Overall field work progress and preliminary results from 1st year measurements in reference sites

2/3/2022

MS Team's meeting

LIFE OrgBalt, LIFE18 CCM/LV/001158

EU LIFE Programme project
"Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland"

Conceptiual study design

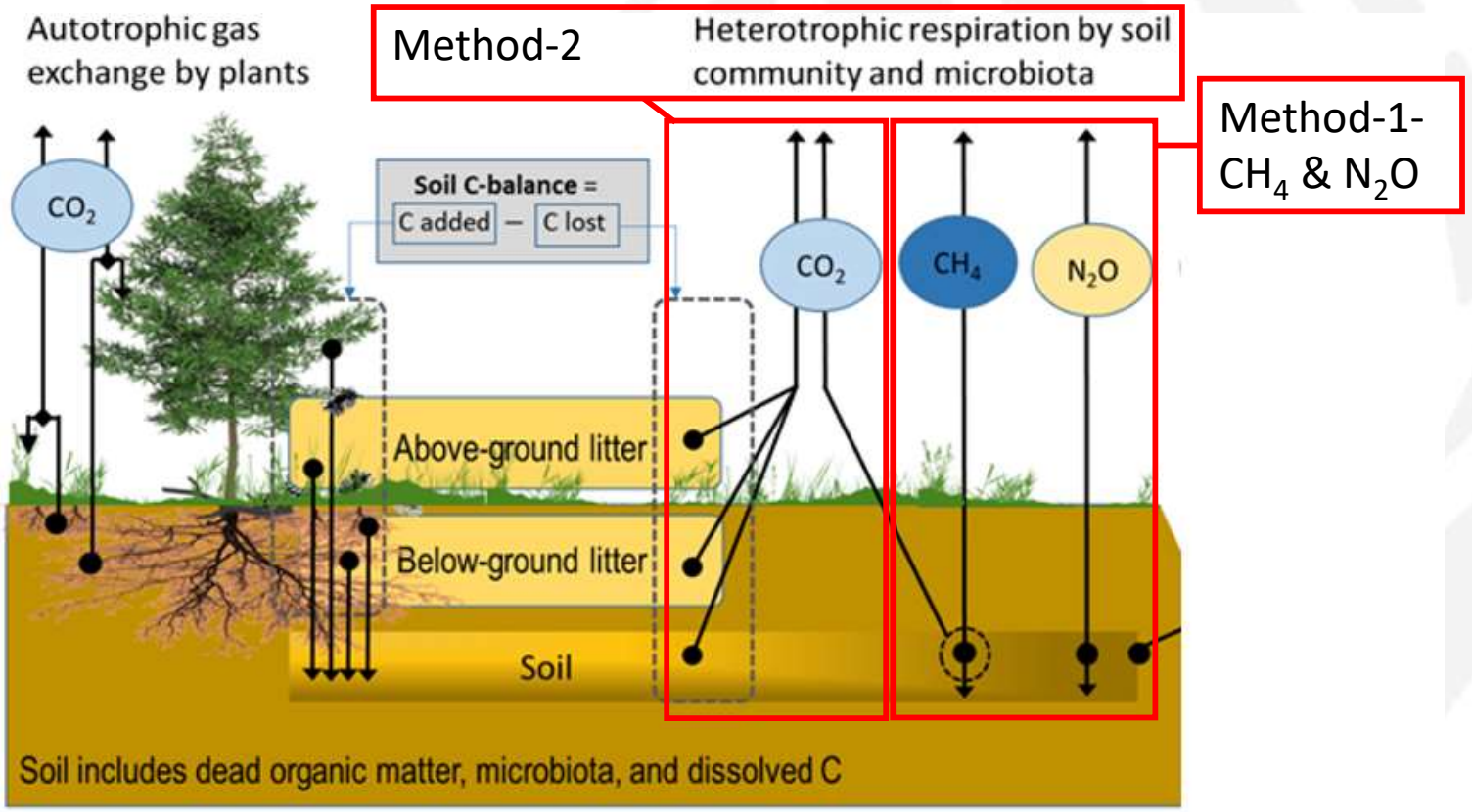


Figure 1. CO_2, CH_4, and N_2O fluxes and mass transfer components (arrows indicate flux/transfer direction) contributing to soil C-stock changes in a forest ecosystem on drained organic soil (as in IPCC, 2014), modified from Jauhiainen et al. (2019).

Progress in 2021 and plans for 2022

GHG flux (January 2021- December 2021):

1. Measurements and sampling:
   - Dark chamber method ('Method-1') - N_2O, CH_4 and wintertime heterotrophic respiration (CO_2)
   - Heterotrophic respiration ('Method-2')
   - NEE - transparent chamber ('Method-3'grasslands)

During the vegetation period only

2. Data QC and flux calculations:
   - N_2O and CH_4 data quality check - continues
   - Heterotrophic respiration flux calculations platform: at last testing states

Next steps in 2022:

- Finalization of Rhet flux platform
- create transparent chamber calculation platform/system or integration with Rhet platform

Progress in 2021 and plans for 2022

Environmental parameters:

- Continuous **soil temperature** (10 (in Finland at 5cm) and 30 cm) and **water level** measurements
- Periodic soil temperature profile (10, 20, 30, 40 cm; manually) and **soil moisture** measurements

Water sampling and analyses:

- Samples collected monthly (once per month)
- Samples filtered and **chemical analyses** done locally (LUKE) or in Silava (UT, LAMMC, SILAVA)
- Water **physical parameters** measured on site with YSI (UT, LAMMC, SILAVA) or in lab (LUKE)

Plans for 2022:

- **Continue regular sampling and analyses**

Progress in 2021 and plans for 2022

Litter production and decomposition

- **Fine and coarse litter collected** during the vegetation period and air-dried in the lab
- **Fine litter** samples are in a process of **fractionation**
- Litter bags are under preparation for **litter decomposition experiment**

Planned in 2022:

- Lab work: to oven dry, weigh, and record the litter dry mass values of all litter fractions
- Lab work: chemical analysis of C and N in Silava
- Litter decomposition experiment: litter bags preparation and installation

Progress in 2021 and plans for 2022

Aboveground biomass and production

Crop fields and grasslands:

- Ground vegetation biomass production (Estonia)

Planned in 2022

Crop fields and grasslands:

- Ground vegetation biomass production (Latvia/Lithuania)

Forests:

- Tree biomass production
- Ground vegetation (herbaceous, perennial, mosses) biomass production

Progress in 2021 and plans for 2022

Belowground biomass and production

Forests:

- Fine-root production: installation of ingrowth (mesh-free) cores

Planned in 2022

- Fine-root production: collection of ingrowth cores: end of 2021, beginning of 2021 – first sampling round
- Fine root biomass: collection of peat cores
- Lab work: to wash out, oven dry, weigh

Crop fields and grasslands:

- Collection of peat cores, roots are washed out - Estonia

Planned in 2022

- Belowground biomass production in Latvia/Lithuania

Progress in 2021 and plans for 2022

Soil sampling and analyses (soil profile study)

- Soil sampling for soil chemical analysis
- Soil sampling for microbiology studies

Planned in 2022

- Finalize the soil sampling
- Lab work: chemical analysis in Silava
- Lab work: soil infrared spectroscopy analysis in Silava/Luke
- Lab work: microbiology analysis in Luke

Data storage flow

- Data template has been updated

Planned in 2022

- Improve the data flow to OneDrive

Results: gas flux measurements – Latvia (monthly)

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LVC101	X	X	X	X	X	X	X		X	X	X	X	11
LVC102	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC103	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC104	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC105	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC106	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC107	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC108	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC109	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC110	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC111	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC112	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC113	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC114	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC115	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC116	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC301	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC302	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC303	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC304	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC305	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC306						X	X	X	X	X	X	X	7
LVC307	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC308	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC309	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC310						X	X	X	X	X	X	X	7
LVC311	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC312	X	X	X	X	X	X	X	X	X	X	X	X	12
LVC313	X	X	X	X	X	X	X	X	X	X	X	X	12

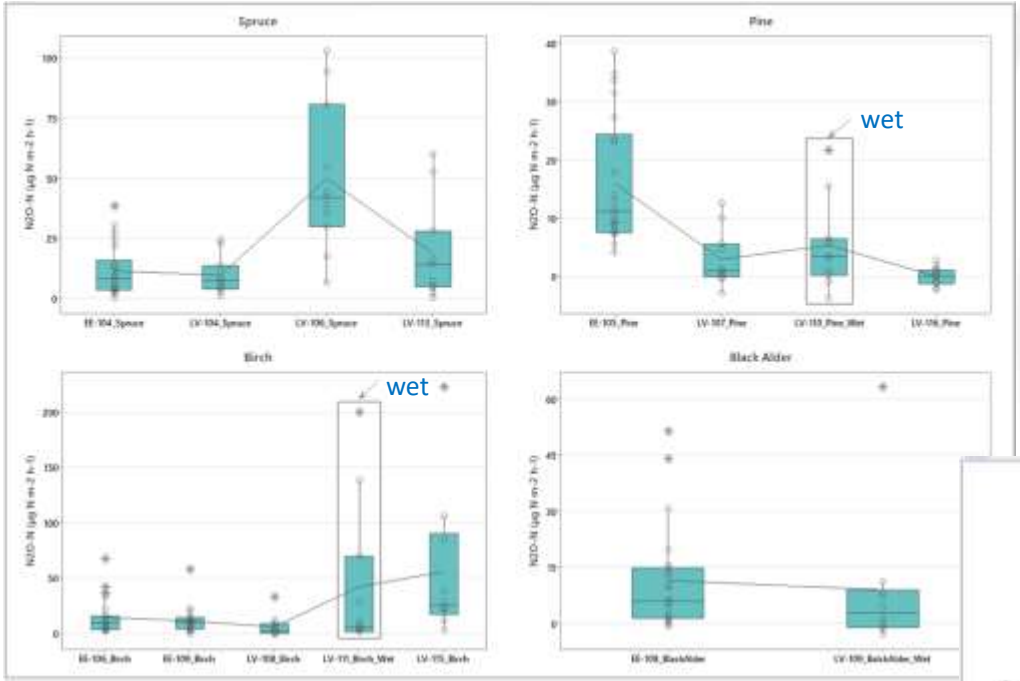
Results: gas flux measurements – Estonia (twice per month)

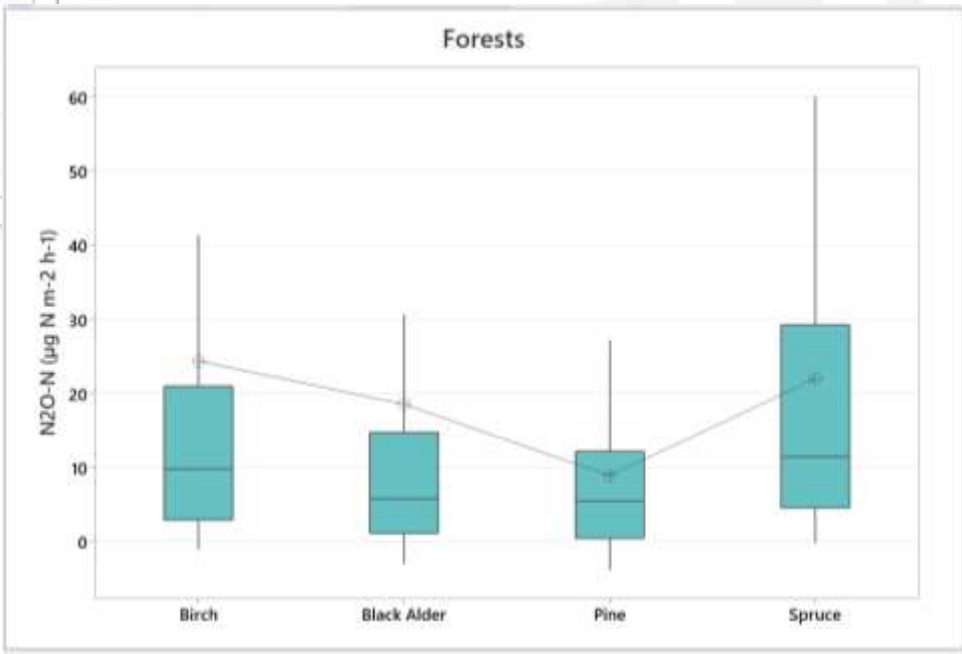
2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EEC101	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC102	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC103	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC104	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC105	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC106	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC107	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC108	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC109	X	X	X	X	X	X	X	X	X	X	X	X	24
EEC110	X	X	X	X	X	X	X	X	X	X	X	X	24

Results: gas flux measurements - Lithuania

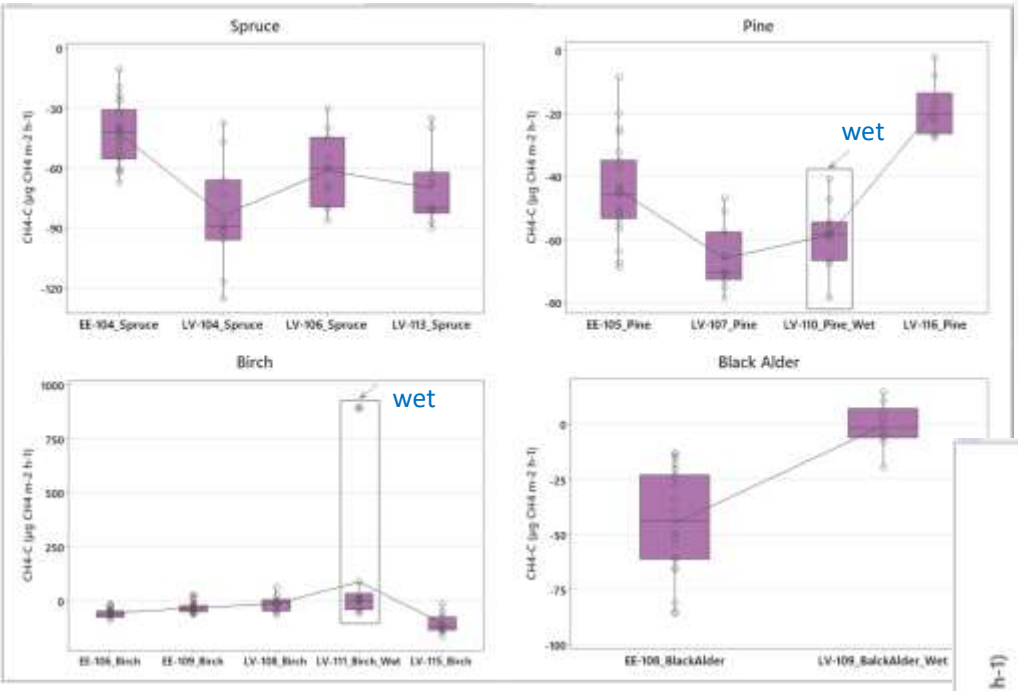
2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
LTC101			X			X	X				X	X	5
LTC102			X								X	X	3
LTC103			X	X		X	X		X		X	X	7
LTC104			X		X		X		X		X	X	6
LTC105			X		X			X		X	X	X	6
LTC106			X	X	X		X			X	X	X	7
LTC107			X			X		X		X	X	X	6
LTC108			X			X	X				X	X	5
LTC109						X	X				X	X	5
LTC110			X			X				X	X	X	5

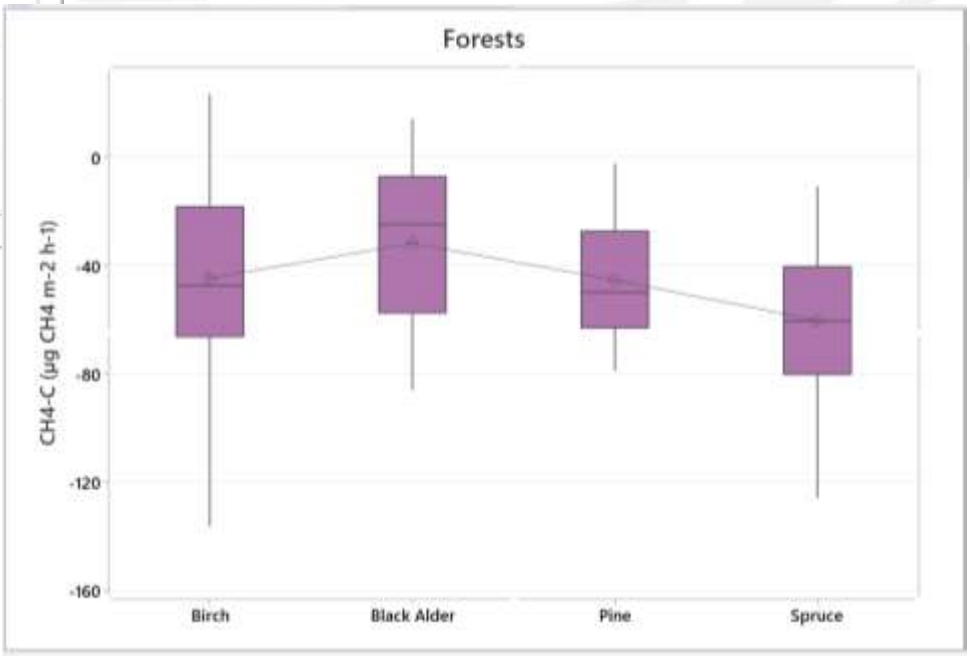
1st year results: reference sites – forests – N_2O soil flux



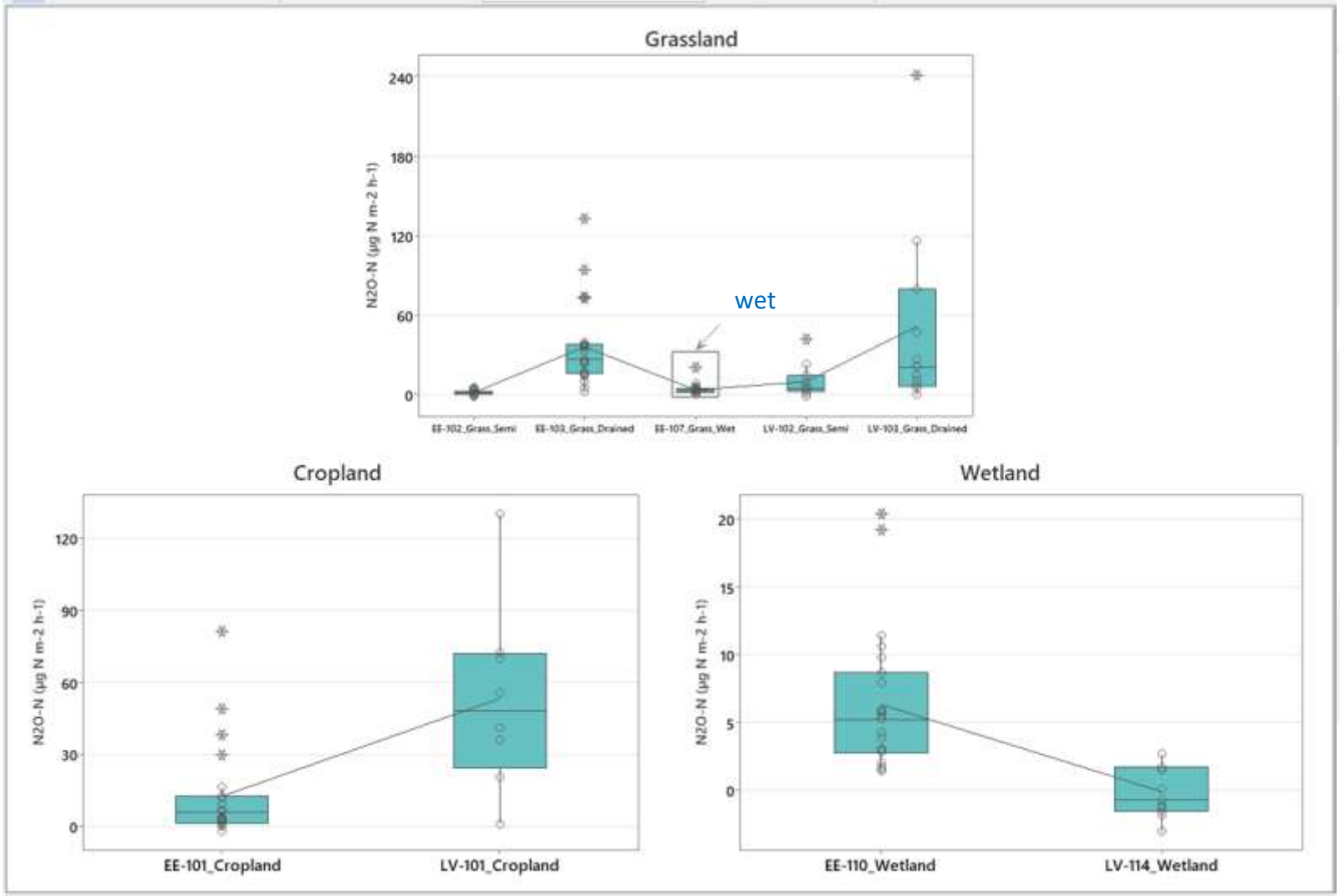


1st year results: reference sites – forests – CH_4 soil flux

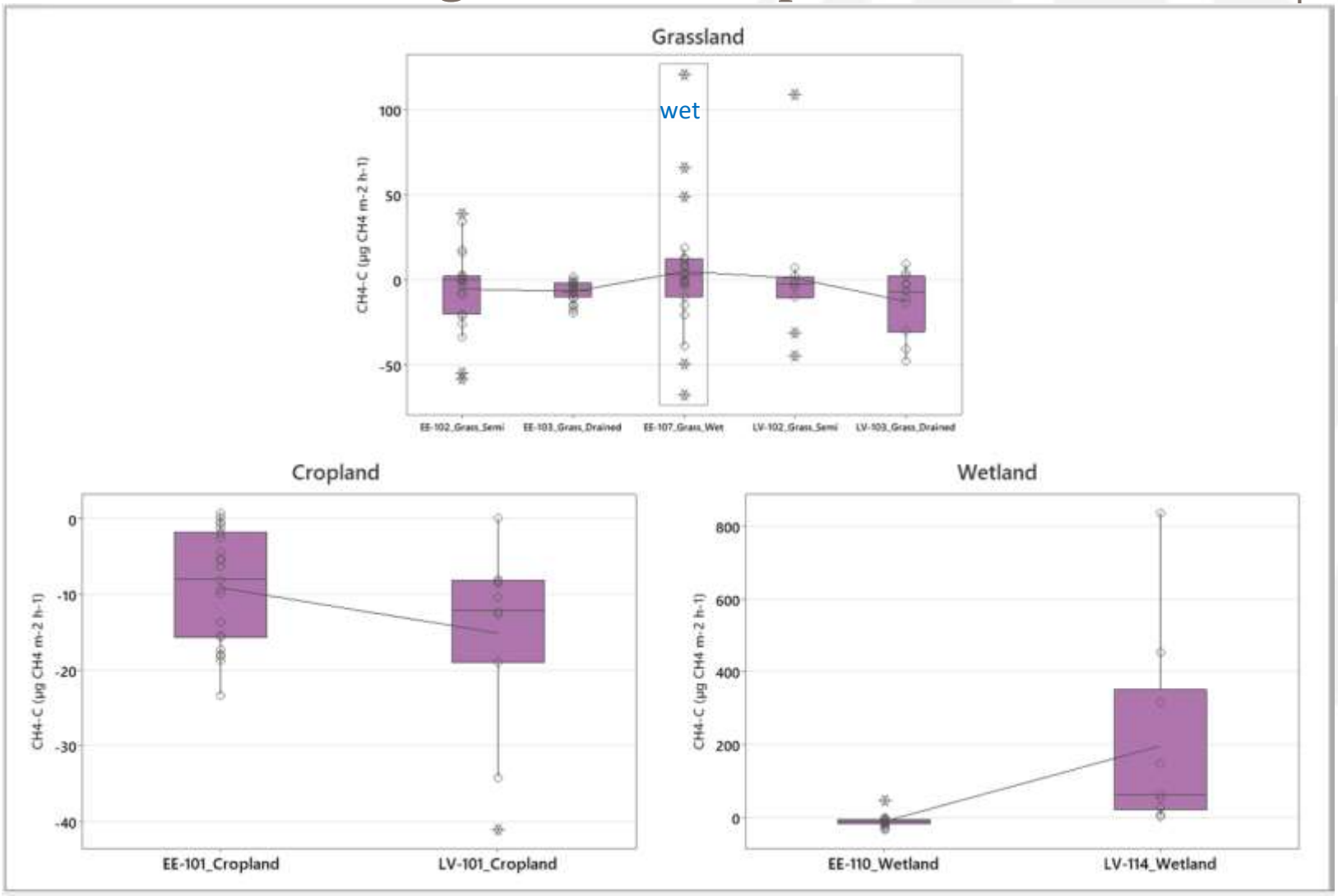




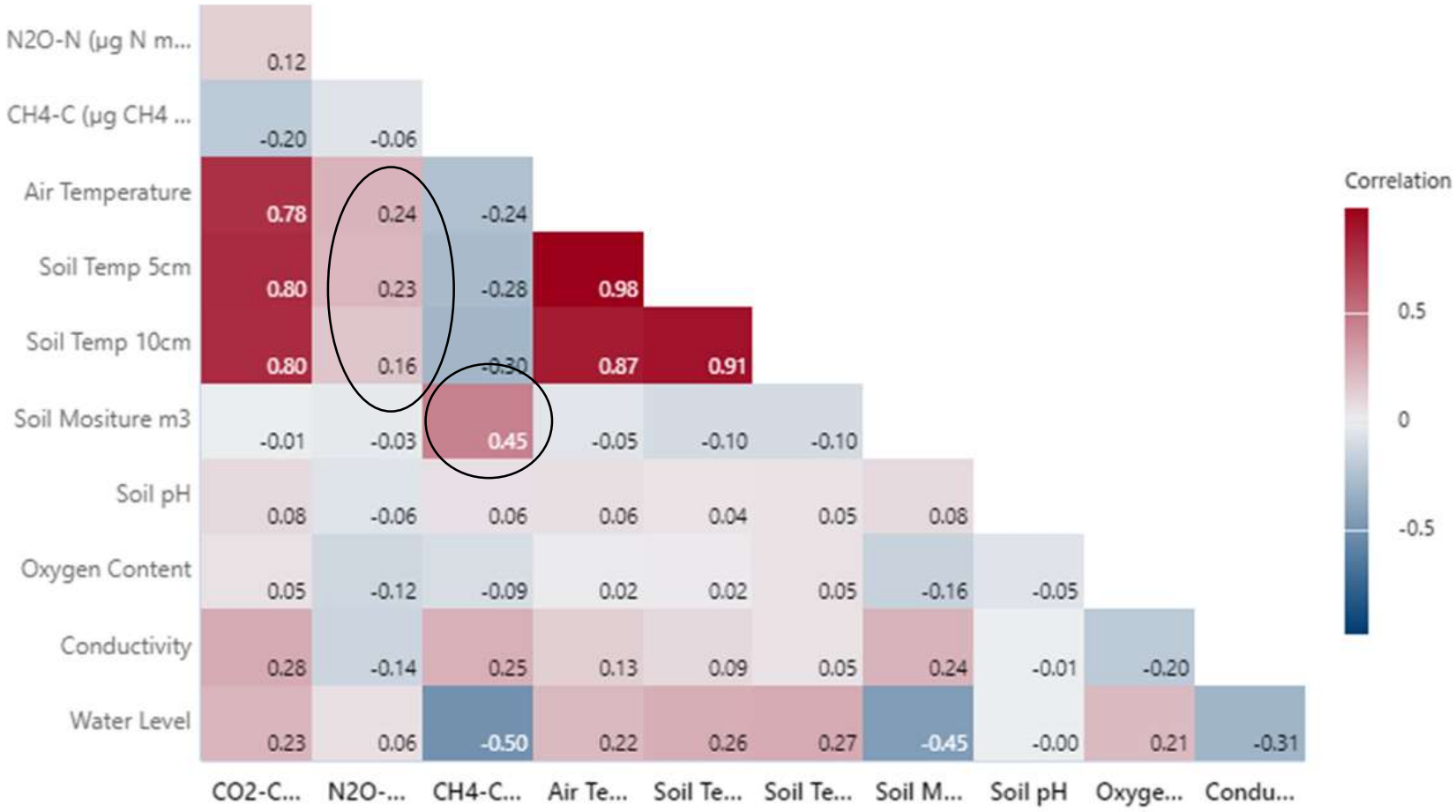
Reference sites – grassland, cropland, wetland – N_2O flux



Reference sites – grassland, cropland, wetland – CH_4 flux



Environmental parameters

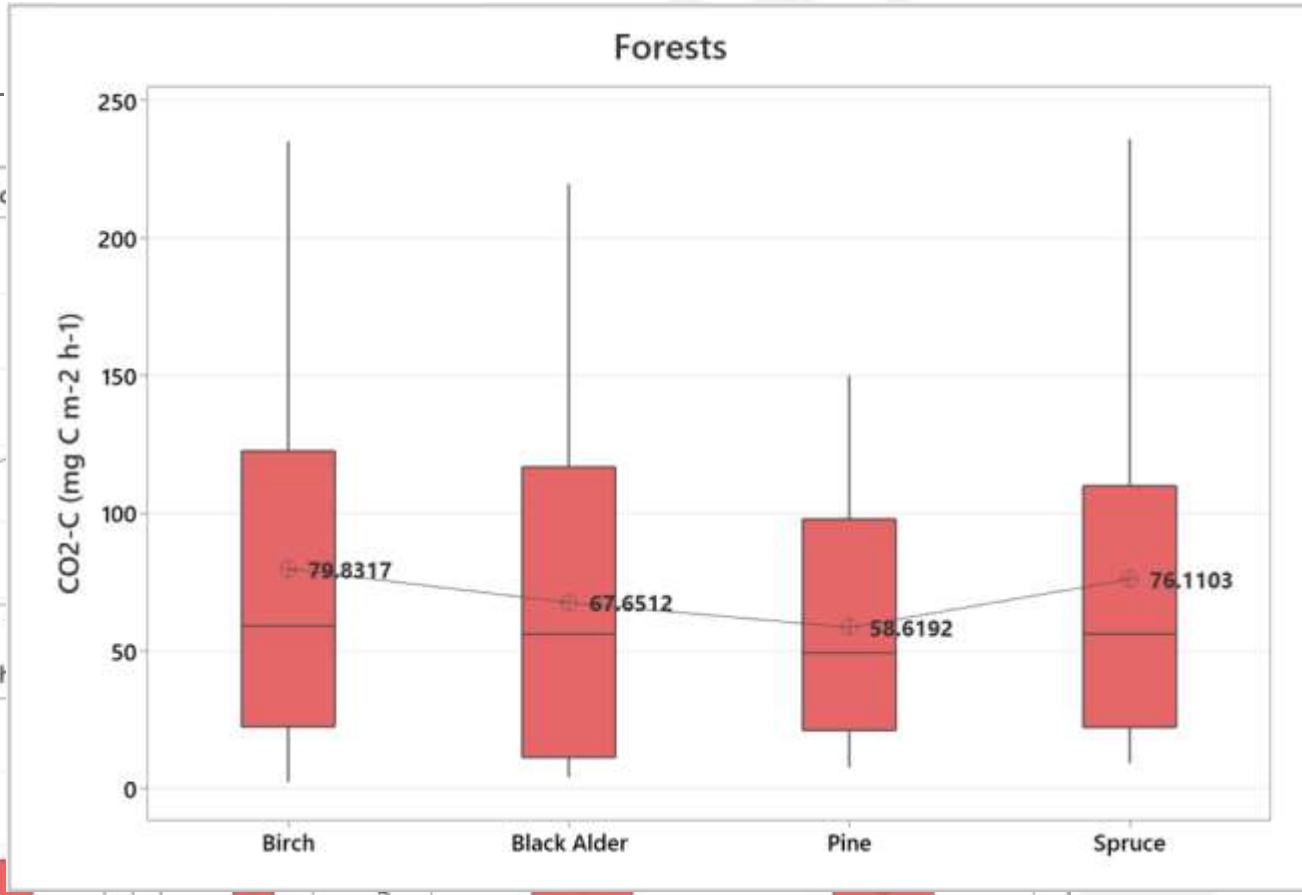


Statistics – 1st year measurements

Variable	Site	N	Mean	SE Mean	StDev	Minimum	Median	Maximum
N_2O (µg N m-2 h-1)	Birch	79	**24.45**	5.41	48.06	-0.98	9.93	271.56
	Black Alder	34	18.60	6.64	38.70	-2.92	5.89	206.46
	Pine	56	9.00	1.66	12.43	-3.76	5.57	60.73
	Spruce	56	22.06	3.64	27.26	-0.08	11.54	128.89
CH_4 (µg CH4 m-2 h-1)	Birch	79	126 (-10,92)	130	1153	-165	-46	9850
	Black Alder	34	-24.98	8.18	47.69	-85.79	-23.83	192.60
	Pine	56	-45.16	3.13	23.42	-78.66	-49.71	48.34
	Spruce	56	**-60.07**	3.28	24.53	-125.76	-60.23	-10.55
N_2O (µg N m-2 h-1)	Cropland	33	**55.3**	23.0	132.0	-2.0	9.3	570.3
	Grassland	91	17.64	3.62	34.49	-1.73	4.27	241.38
	Wetland	34	4.266	0.909	5.299	-3.007	2.880	20.351
CH_4 (µg CH4 m-2 h-1)	Cropland	34	-11.13	1.62	9.43	-41.06	-9.57	0.67
	Grassland	91	-3.30	2.83	27.02	-67.91	-2.50	120.79
	Wetland	34	**121.5**	74.7	435.3	-33.8	-4.4	2389.7

All guestions or recommendations are WELCOME!

Reference sites –



Reference sites – grassland, cropland, wetland