GHG flux monitoring group activities

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15.7.2020, Steering group meeting

LIFE OrgBalt, LIFE18 CCM/LV/001158

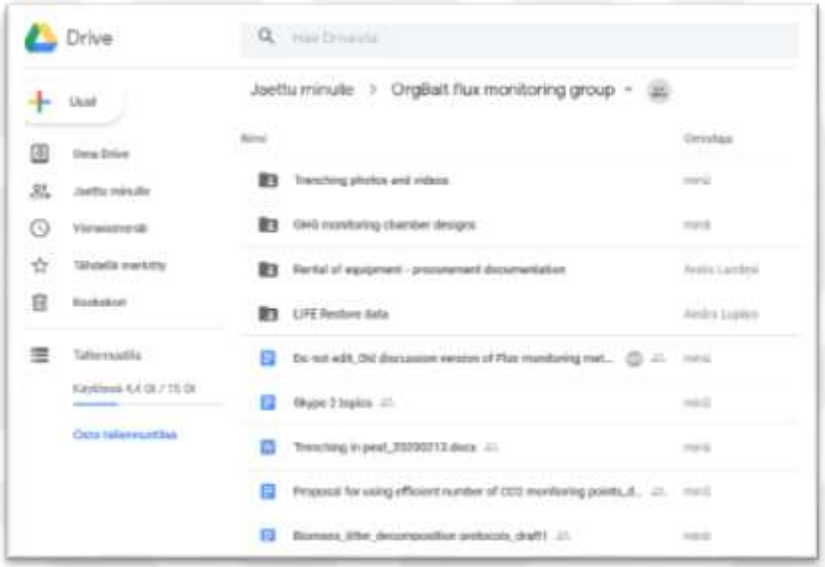
EU LIFE Programme project
"Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland"

Content

- GHG monitoring group activities
  - Protocols document
    - Ways to work
    - Work packages
    - Status of Work
  - Calibration seminar in Tartu 29-30.6.2020
  - Video

Protocols document – Ways to work

- Draft with key titles and initial text content were created into Google drive October 2019
- Text was open for modifications and commenting
- Skype meetings were arranged

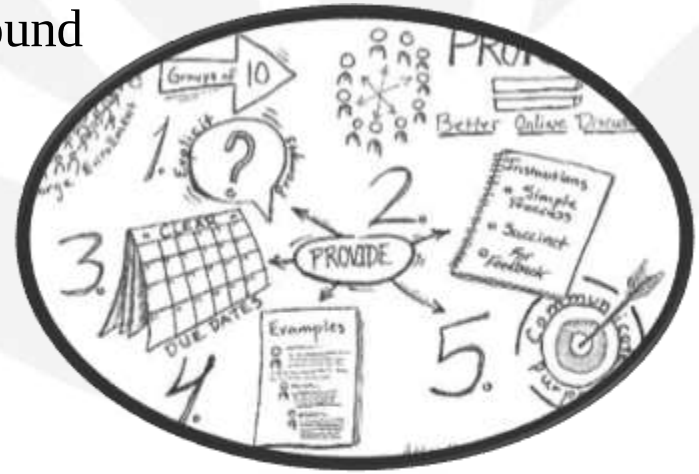


…. draft text refinement

- In Tartu (30.6.2020) it was agreed to finalize the protocols document in 7 smaller groups focusing in work packages
  - Each work package has a leader and one person from each GHG monitoring involved country

Protocols document – Work packages

- Background and principles
- Site preparations
- Heterotrophic CO2 flux monitoring
- Static dark chamber monitoring (incl. CH4 & N2O)
- Environment data (water & soil data)
- Litter production and decomposition belowground
- Biomass production aboveground
- Data management (codes and storage)



Protocols document – Content examples

- **Background and principles**

Quantifying the soil GHG balance, especially for CO2, in forests and other ecosystems on organic soils are technically challenging. Monitoring needs to take into account that:

i) C-sequestration into plant biomass takes place in a potentially voluminous and diverse vegetation community with uneven spatial distribution,

ii) the C transfer from biomass into dead organic matter takes place both in aboveground and belowground part,

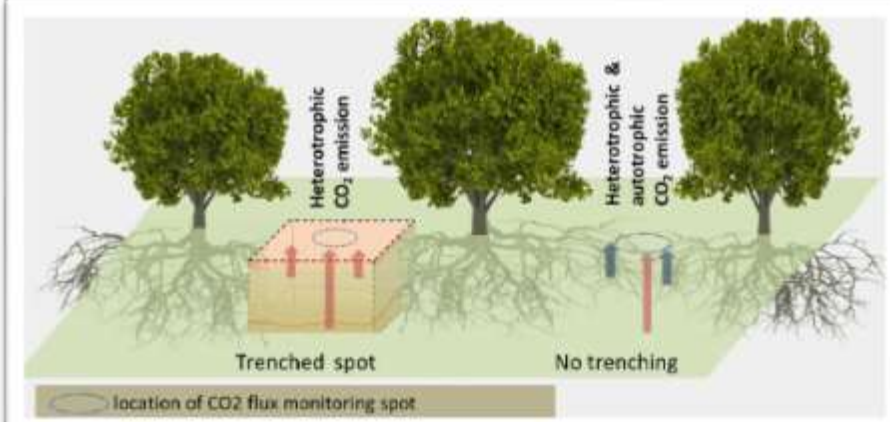
iii) physical and biochemical characteristics in organic soils change over time,

iv) CO2 release through heterotrophic processes takes place both in recently deposited litter and in a soil composed of previously accumulated dead organic matter,

v) in flux measurements, CO2 formed in the heterotrophic processes in the soil must be separated from similarly large CO2 emissions formed in autotrophic root respiration,

vi) rates of biological processes change over the year and differ between years depending on weather conditions, stand development and management.

In this document "soil CO2 balance" includes C transfer fluxes to the soil as above- and belowground litter, and losses by decomposition of litter and soil organic matter (**Fig. 1**).



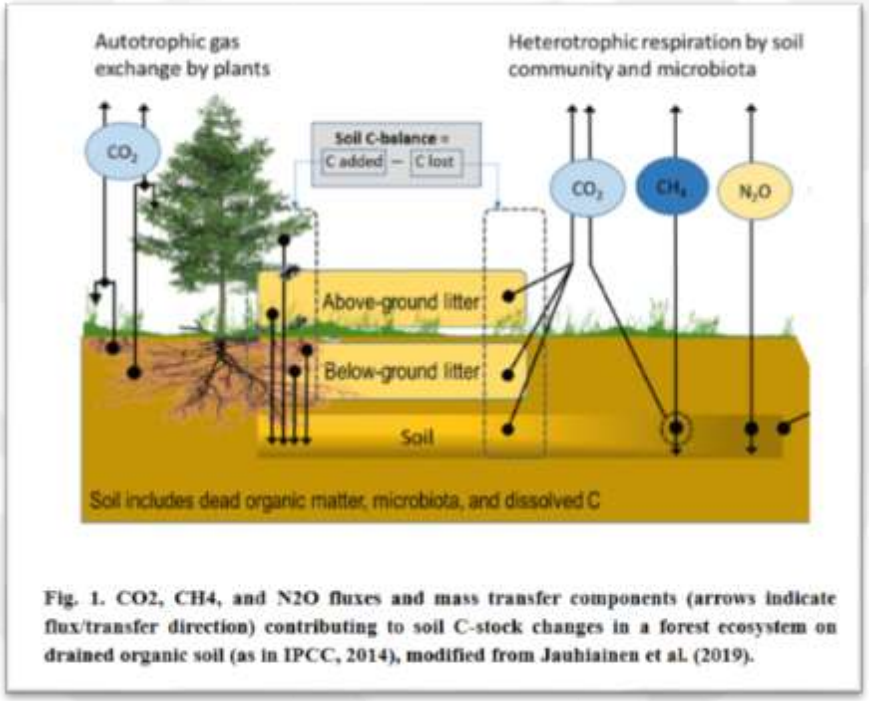
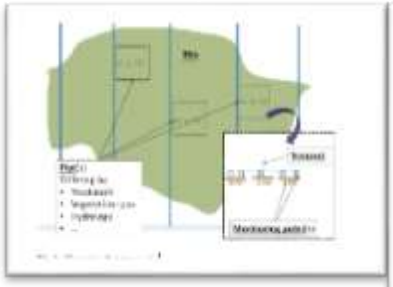


Fig. 1. CO2, CH4, and N2O fluxes and mass transfer components (arrows indicate flux/transfer direction) contributing to soil C-stock changes in a forest ecosystem on drained organic soil (as in IPCC, 2014), modified from Jauhiainen et al. (2019).

Protocols document – Content examples

- **Site preparations**



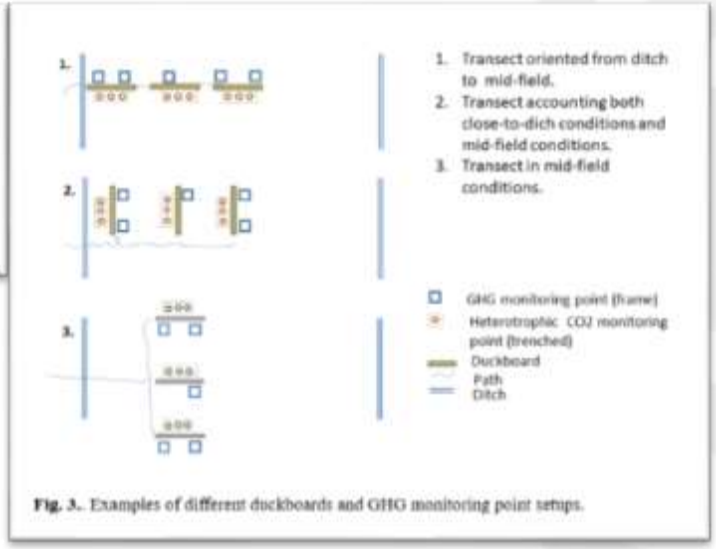
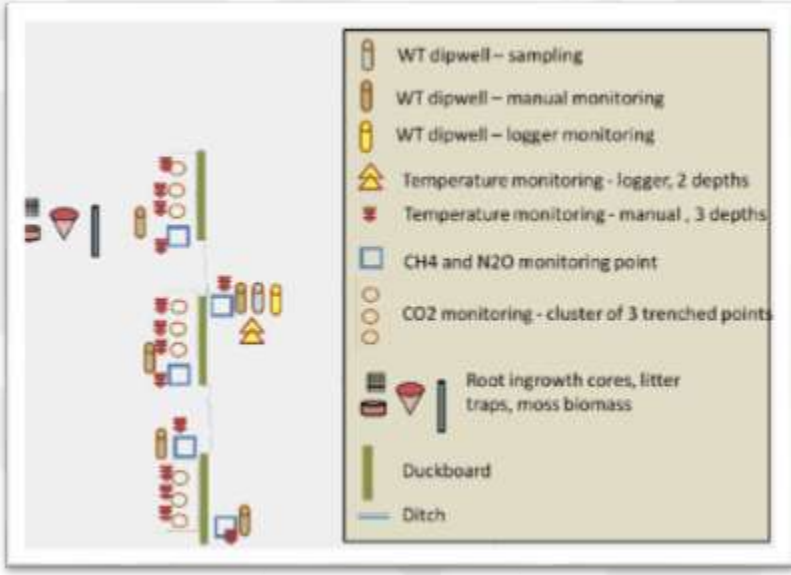
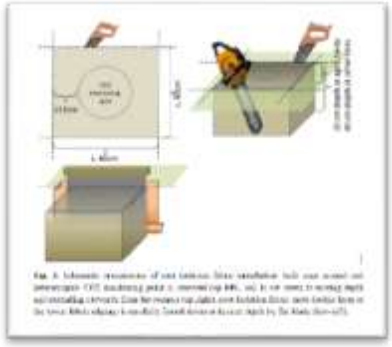


Fig. 3. Examples of different duckboards and GHG monitoring point setups.



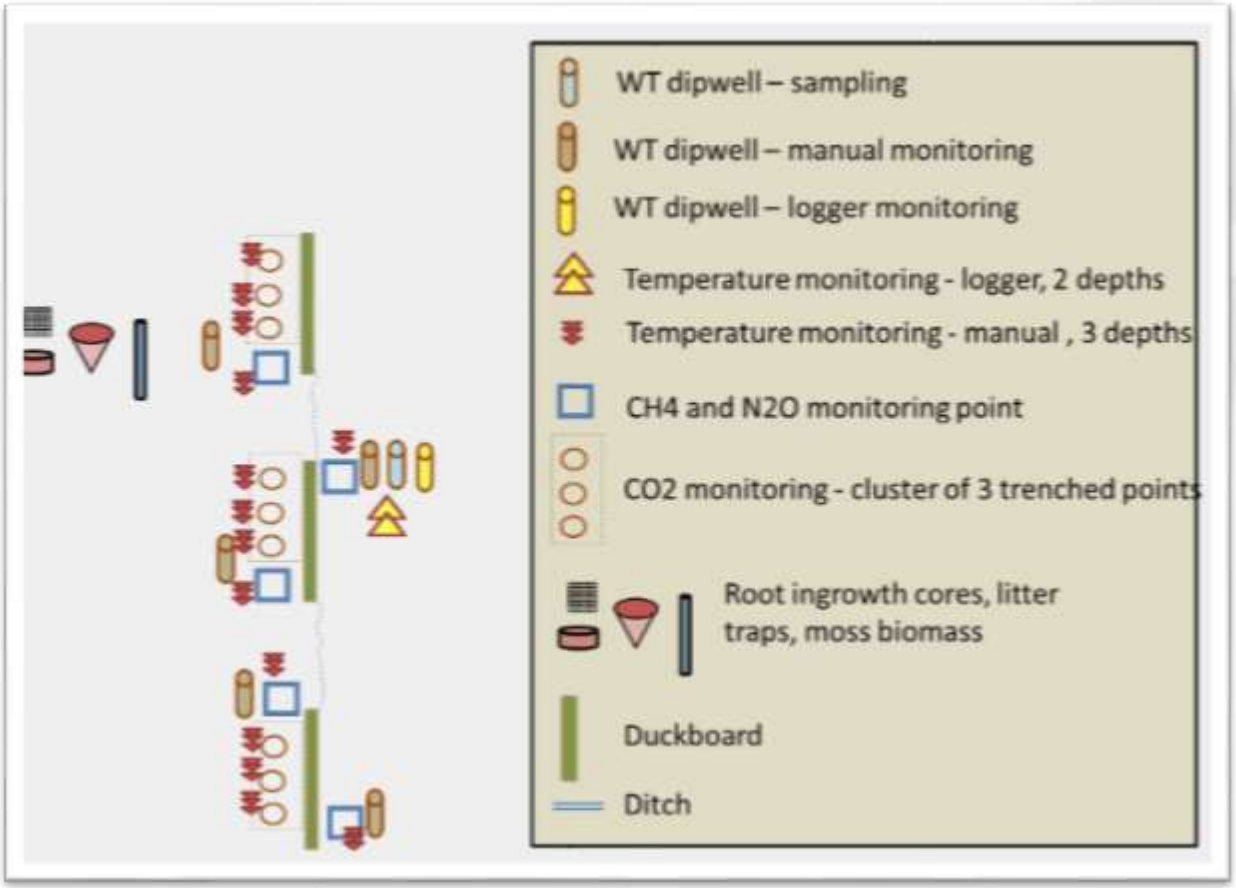


Protocols document – Content examples

- **Heterotrophic CO2 flux monitoring**
  - Monitoring equipment types and equipment specifications
  - Number of replicated measurements to take
  - Data extent over time
    - Number of monitoring events
    - Timing of monitoring over year
  - How to measure
    - Optimizing data quality
    - Work procedures at the site
    - Datatypes collected during monitoring events
  - Field documents
    - Field guide
    - Field forms

Protocols document – Content examples

- **Environment data (water & soil data)**

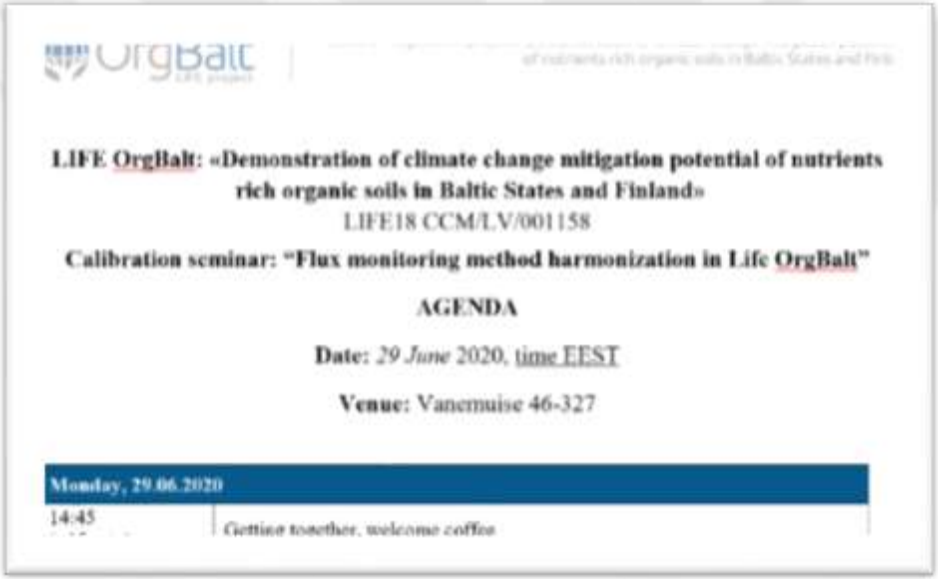


Protocols document – Work Status

- Methods Agreed
- Site outline for monitoring arrangements Agreed
  - Number of monitored points/ where monitored/ how often monitored/ …
  - Sites are mostly set and site preparations started
- Equipment and other instrumentation Agreed
  - Equipment are in use, in production, or ordered
- Protocols document is in finalization phase
  - To be finalized in work groups
  - Field guides to be produced
  - Joint data coding system to be fixed
  - Summary to be produced
- Protocols are already implemented and the written document is aimed to be ready by September 2020

Calibration seminar in Tartu 29 - 30. 6. 2020

- Need for face to face meeting and practical method/tool demonstration was needed
- Seminar was intended to take place April 2020
- Postponement due to Covid-19
- Seminar took place in Tartu 29 - 30. 6. 2020
  - i.e., as soon as work-related travels between the Baltic states and Finland was possible again



LIFE OrgBalt: «Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland»

LIFE18 CCM/LV/001158

Calibration seminar: "Flux monitoring method harmonization in Life OrgBalt"

AGENDA

Date: *29 June* 2020, time EEST

Venue: Vanemuise 46-327

Monday, 29.06.2020	
14:45	Getting together, welcome coffee

Calibration seminar in Tartu 29 - 30. 6. 2020

Day 1

Practical exercises in pine forest site in Laeva, Estonia:

- GHG flux measurements
- Biomass collection
- Soil and water sampling
- Meteorological parameters (soil temp and moisture, water level etc.)

- Dinner & informal discussions atthe Gunpowder Cellar restaurant & local pub

Calibration seminar in Tartu 29 - 30. 6. 2020

Day 2 at Tartu University

- Basic principles, site preparations
- Heterotrophic respiration measurements - preparation, measurements, data storage
- Non-transparent, chamber measurements of CH4 and N2O - preparation, sampling, analyzes
- Litter, above- and belowground biomass - preparation of sites, sampling, analyzes etc
- Meteorological parameters measurements (soil temp, moisture etc), soil and water sampling, microbiology, all other analyzes
- Data format, storage and processing
- Introduction to field equipment

OrgBalt LIFE project

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

Thank you!
Kiitos!

Lettosuo clearfelled site, May 2020

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The project "Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland" (LIFE OrgBalt, LIFE18 CCM/LV/001158) has received funding from the LIFE Programme of the European Union and the State Regional Development Agency of Latvia. www.orgbalt.eu