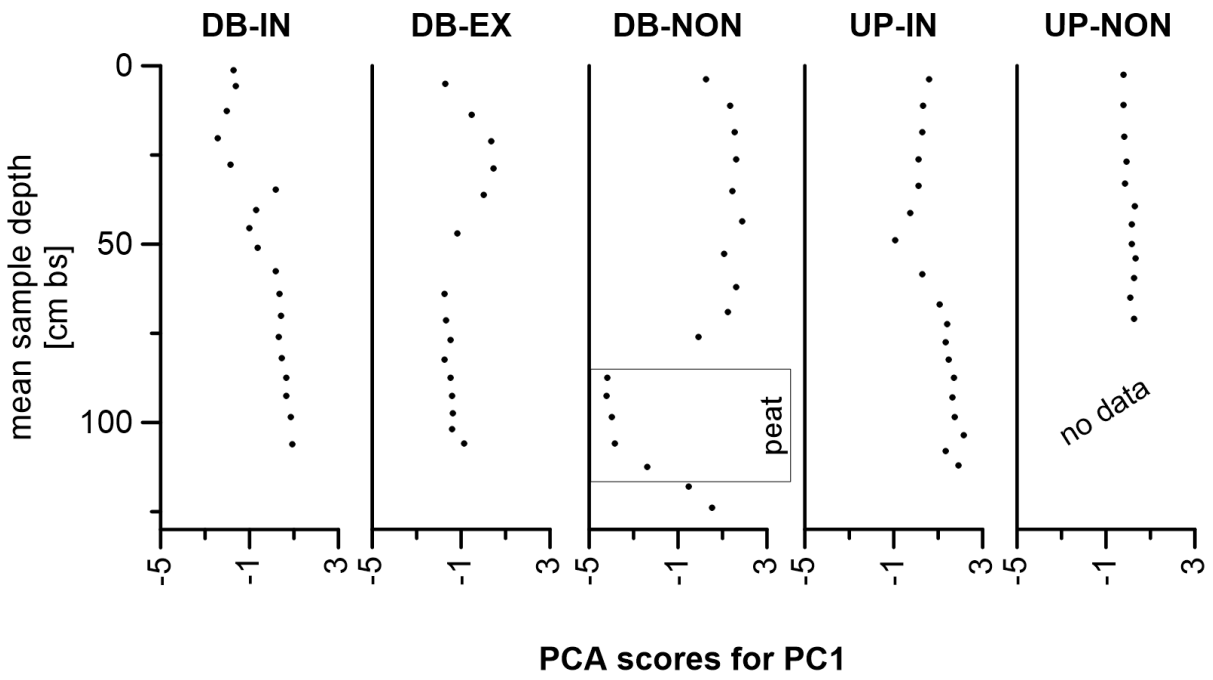

Figure S1 - PCA scores (PC1) for all 5 sampling sites plotted over depth; the peat layer in DB-NON is marked to underline the strong differences in score values for this core section.

Table S1 - PCA scores of all samples for PC1, PC2 and PC3

Sample	PC1	PC2	PC3
DB-IN 0 - 2.5 cm	-1.72828936822952	0.79456126167141	-0.61482725290452
DB-IN 2.5 - 9 cm	-1.61378417246138	0.836613877279835	-0.460232049621469
DB-IN 9 - 16.5 cm	-2.02584215117961	0.484916847416413	-0.408520198467624
DB-IN 16.5 - 24 cm	-2.43468671841201	0.360133437721508	-0.182853221506374
DB-IN 24 - 31.5 cm	-1.85797896541634	0.586104578654619	0.0297473834549391
DB-IN 31.5 - 38 cm	0.164611578748646	-1.26416459186833	-0.159666354741859
DB-IN 38 - 43 cm	-0.703894321779553	-0.617433511767476	-0.36363440711776
DB-IN 43 - 48 cm	-0.99578554193291	-0.479524510773411	-0.446574157450325
DB-IN 48 - 54 cm	-0.641363436186067	-0.427401531216055	-0.366574393341726
DB-IN 54 - 61 cm	0.185884511833234	-0.962729545593494	-0.192424664678638
DB-IN 61 - 67 cm	0.355426430987167	-0.714847292891141	-0.018408454962224
DB-IN 67 - 73 cm	0.429112041353264	-0.936623045473872	-0.10401930408524
DB-IN 73 - 79 cm	0.307608019729899	-0.832450805588648	-0.120188574399396
DB-IN 79 - 85 cm	0.459362568752285	-0.181038028611709	-0.178746260767103
DB-IN 85 - 90 cm	0.63793931760529	1.53566392195926	-0.538563646706518
DB-IN 90 - 95 cm	0.641733865886682	1.63558097293812	-0.552565321875372
DB-IN 95 - 102 cm	0.849147307721511	1.40945744441639	-0.359610680433202
DB-IN 102 - 110 cm	0.924561472069458	1.27711042771241	-0.199862869999766
DB-EX 0 - 10 cm	-1.72762316025062	0.390676828058753	0.297209904020113
DB-EX 10 - 17.5 cm	-0.53819655312725	-0.581711069453459	-0.701840319118469
DB-EX 17.5 - 25 cm	0.350673788342737	-0.66628617482599	-0.107534641361183
DB-EX 25 - 32.5 cm	0.450272628084469	-0.299805406658183	0.0534447836235677
DB-EX 32.5 - 40 cm	0.0198590420979712	-0.0760137345866076	-0.0873251220091136
DB-EX 43 - 51 cm	-1.17353471363093	0.191288603769064	0.0391197112132075
DB-EX 59 - 69 cm	-1.74232931899253	0.0781975224372	0.867226685807276
DB-EX 69 - 74 cm	-1.66144771812034	0.282643184151303	-0.0544025140929912
DB-EX 74 - 80 cm	-1.46125612498465	0.278792377486865	-0.560629050457609
DB-EX 80 - 85 cm	-1.7383131145873	0.249213647145052	-0.528605161092288
DB-EX 85 - 90 cm	-1.45756920175365	0.201278245454611	-0.57323916622093
DB-EX 90 - 95 cm	-1.39559390729031	0.215245091344257	-0.707091355941216
DB-EX 95 - 100 cm	-1.35954009338321	0.0940292736766472	-0.448091246315404
DB-EX 100 - 104 cm	-1.41570413047677	0.220282504139758	-0.645202273858343
DB-EX 104 - 108 cm	-0.86791286475283	-0.200144811836961	-0.583093400796626
DB-NON 0 - 7.5 cm	0.271191995263323	0.1116022739381	0.24721001304744
DB-NON 7.5 - 15 cm	1.35823964620241	-0.24985296102967	0.350571453641561
DB-NON 15 - 22.5 cm	1.53823060930171	-0.116225987934259	0.446758112296384

DB-NON 22.5 - 30 cm	1.61721067149005	-0.330255037299748	0.405292357865951
DB-NON 31.5 - 39 cm	1.44184358336806	-0.595279417693444	0.297877675702354
DB-NON 40 - 47.5 cm	1.88269301331624	0.0785621673086083	0.570397430619768
DB-NON 47.5 - 58 cm	1.07729181556172	-0.982049357621838	0.0855606476439327
DB-NON 58 - 66 cm	1.60382518090042	-0.145085247672119	0.45960579195335
DB-NON 66 - 72 cm	1.22653863363841	-0.465379468151475	0.269677984166531
DB-NON 72 - 80 cm	-0.0876267751171507	-0.899492602046968	-0.116425503609968
DB-NON 85 - 90 cm	-4.19253237028427	-0.34259657133402	1.28448942061627
DB-NON 90 - 95 cm	-4.22061991065372	-0.380821987059903	1.41709531144882
DB-NON 95 - 102 cm	-3.986318924247	-0.518552919675533	1.34933137634462
DB-NON 102 - 110 cm	-3.84721155104831	-0.0686628123322466	0.0999809540727091
DB-NON 110 - 115 cm	-2.39152503189249	1.96229184821575	0.827343538088331
DB-NON 115 - 121 cm	-0.512355979270665	0.572181840552919	-0.530468506753881
DB-NON 121 - 127 cm	0.519180870204634	-0.176361252223538	-0.398142957558924
UP-IN 0 - 7.5 cm	0.581270466420169	-1.13685115968999	0.0900988431775815
UP-IN 7.5 - 15 cm	0.332624869558444	-0.835526318737297	-0.248548826301236
UP-IN 15 - 22.5 cm	0.280785462423725	-1.28203982724231	-0.19504449577392
UP-IN 22.5 - 30 cm	0.116041280221733	-1.14058402162561	-0.303268194100373
UP-IN 30 - 37.5 cm	0.131581545975197	-1.01479664660951	-0.254708106829293
UP-IN 37.5 - 45 cm	-0.263301152106179	-0.846955543702143	-0.45712094543485
UP-IN 45 - 53 cm	-0.936104657574038	-0.382671479680713	-0.585476638750803
UP-IN 53 - 64 cm	0.285526110933803	-0.171023993251327	-0.457959694085462
UP-IN 64 - 70 cm	1.07241301714104	-0.0557197077818492	0.0396872028329865
UP-IN 70 - 75 cm	1.41416169896124	0.111198995078279	0.254857411542177
UP-IN 75 - 80 cm	1.32534689627241	-0.255492113495384	0.221697583455245
UP-IN 80 - 85 cm	1.48746929544828	-0.366853225977491	0.333920001529216
UP-IN 85 - 90 cm	1.71068315222418	-0.316640114615832	0.502477501562614
UP-IN 90 - 96 cm	1.63343219618652	-0.248005711594269	0.439227112733296
UP-IN 96 - 101 cm	1.74210268355141	0.234884519857074	0.459035954943547
UP-IN 101 - 106 cm	2.16218539485719	1.19051534784052	0.671268571114924
UP-IN 106 - 110 cm	1.33518986869115	0.335344189733196	0.133115786202302
UP-IN 110 - 114 cm	1.9116241492708	1.18138469808452	0.495705147857055
UP-NON 0 - 5 cm	0.803971303920385	0.52865626398542	-0.209705539744404
UP-NON 7 - 15 cm	0.811072882040621	0.255210299617119	-0.201173882672043
UP-NON 17 - 23 cm	0.800601202496243	0.580422989782014	-0.170521832386132
UP-NON 23 - 31 cm	0.85270437931884	0.17985457311159	-0.0686505950979235
UP-NON 31 - 35 cm	0.922791296544158	0.0589824232203635	-0.138482685886514
UP-NON 37 - 42 cm	1.49299239008226	0.145700297207129	0.311740062987035

UP-NON 42 - 47 cm	1.24443876058526	-0.196806371334027	0.152275276659587
UP-NON 47 - 53 cm	1.29170760757515	0.209982440856021	0.170979270812145
UP-NON 53 - 55 cm	1.51250325642168	0.28437487218781	0.321257500444112
UP-NON 57 - 62 cm	1.35019081717204	0.705325339266223	0.25784362193826
UP-NON 62 - 68 cm	0.869939211008574	0.593246979757409	0.0769617970198236
UP-NON 70 - 72 cm	1.19045214137952	1.31924351152433	0.269935286869985

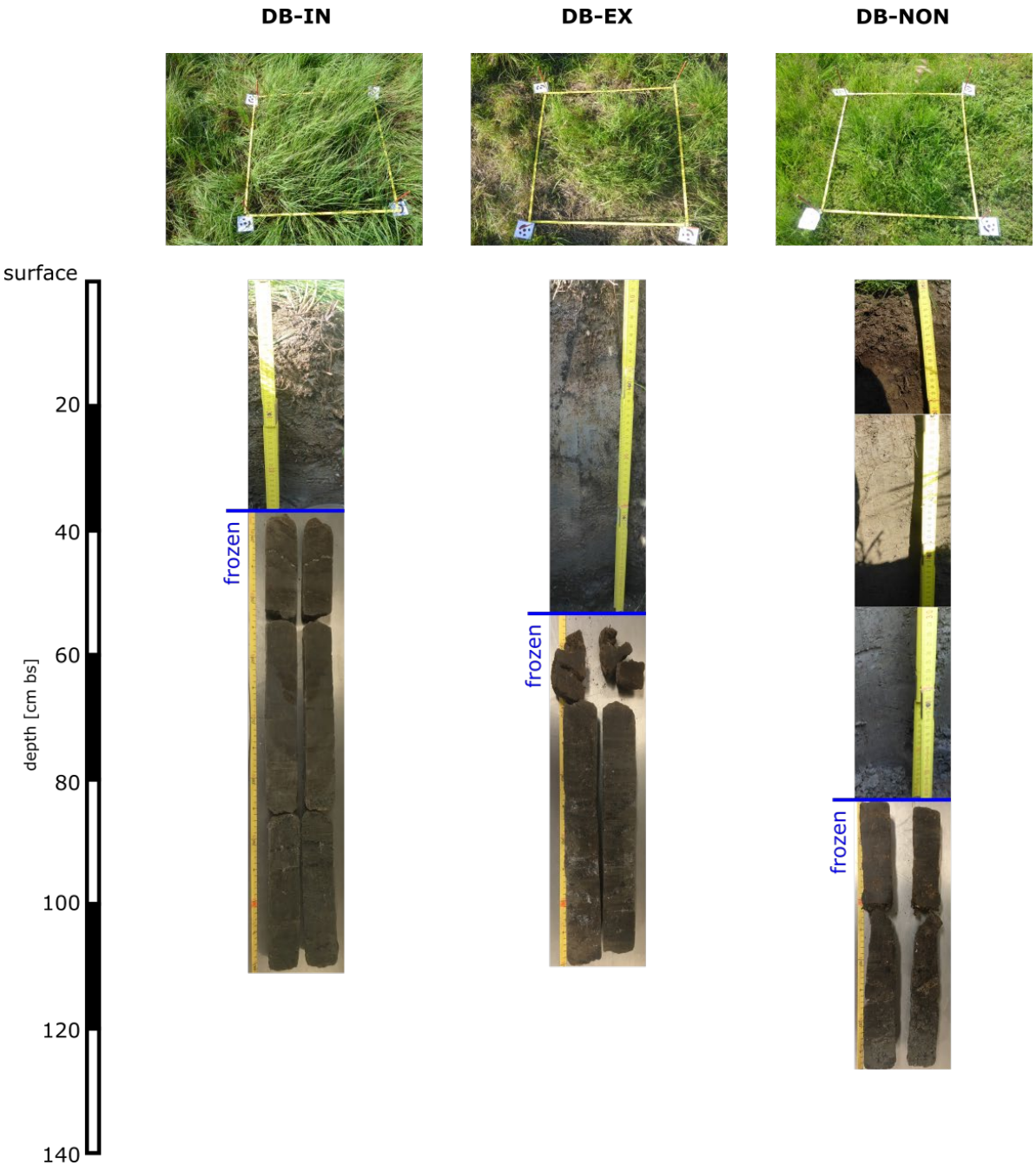

Figure S2 - Vegetation found on site, and cores obtained from the partially drained thermokarst basin DB.

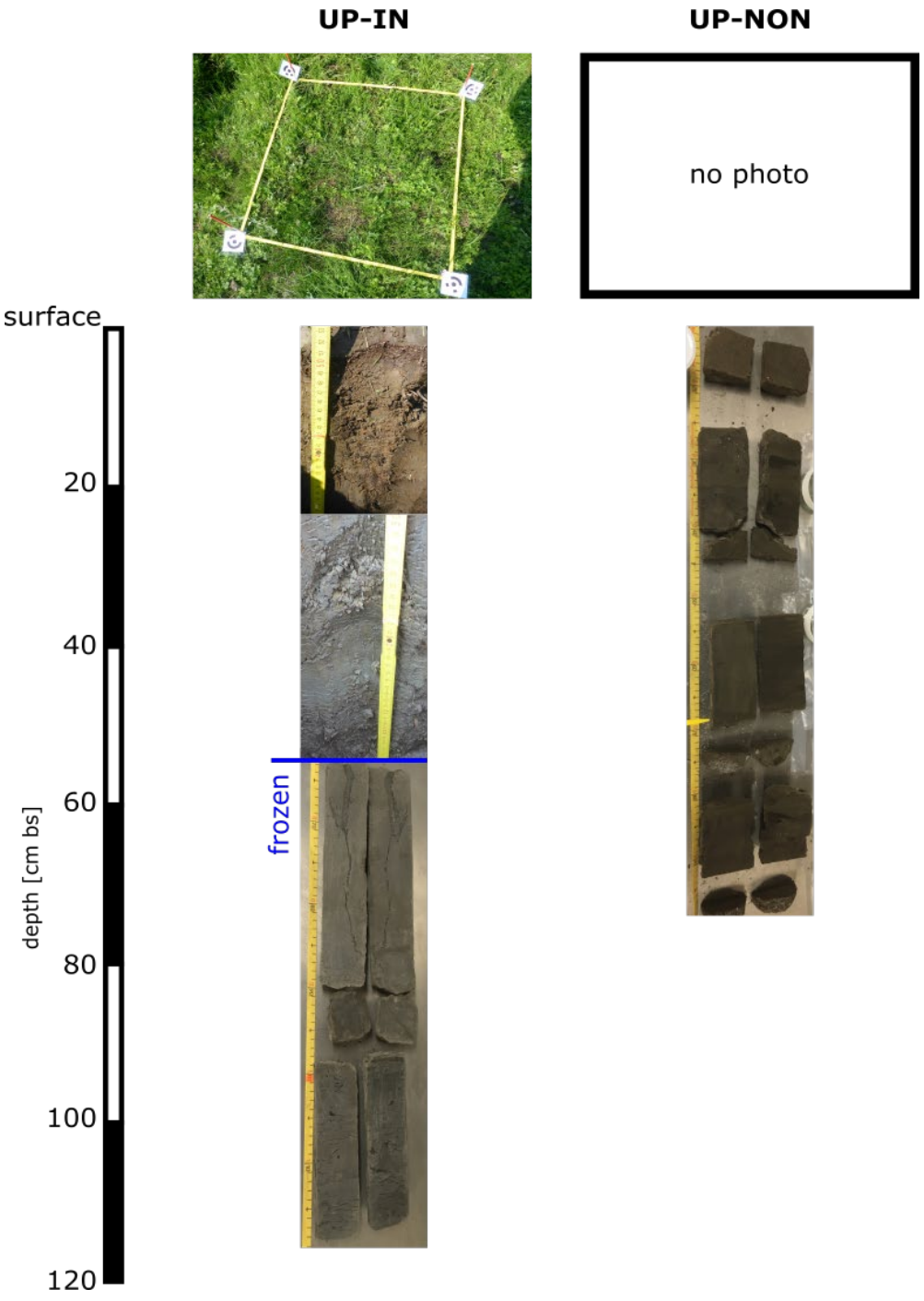

Figure S3 - Vegetation found on site, and cores obtained from the Yedoma upland UP.

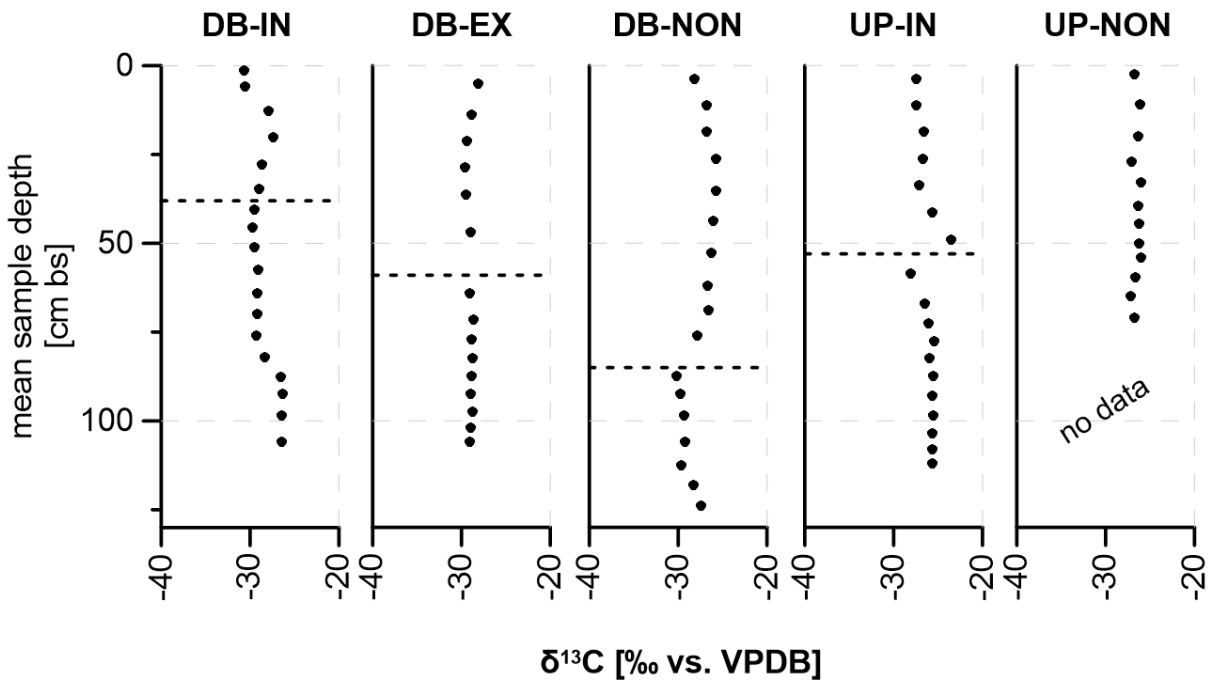

Figure S4 - $\delta^{13}C$ values, given in ‰ vs. VPDB, plotted over depth for all sampling sites; higher values indicate a less degraded state of the organic material; dashed lines mark the thaw depth found in July 2019.

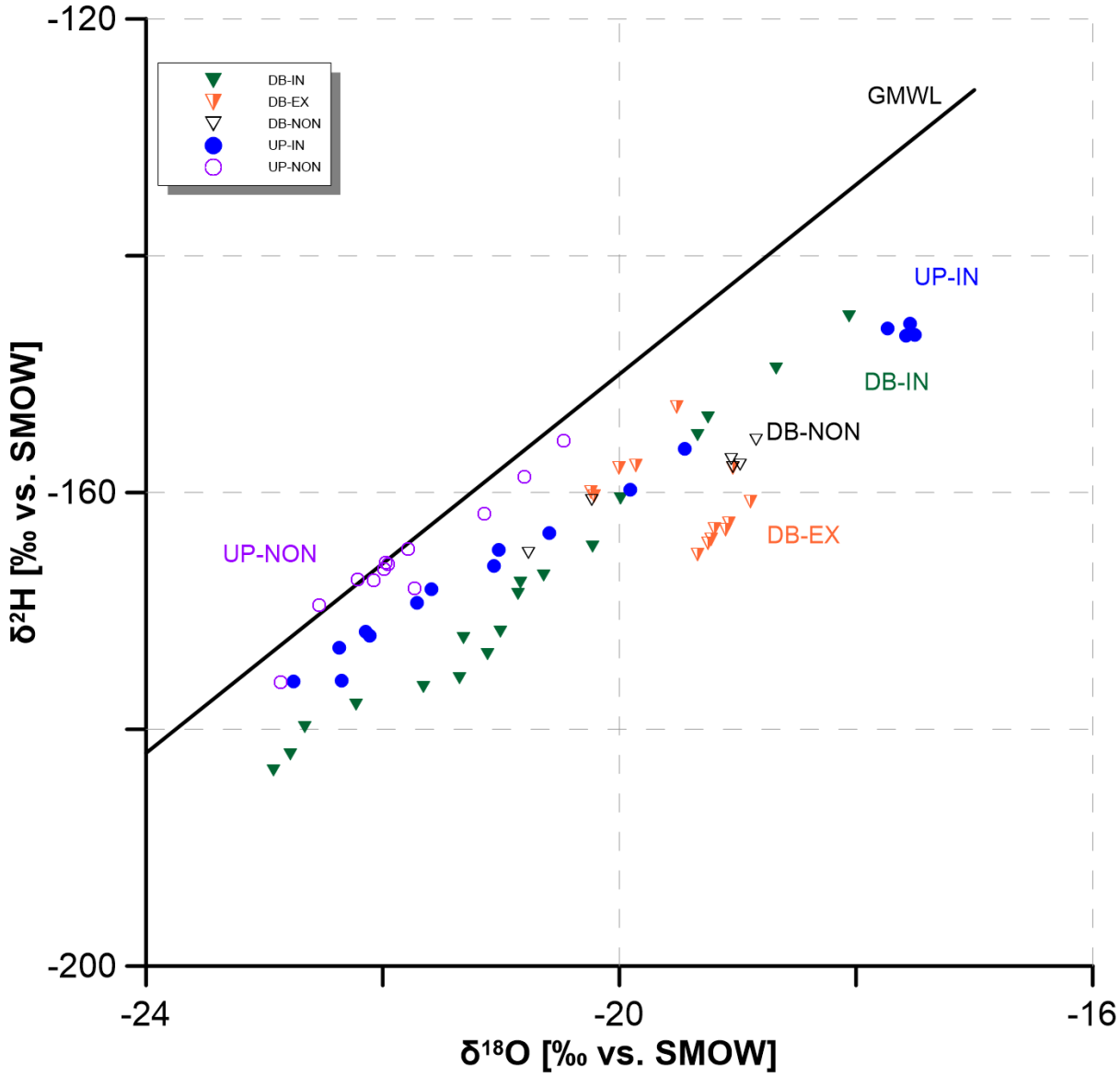

Figure S5 - $\delta^{18}O$ (stable oxygen isotopes) plotted versus $\delta^{2}H$ (stable hydrogen isotopes) along the global meteoric water line (GMWL, $\delta^{2}H=8*\delta^{18}O+10$); main clusters of each sampling site are identified by circles; these measurements derive from pore water that was extracted from the samples using artificial plant roots (Rhizones) with a pore size of 0.15 µm and applied vacuum; not all samples could be analysed due to low water content.

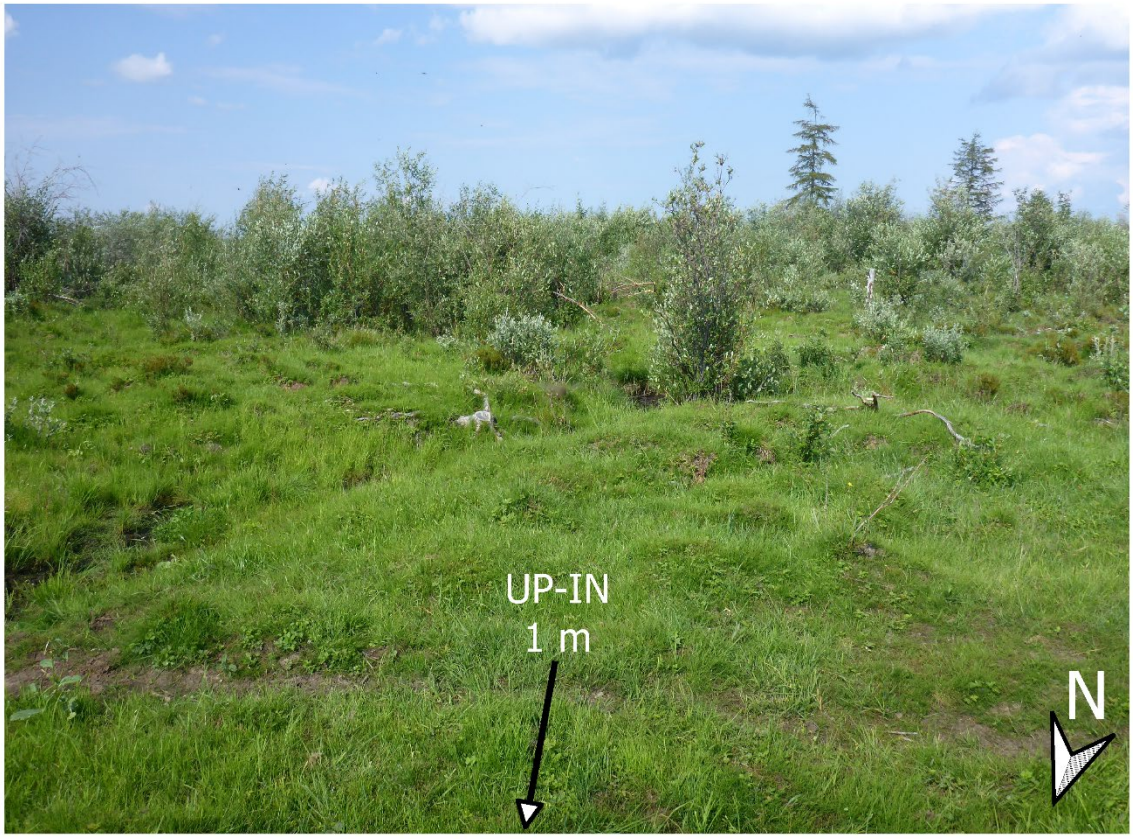

Figure S6 – photograph of the surrounding landscape, taken from site UP-IN; view direction is SSE; foreground: grasses and other short vegetation along with an animal path; background: willow shrubs with up to 2.5 m in height in the extensively grazed neighborhood of the intensively grazed site UP-IN.