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Measurements of greenhouse gases emissions in Latvia - main findings and recommendations

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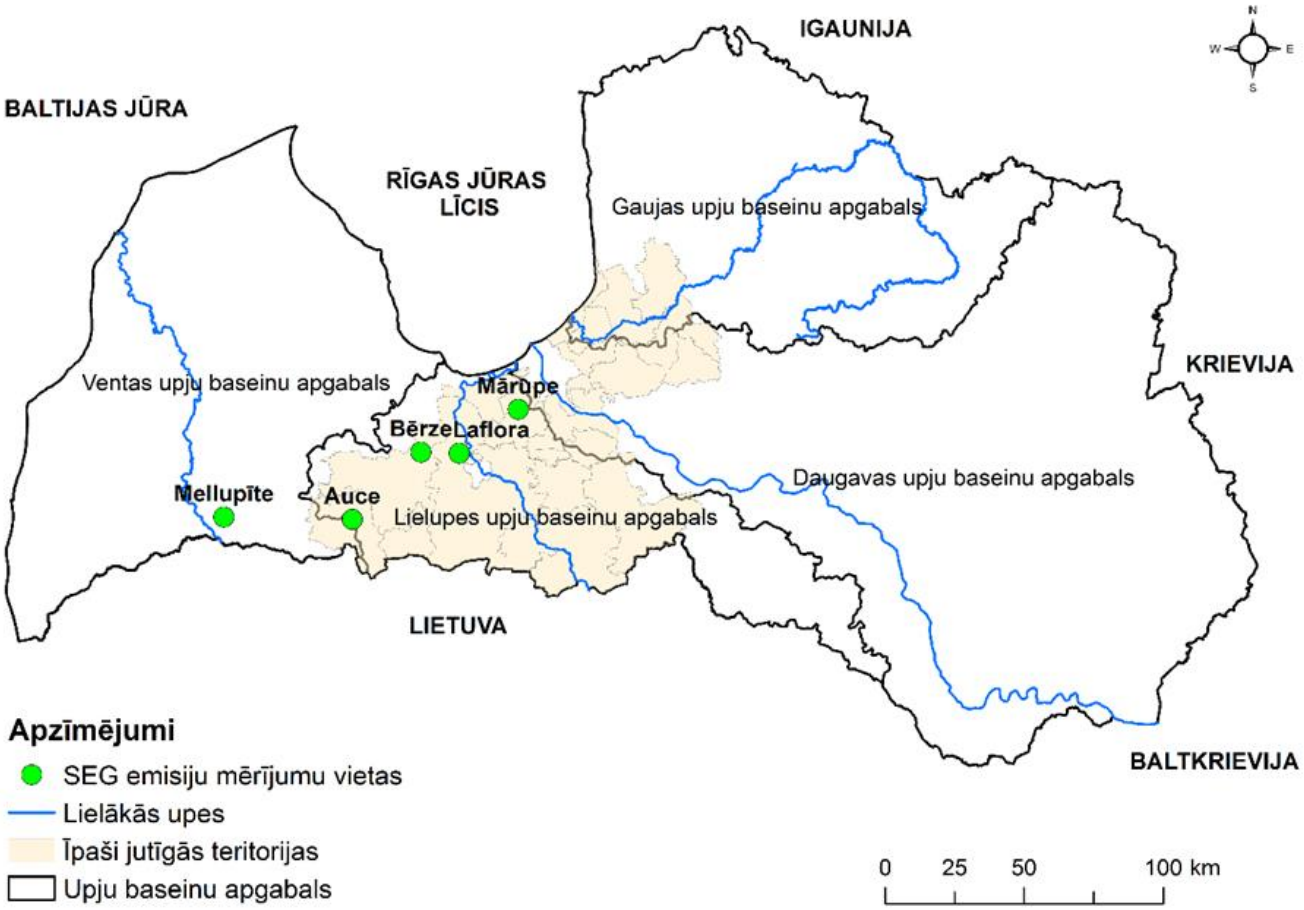
Content

1. GHG emissions from agricultural fields (mineral and organic soils with predominant application of mineral fertilizers)

2. GHG emissions from agricultural fields if digestate from a biogas plant is applied

3. GHG emissions from agricultural fields if pig slury digestate with and without acid is applied

Study sites (1)

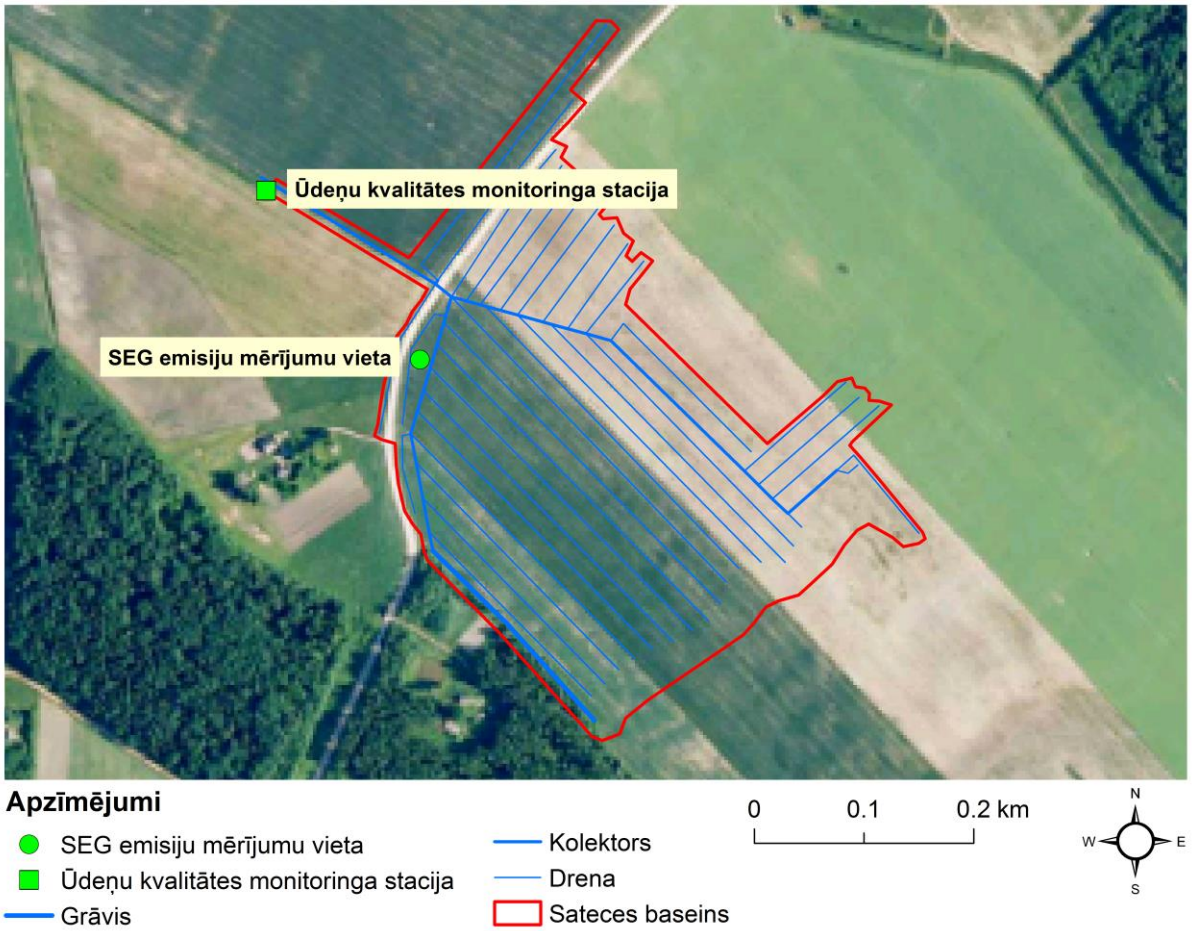


Berze study site

Crops: corn (2017), and peas (2018)

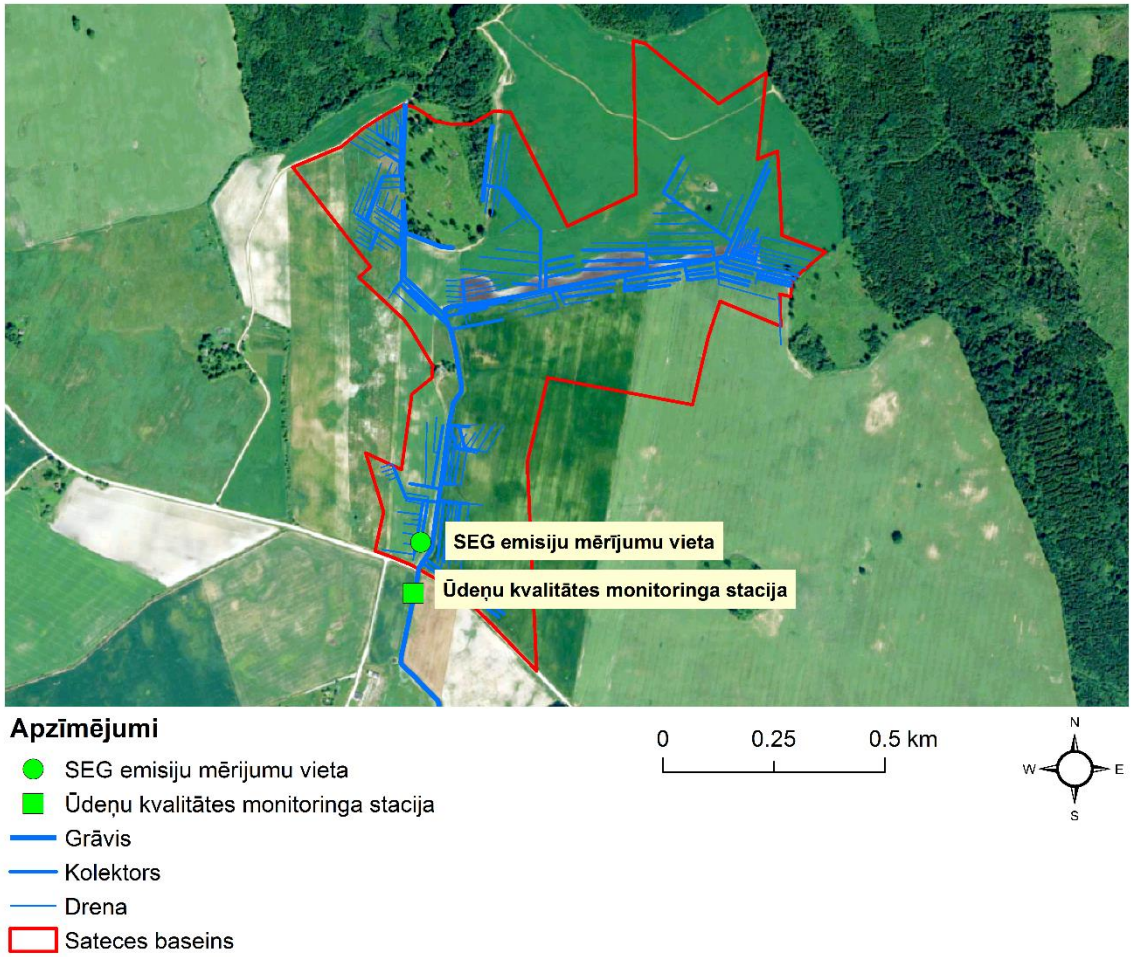
Mellupite study site

Crops: winter oilseed rape (2017) and winter wheat (2018)



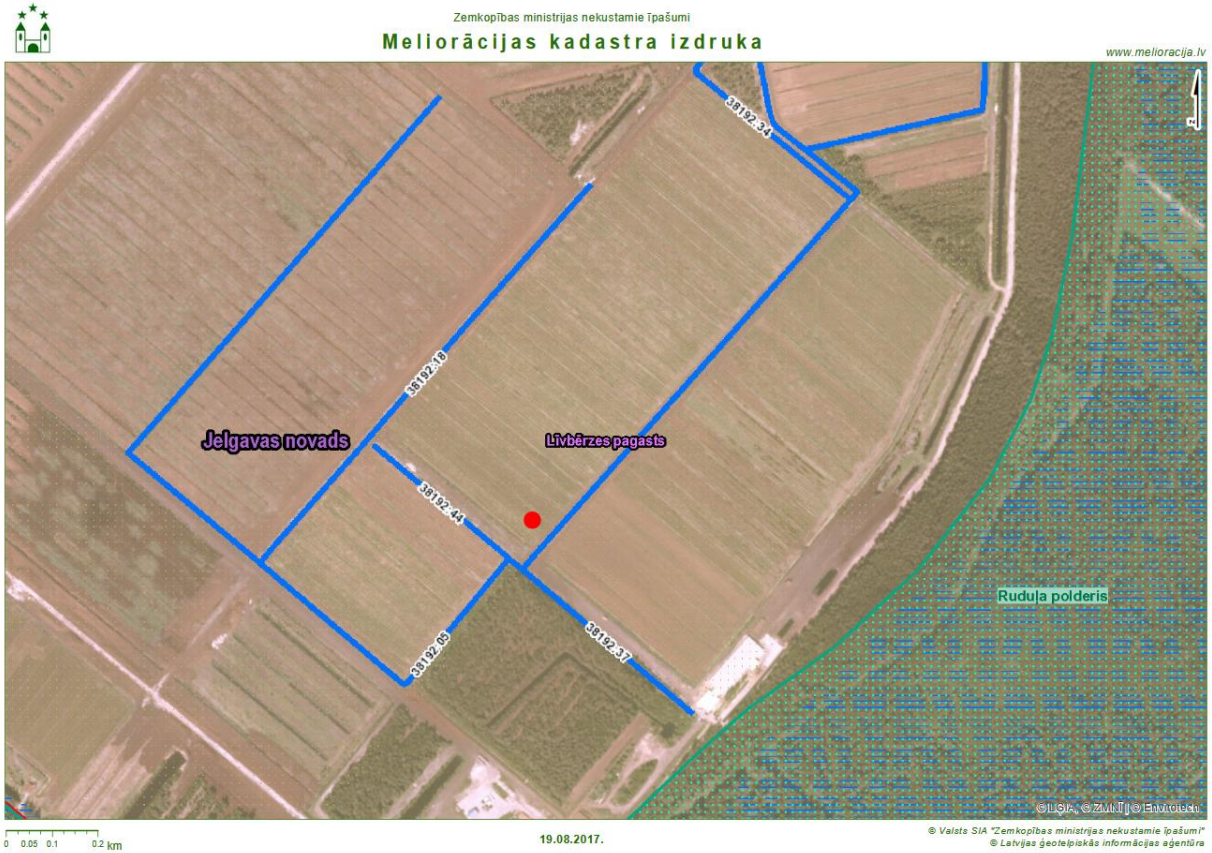
Auce study site

Crops: winter wheat (2017) and spring wheat (2018)



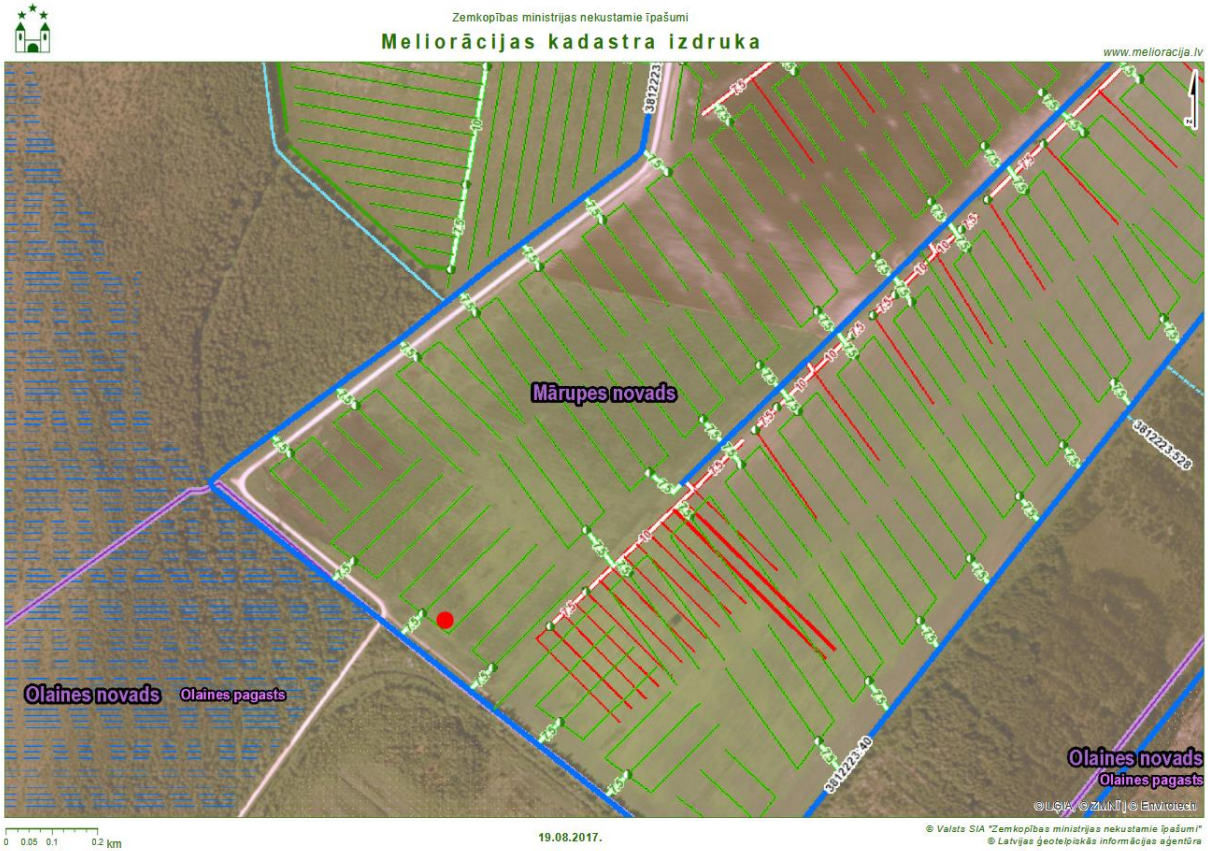
Laflora study site

Blackberry (2017 and 2018)



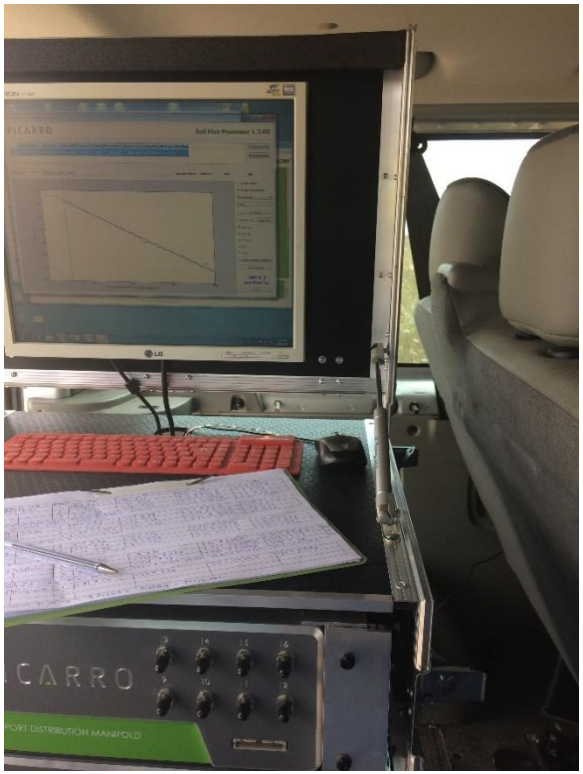
Marupe study site

Fallow (2017 and 2018)



Equipment for field measurements

Emissions of N_2O, CH_4, CO_2, NH_3 from soil were measured using the cavity ring down spectroscopy device Picarro G2508

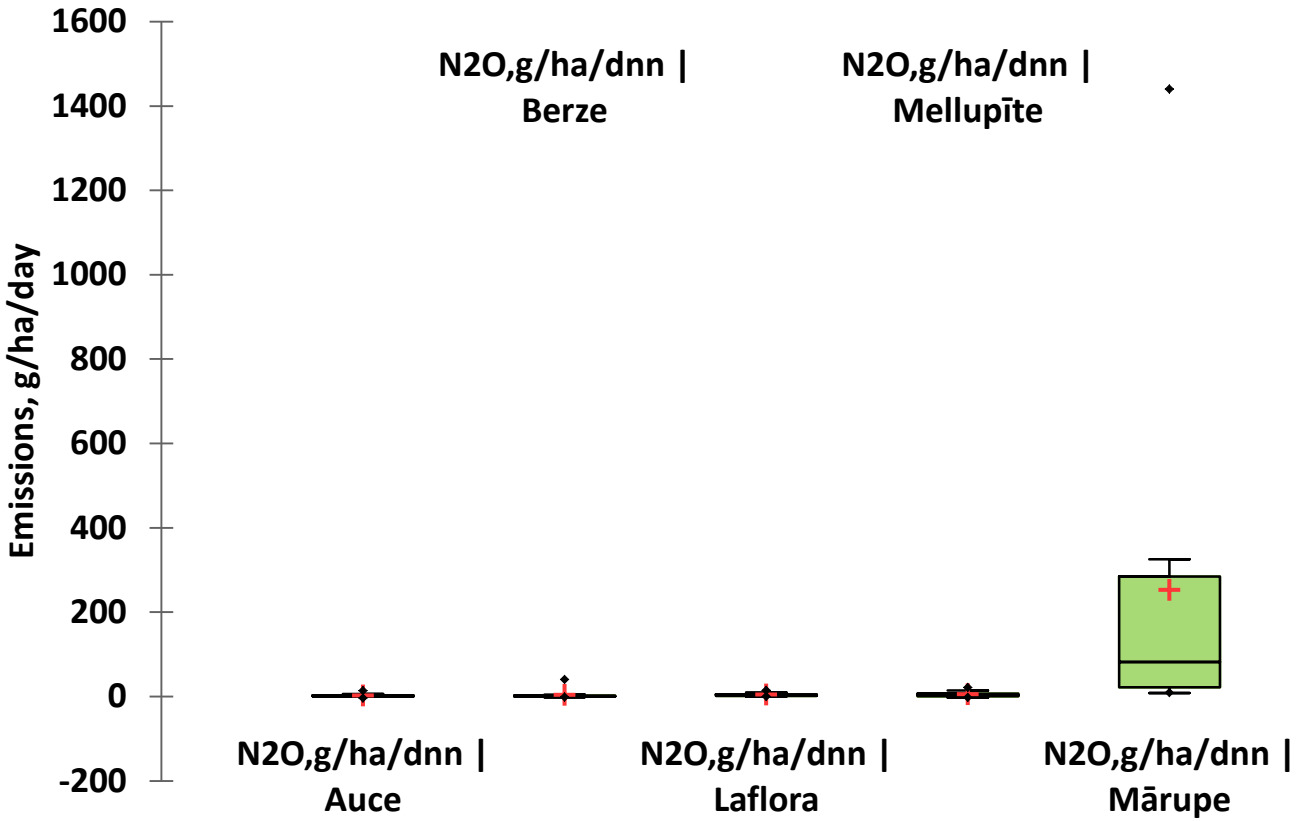


Equipment for field measurements

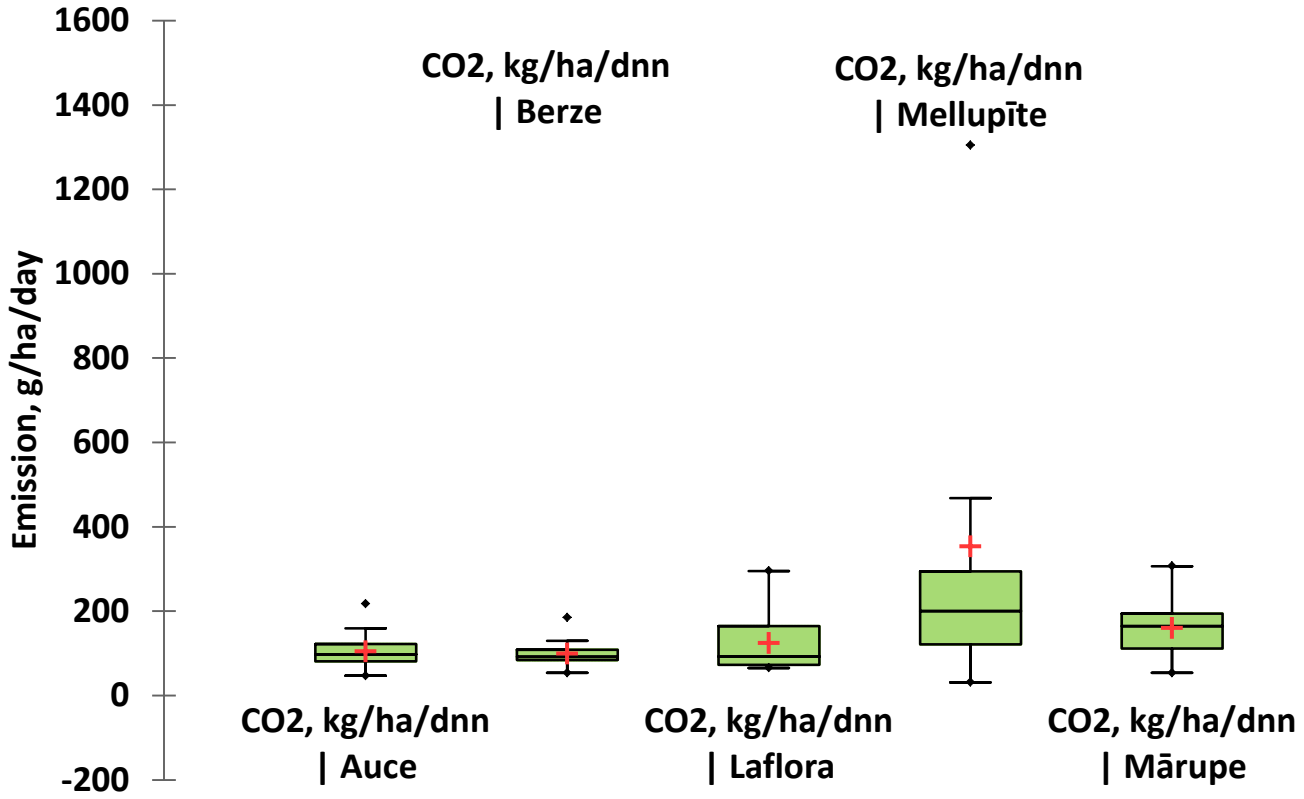
In addition, air temperature measurements in soil and air inside / outside of chambers were carried out.

Diver DI 500, Eijkelkamp

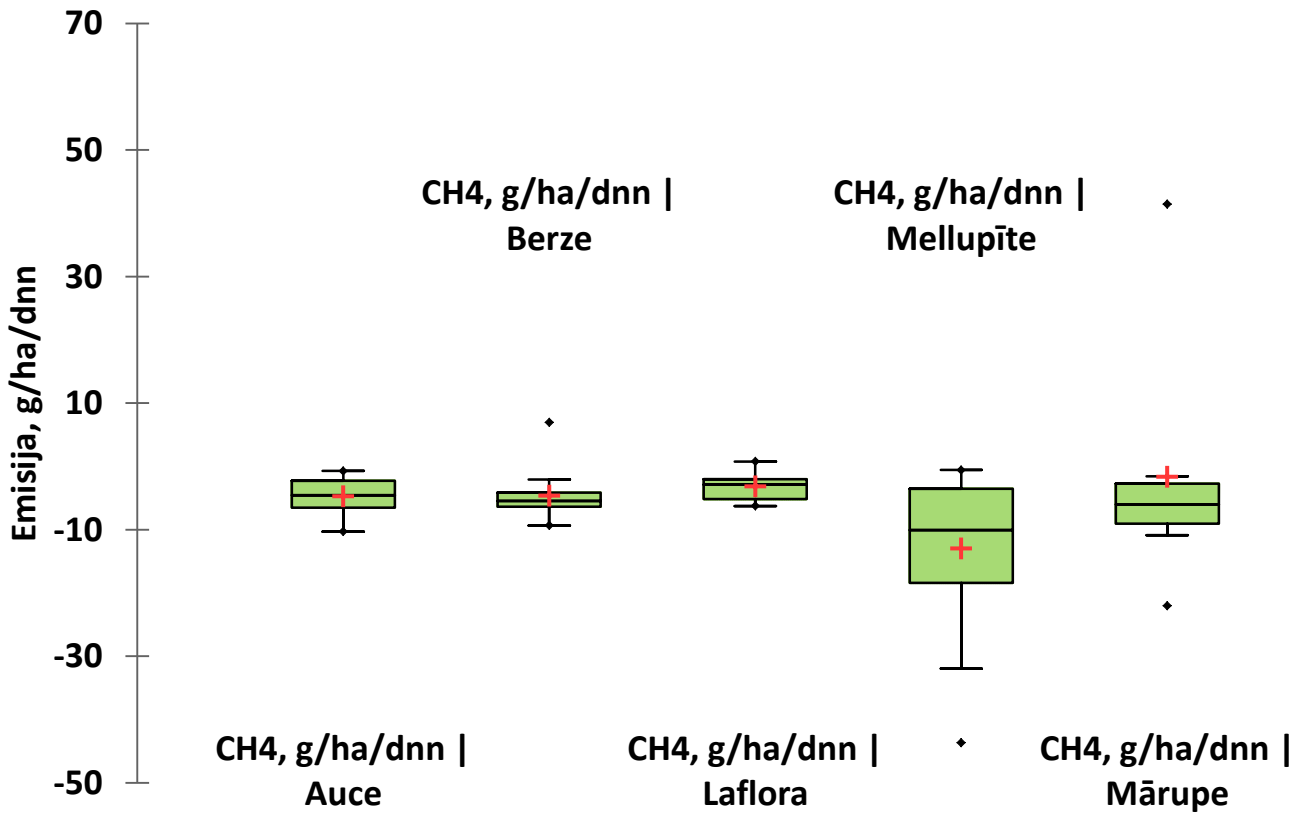
Results in 2017 – Nitrous oxide (N_2O)



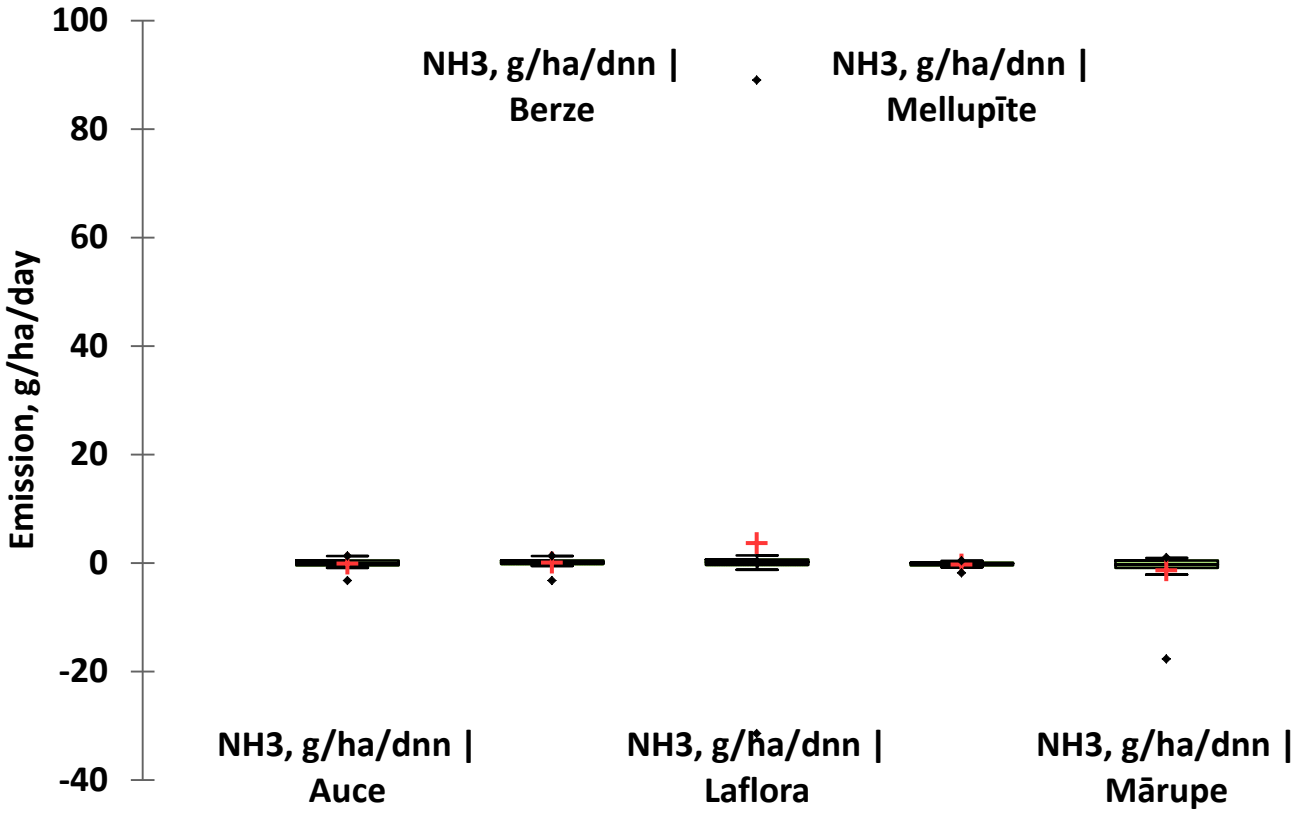
Results in 2017 – Carbon dioxide (CO_2)



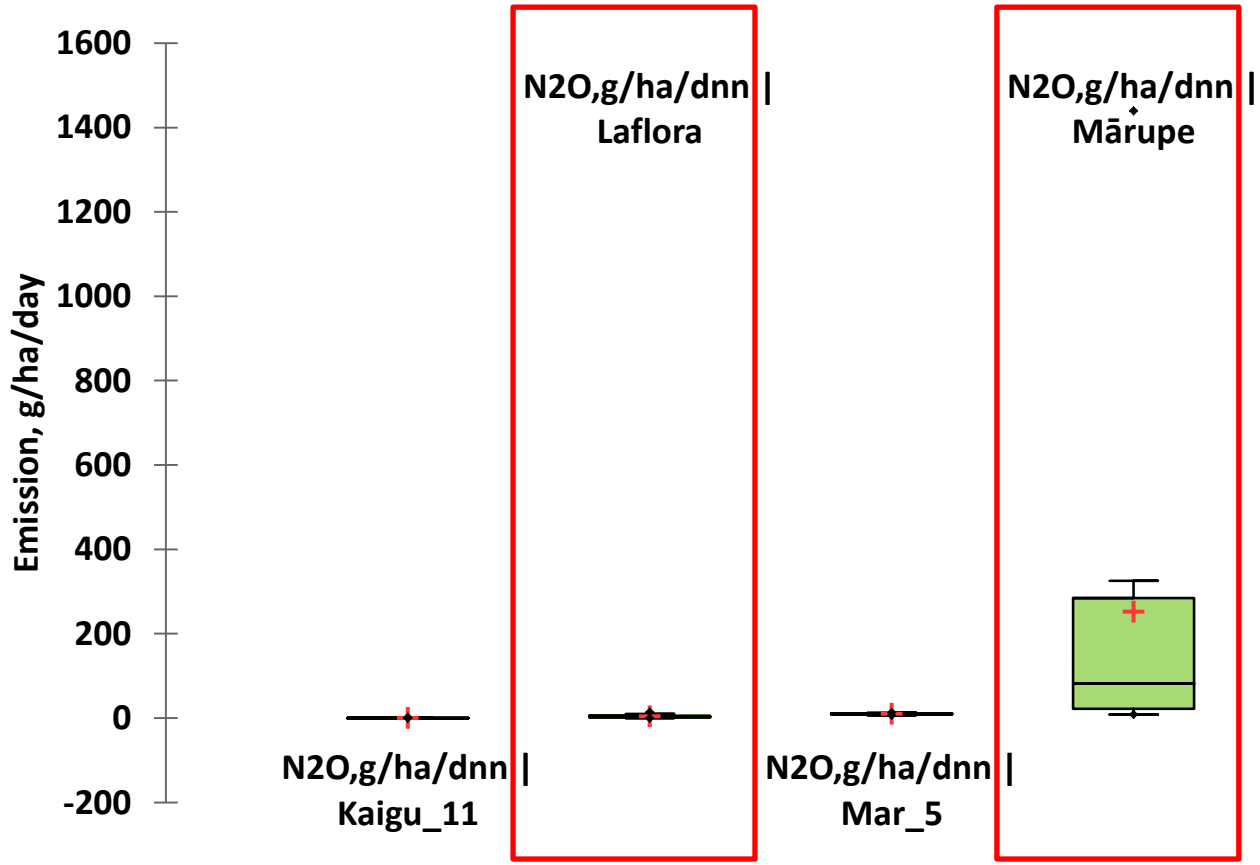
Results in 2017 – Methane (CH_4)



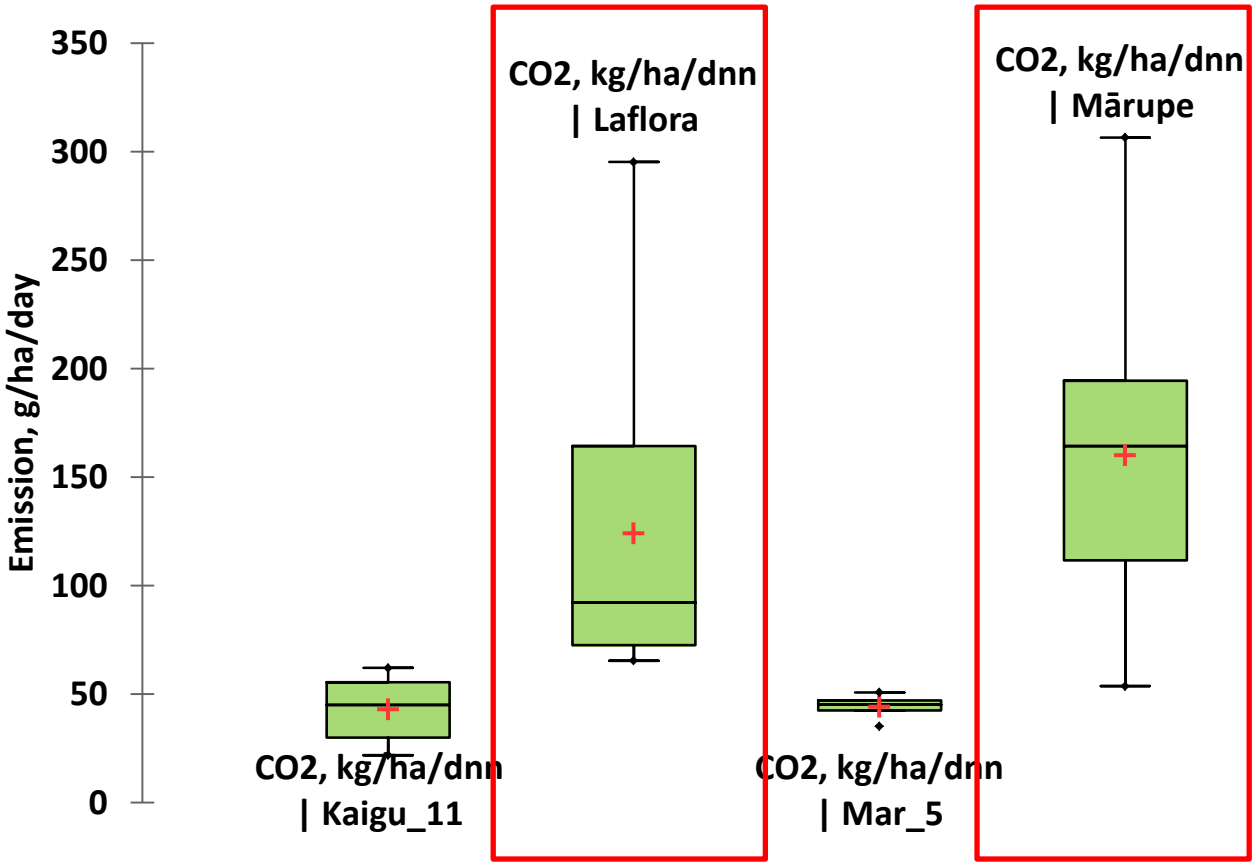
Results in 2017 – Ammonia (NH_3)



A comparison of two measuremet methods – Nitrous oxide (N_2O)



A comparison of two measuremet methods – Carbon dioxide (CO_2)



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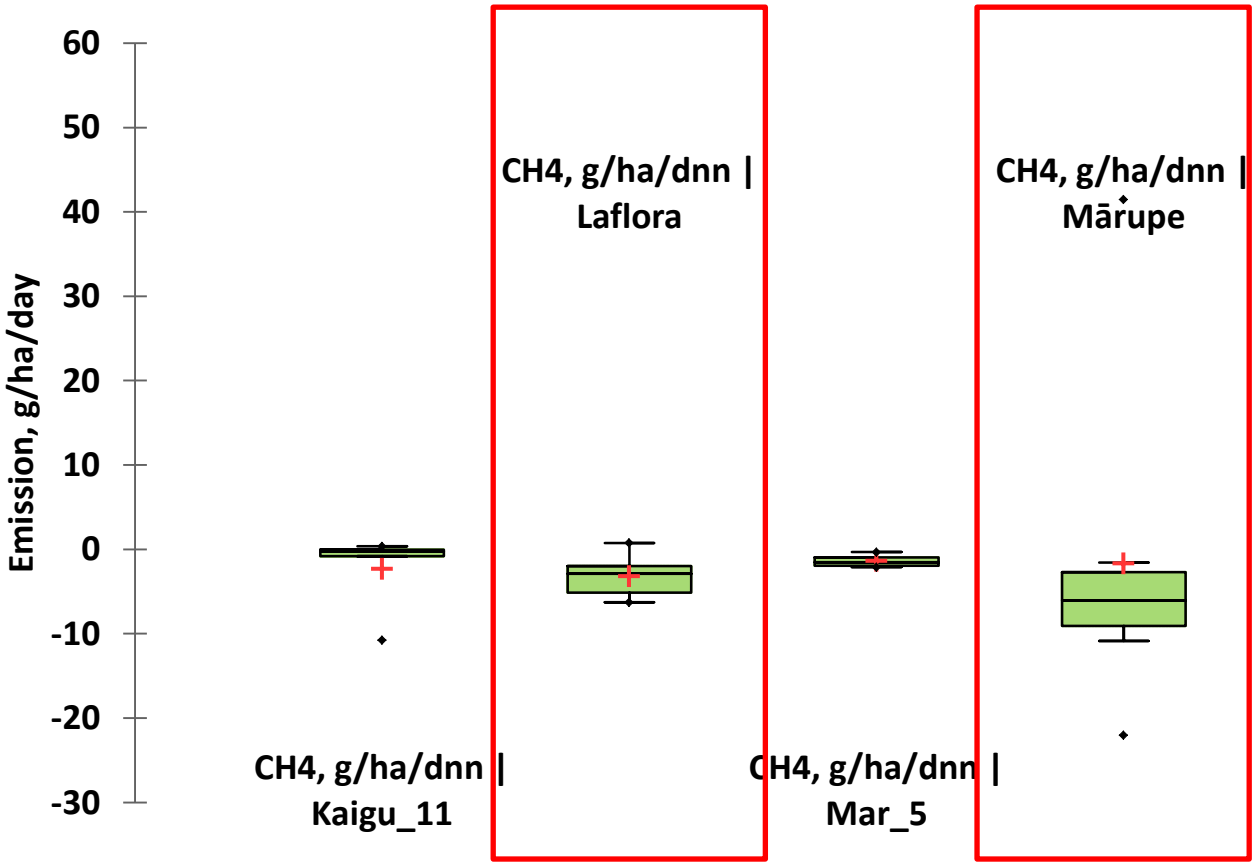


Kendall rank correlation coefficient in mineral soils in 2017

Variables	Air temperature, ^{O}C	N2O, g/ha/dnn	CH4, g/ha/dnn	CO2, kg/ha/dnn	NH3, g/ha/dnn
Air temperature, ^{O}C	1***	-0,020	**-0,294*** **	**0,336*** **	-0,072
N2O,g/ha/dnn	-0,020	1	-0,123	**0,262*** **	0,144
CH4, g/ha/dnn	**-0,294*** **	-0,123	1	**-0,426*** **	-0,034
CO2, kg/ha/dnn	**0,336*** **	**0,262*** **	**-0,426*** **	1***	-0,063
NH3, g/ha/dnn	-0,072	0,144	-0,034	-0,063	1***

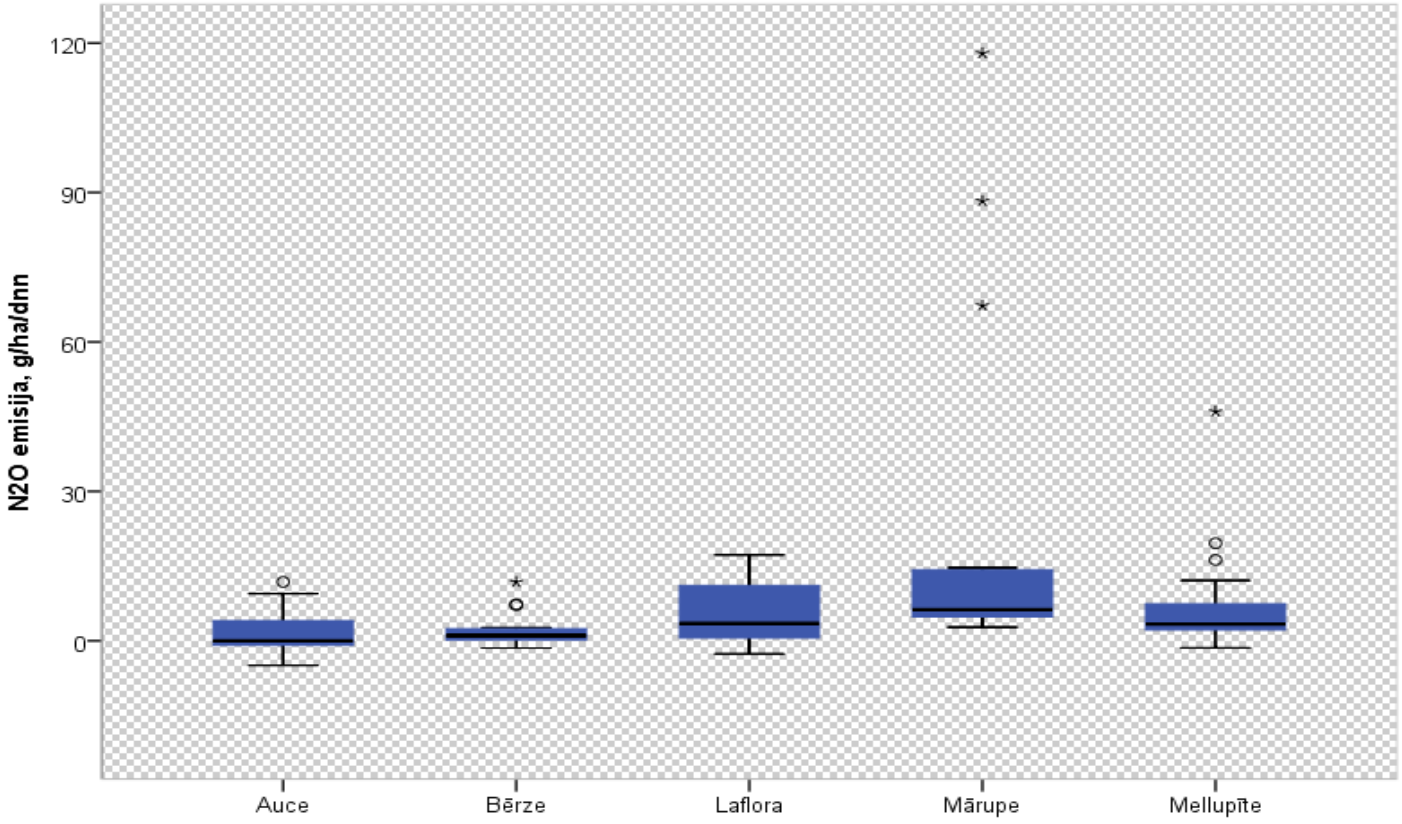
*** p-value <0.01; ** p-value <0.05; *p-value <0.1

Kendall rank correlation coefficient in organic soils in 2017

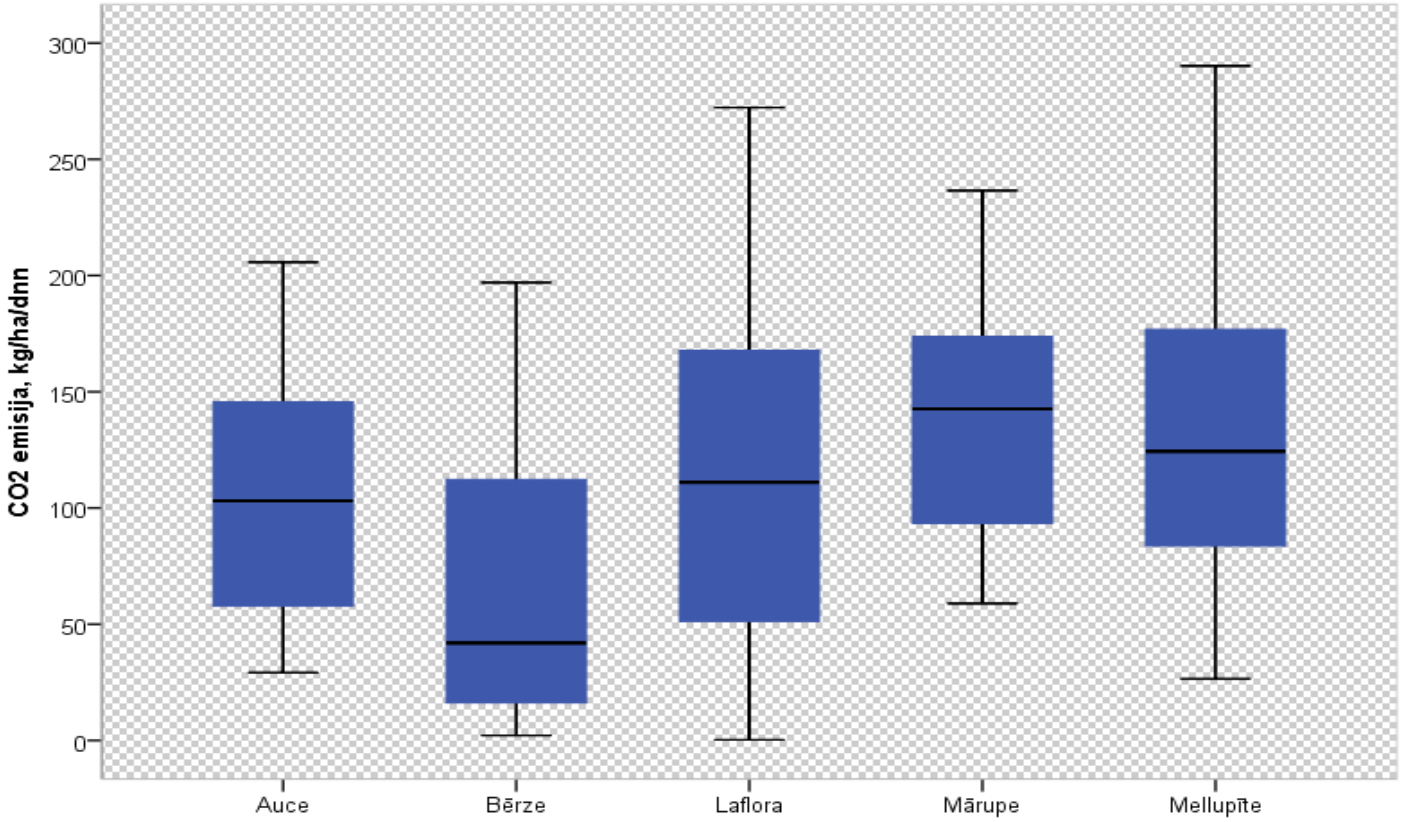
Variables	Air temperature, ^{o}C	N2O, g/ha/dnn	CH4, g/ha/dnn	CO2, kg/ha/dnn	NH3, g/ha/dnn
Air temperature, ^{o}C	1	0,162	-0,114	-0,085	0,197
N2O,g/ha/dnn	0,162	1	-0,144	0,065	0,019
CH4, g/ha/dnn	-0,114	-0,144	1	-0,129	-0,004
CO2, kg/ha/dnn	-0,085	0,065	-0,129	1	-0,087
NH3, g/ha/dnn	0,197	0,019	-0,004	-0,087	1

*** p-value <0.01; ** p-value <0.05; *p-value <0.1

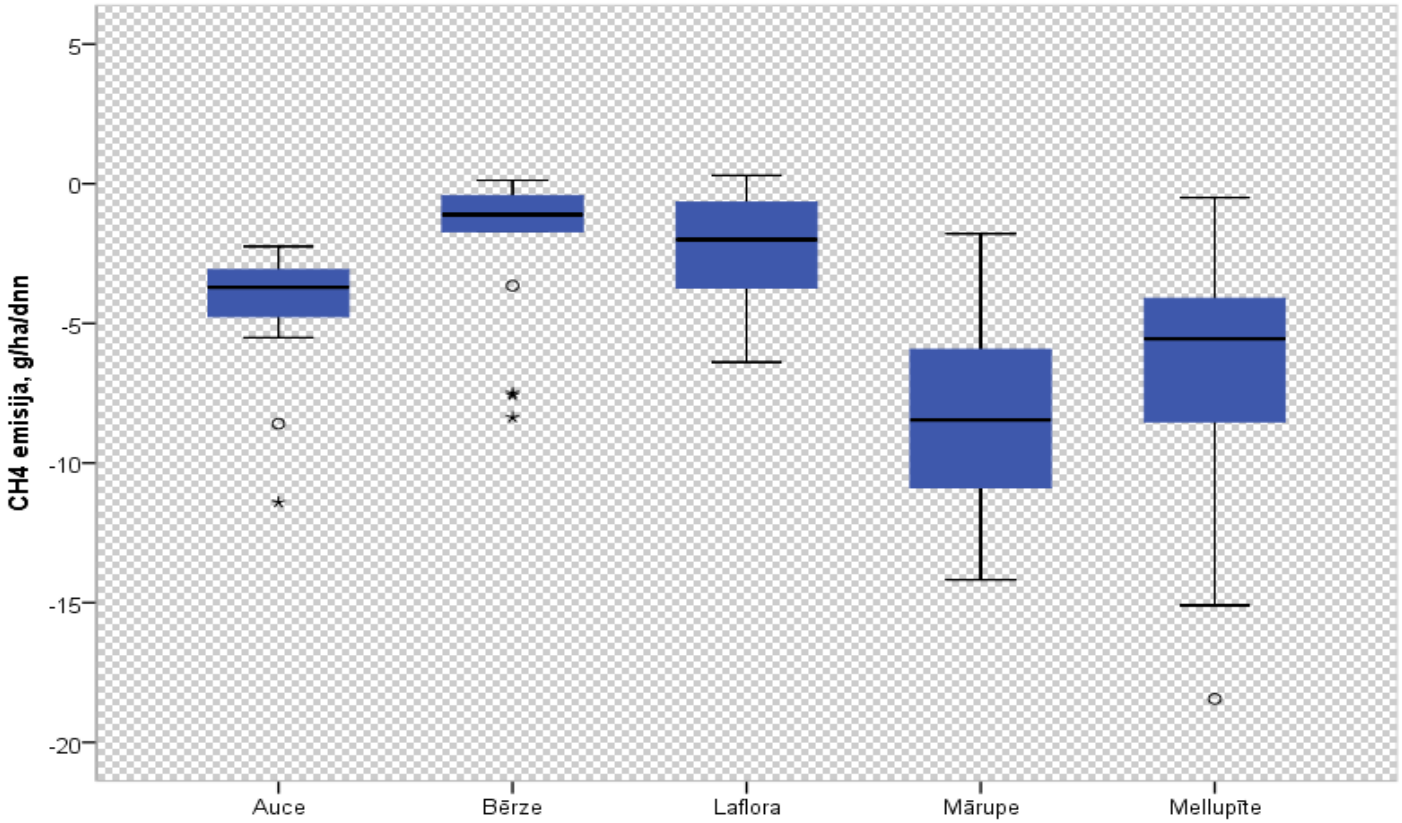
Results in 2018 – Nitrous oxide (N_2O)



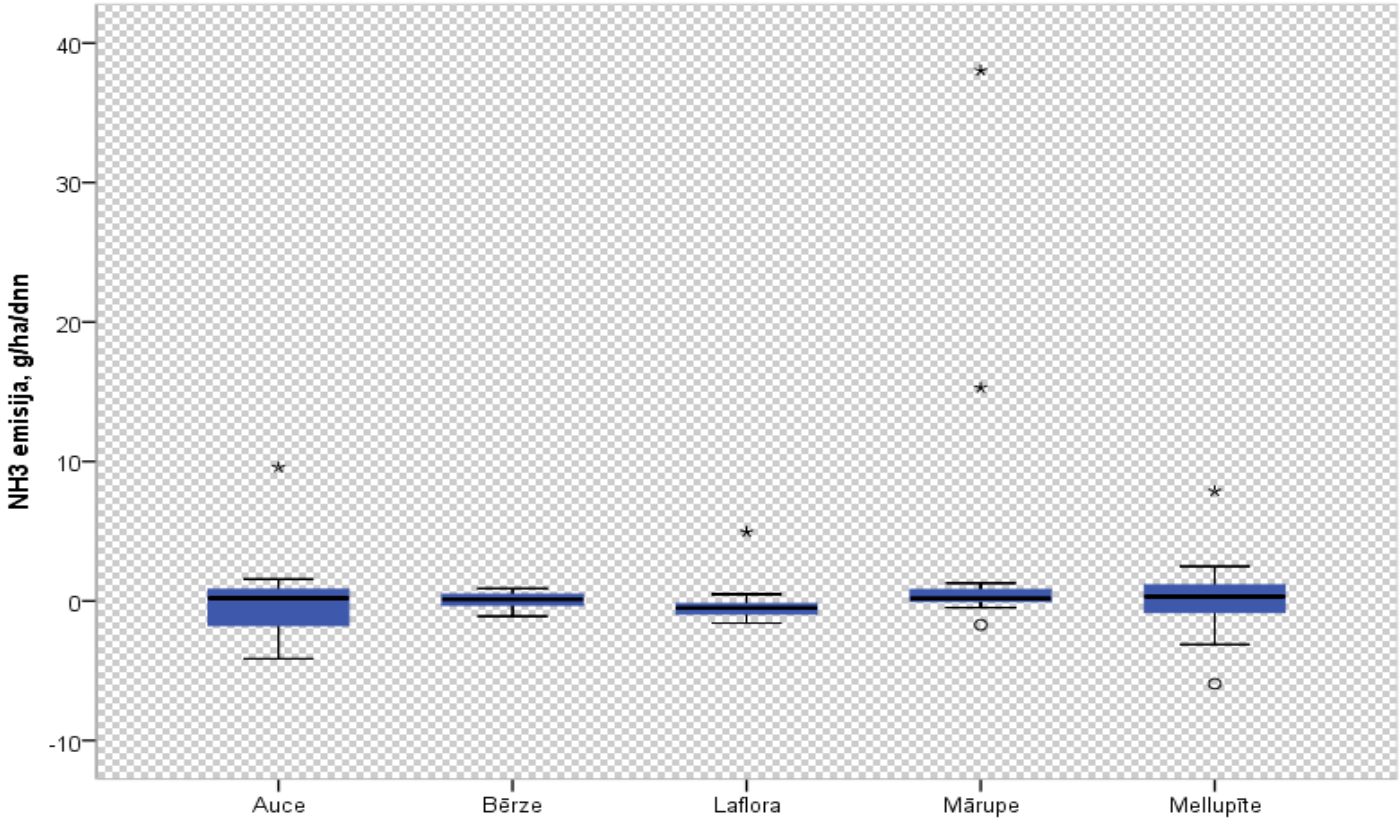
Results in 2018 – Carbon dioxide (CO_2)



Results in 2018 – Methane (CH_4)

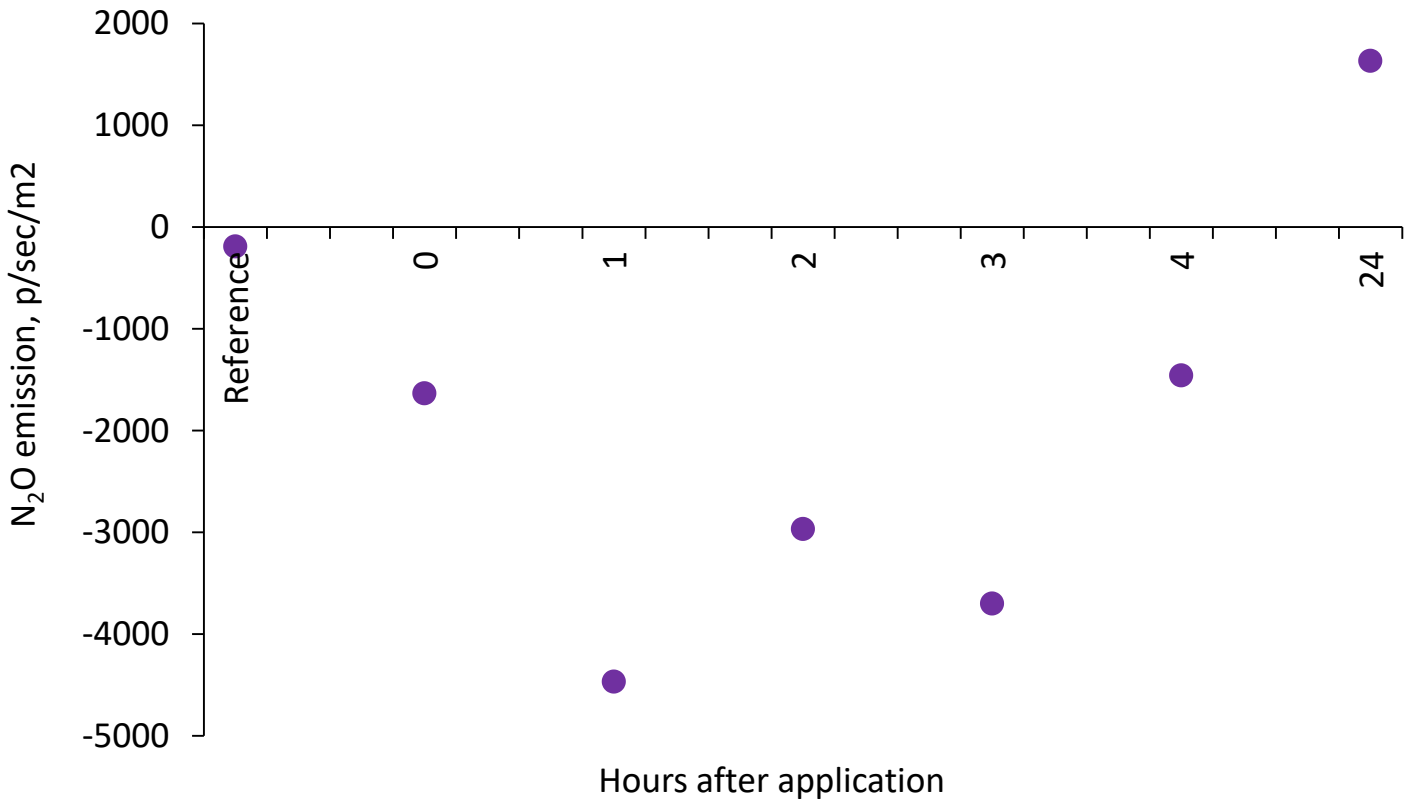


Results in 2018 – Ammonia (NH_3)

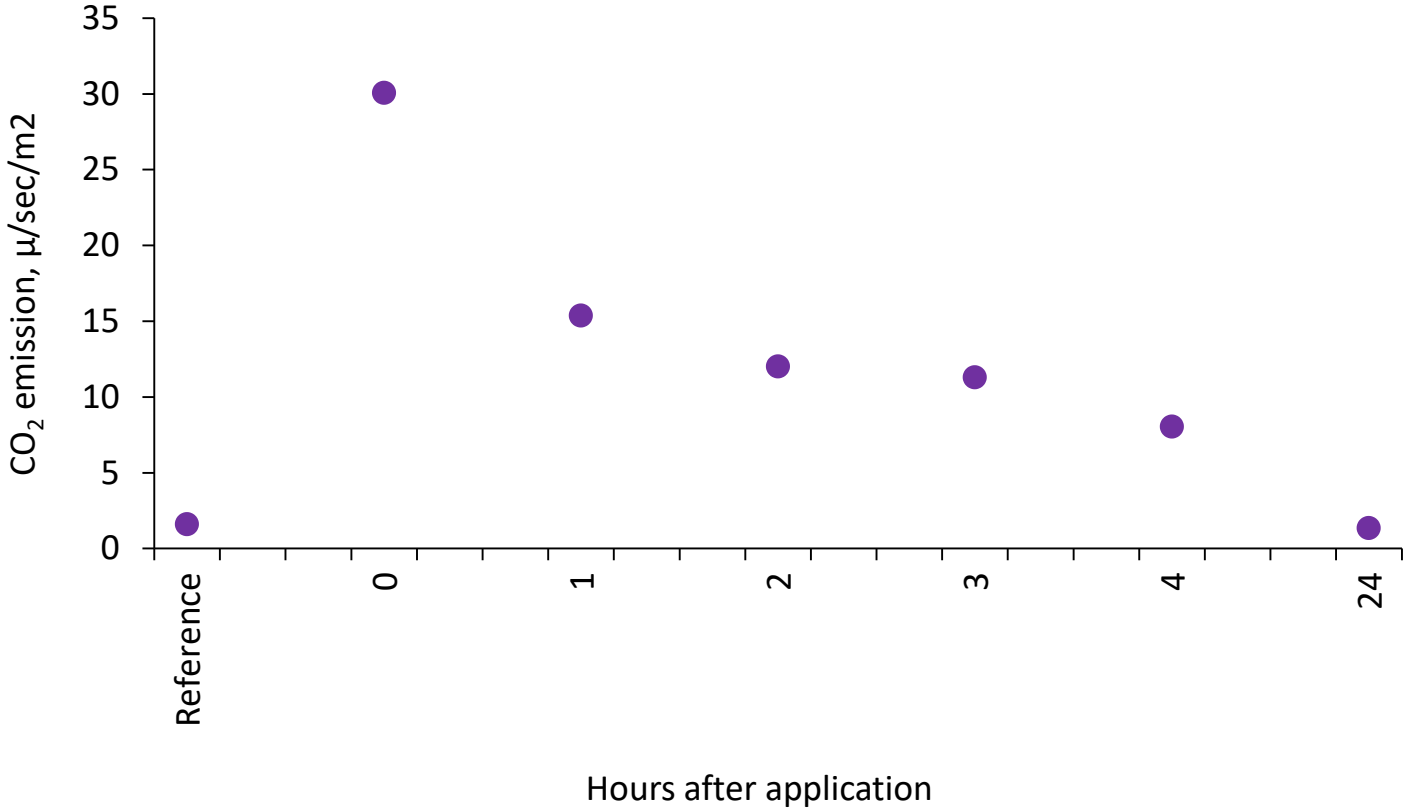


Study sites (2)

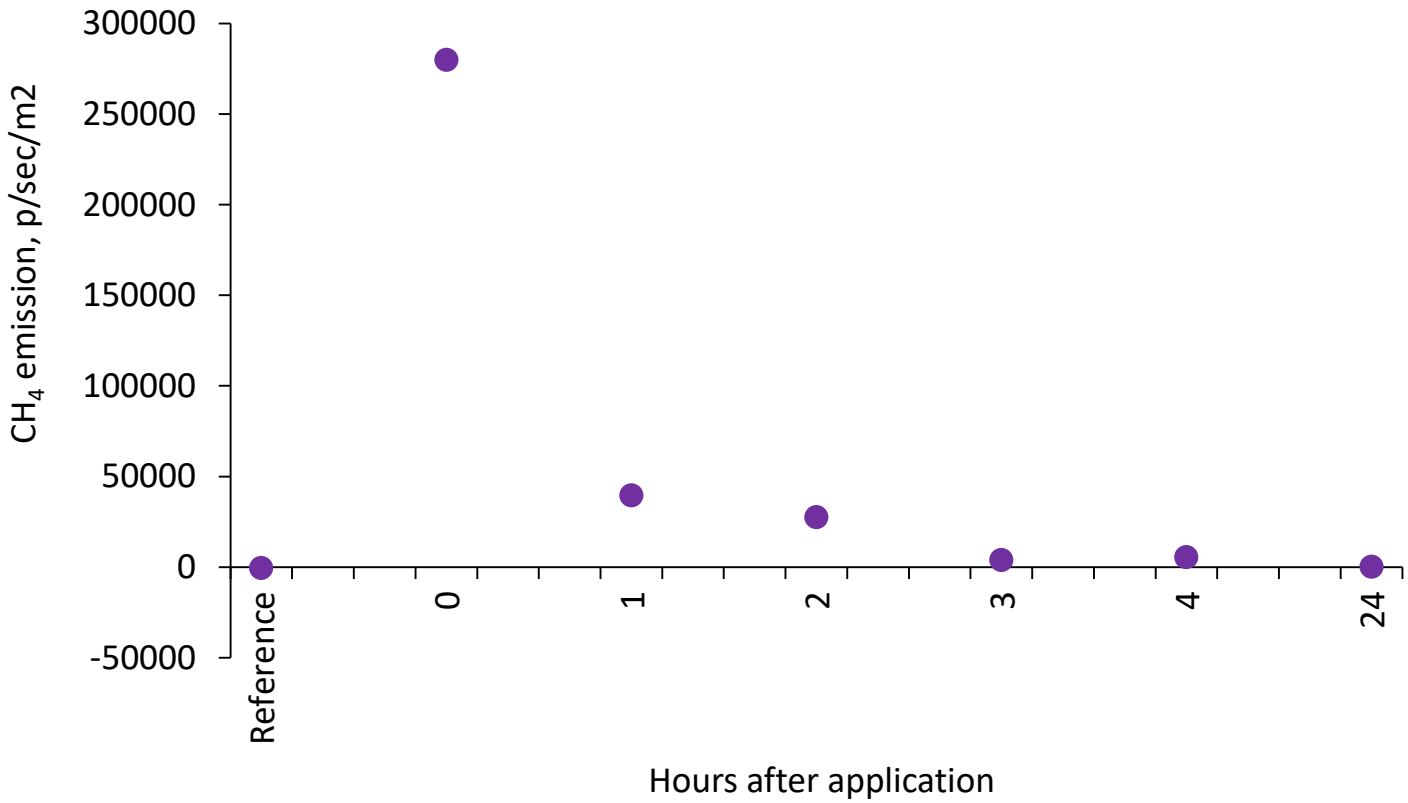
Results in 2018 – Nitrous oxide (N_2O)



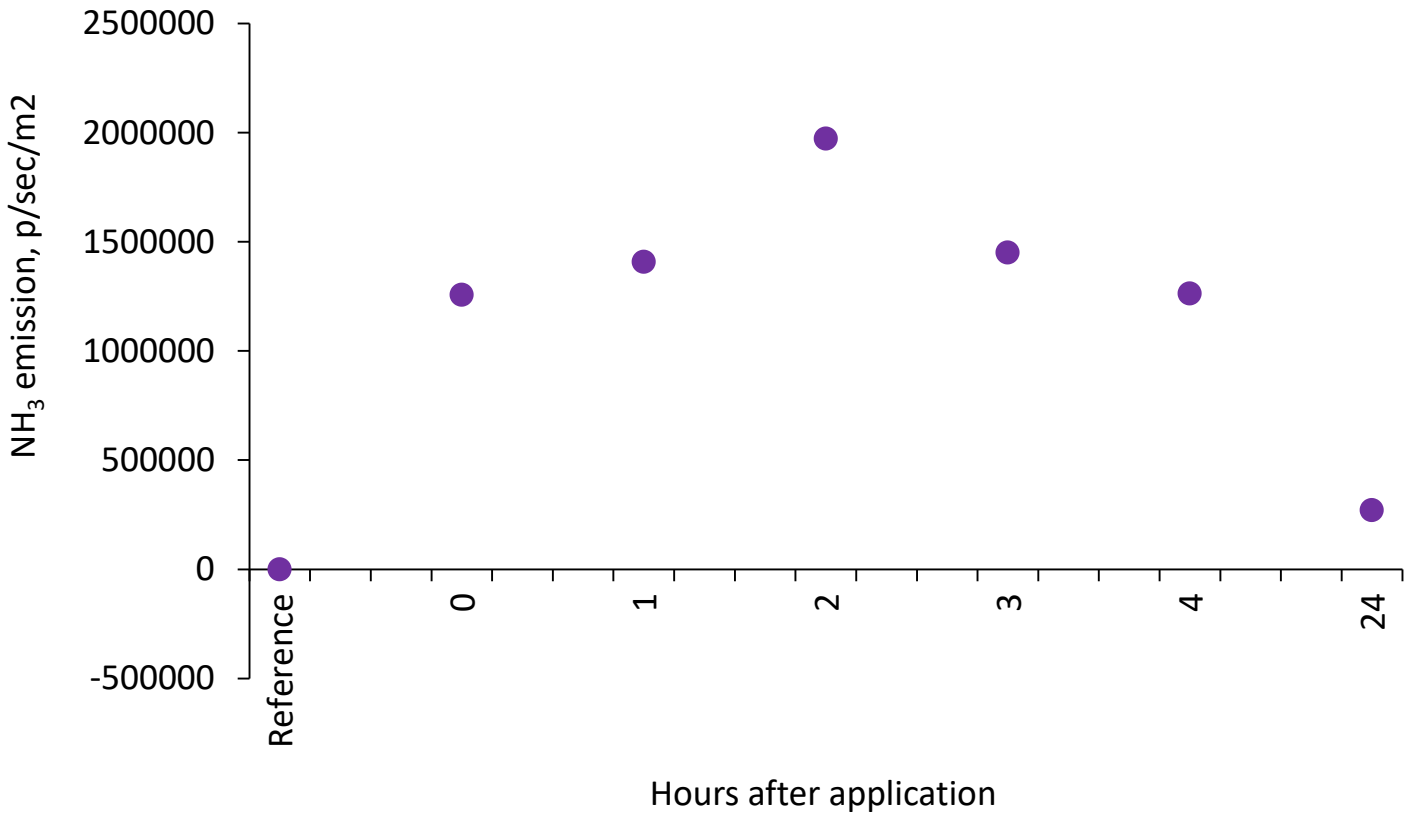
Results in 2018 – Carbon dioxide (CO_2)



Results in 2018 – Methane (CH_4)

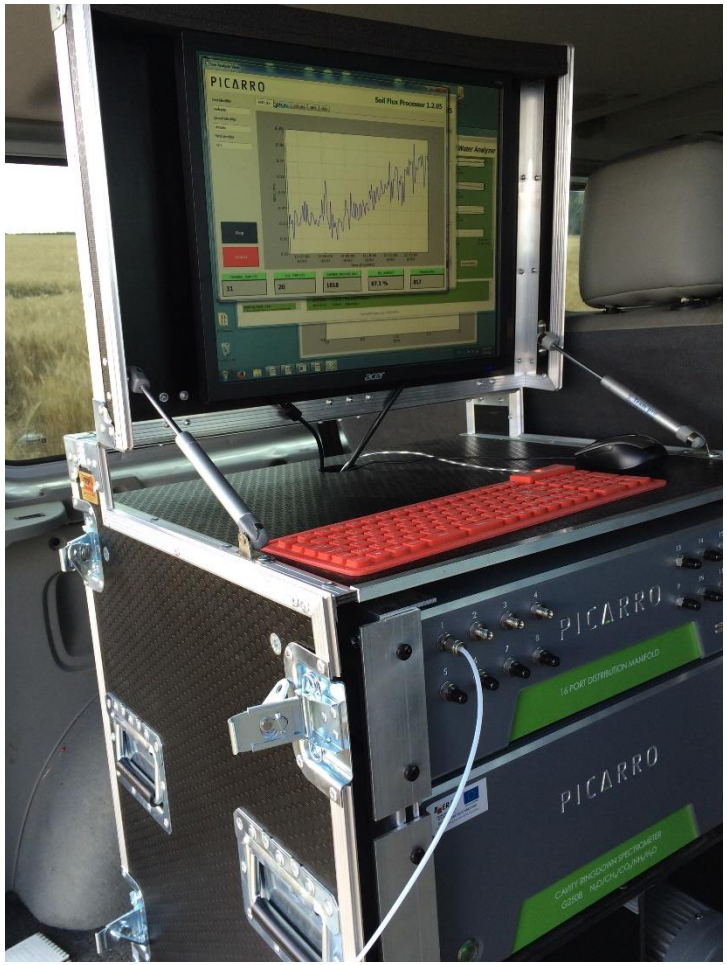


Results in 2018 – Ammonia (NH_3)

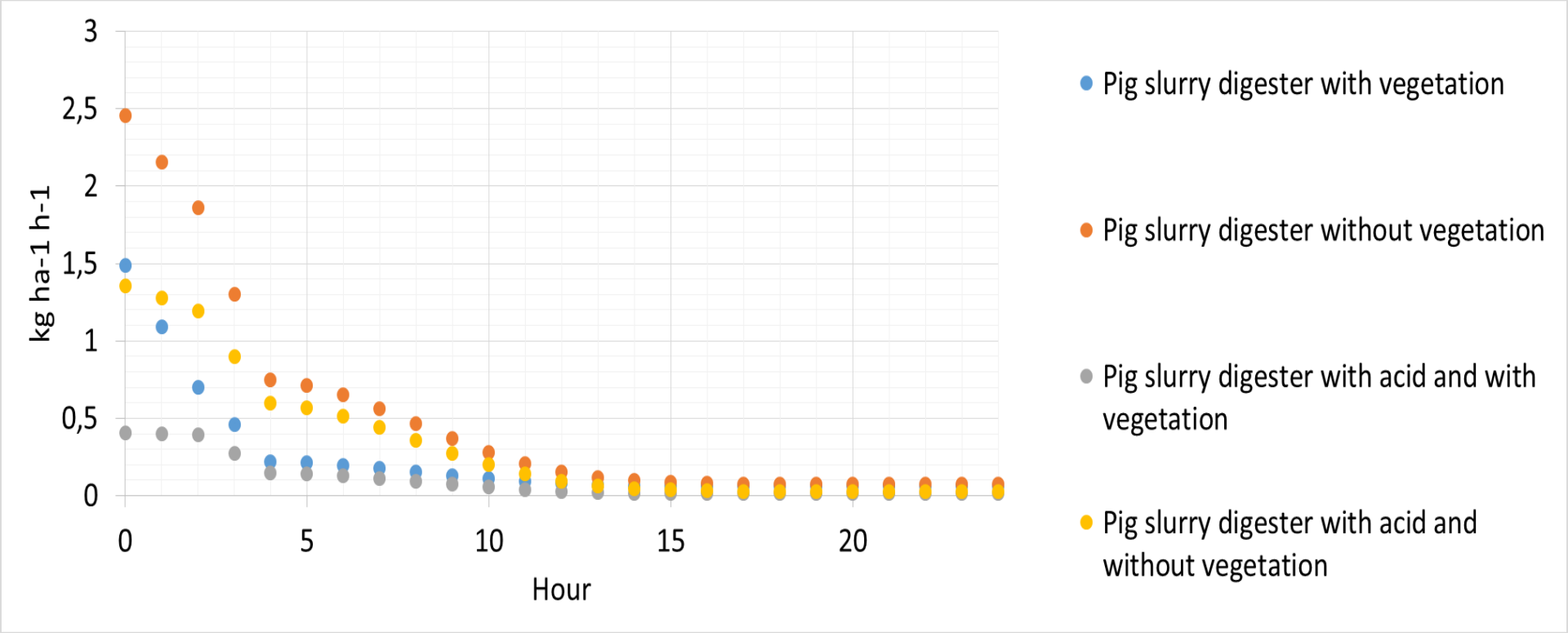


Study site and measurements of GH of pig ut aci

Setup of measurements



Results in 2018 – Ammonia (NH_3)



Findings and recommendations

- ✓ Organic soils tend to have higher emissions of N_20 when compared with mineral soils;
- ✓ Emissions of ammonia tend to be similar at both organic and mineral soils;
- ✓ Increased emissions of ammonia occur aproximatelly 10 hours after application;
- ✓ Acidification of pig slurry show the highest potential to reduce emissions of ammonia.

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Thank you for your attention!

Any questions, comments or suggestions?

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