OrgBalt
LIFE project

GHG and Environmental Measurements

Data Gathering and Processing

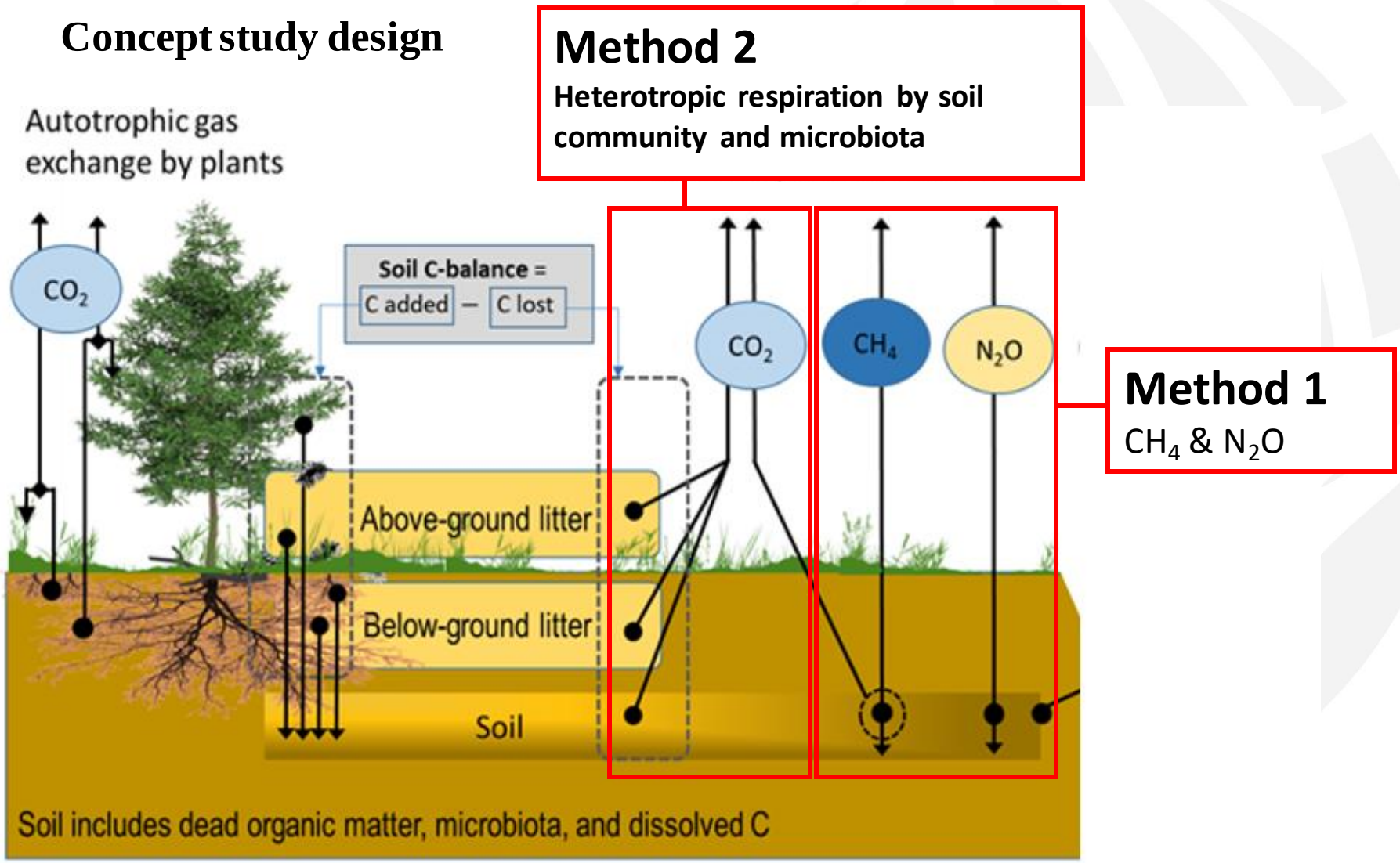
March 2nd 2023

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"

Concept study design



Modified from Jauhiainen et al. (2019)

Status Continuous Sampling (Method 1 and 2)

"Method 1+2" → 2 years / seasons GHG

FIN: 06/2020-05/2022 → min 1/site/mth → finished

EST: 01/2021-12/2022 → 2/site/mth → finished

LV: 01/2021-12/2022 → 1/site/mth → finished

LT: 10/2021-09/2023 → min 1/site/mth → ongoing

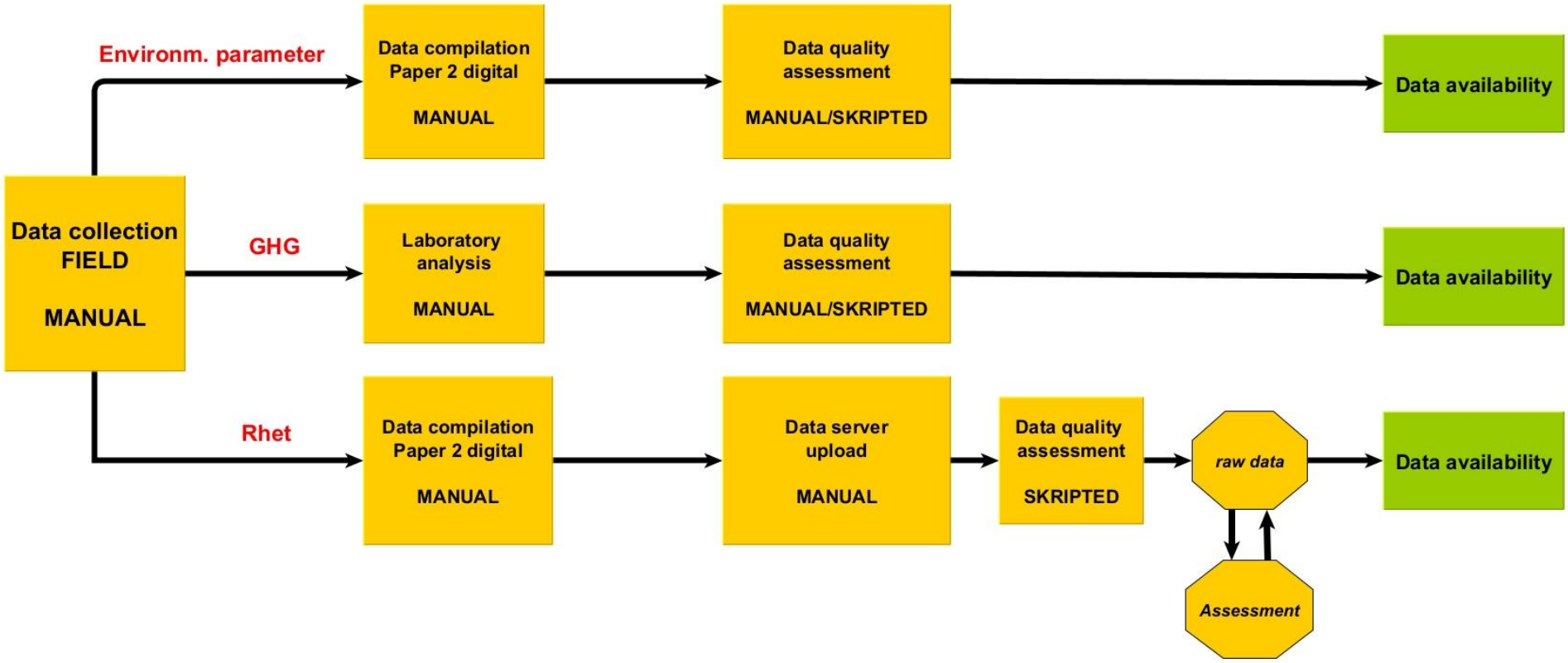
→In total ***~ 1'500 sampling campaigns*** GHG

"Method 2 – Rhet"

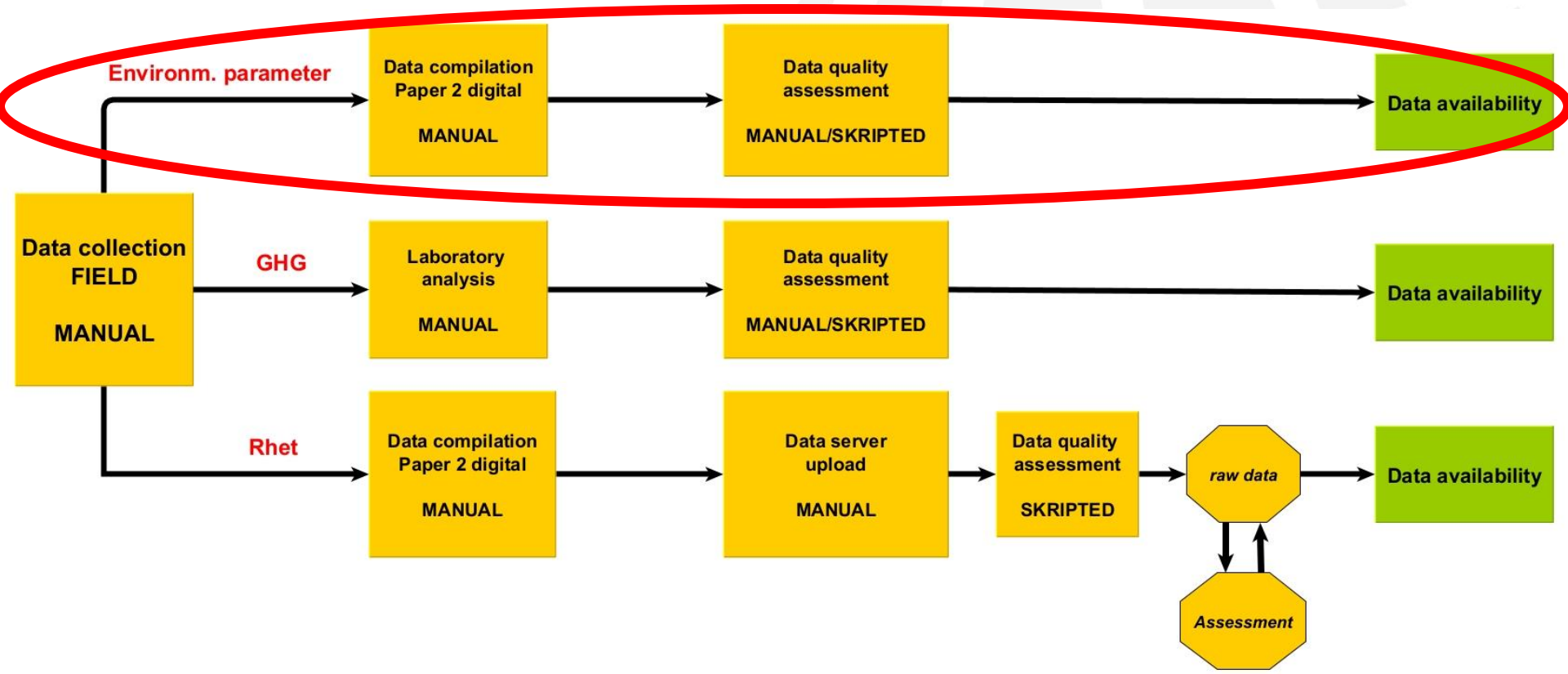
→ measurements in vegetation season (2)

→e.g. EST: May-Nov 2/month, 10 sites → > 260 campaigns

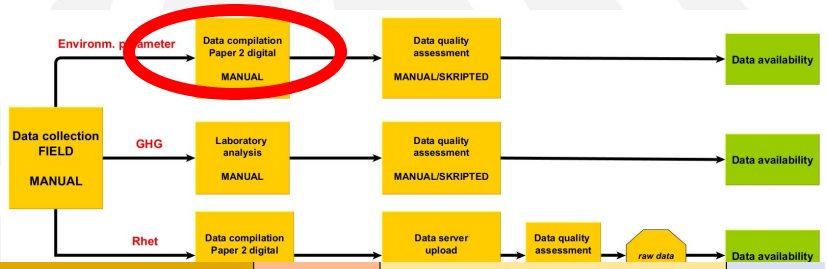
Data gathering and processing – process flow scheme



Data gathering and processing – process flow scheme



Data Compilation In-Situ Environmental Parameters

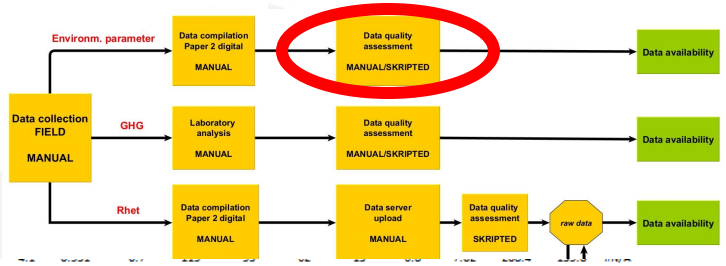


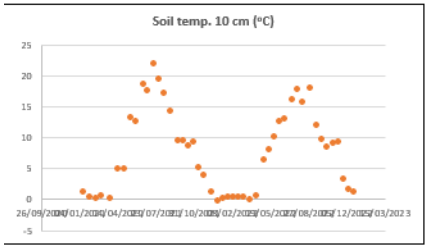
3) Do not overwrite in the orange columns (C; E; I; W).

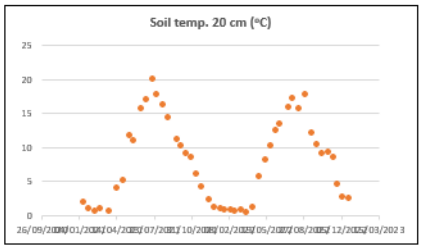
	Person responsible	Site ID	Site name	Sub-plot	Master ID (SiteID&Subplot&YY&MM)	YYYY	MM	DD	Date (YY-MM-DD)	Time	Clouds	Precip	Wind	T_{air}, °C	T_{soil} 10 cm, °	T_{soil} 20 cm, °	T_{soil} 30 cm, °	T_{soil} 40 cm, °	SWC, m^3/m^3	T_{soil} 5 cm, °	WL, tube insight, c	WL, tube outsight,	Difference, cm	Snow depth, c	T_{water}, °C	pH
10	Hanna	EEC106	LaevaBirch	A	EEC106-A-2022-10	2022	10	11	22-10-11	11:20	3	4	2	6.0	8.4	8.7	9.8	10.0	0.308	7.7	153.0	38.5	114.5	#N/A	#N/A	#N/
11	Hanna	EEC106	LaevaBirch	B	EEC106-B-2022-10	2022	10	11	22-10-11	11:29	3	4	2	6.0	8.4	9.0	9.8	10.2			152.5	35.0	117.5	#N/A	#N/A	#N/
12	Hanna	EEC106	LaevaBirch	C	EEC106-C-2022-10	2022	10	11	22-10-11	11:45	3	4	2	6.0	8.5	8.8	9.7	10.0	0.352	7.2	146.0	30.5	115.5	#N/A	9.40	6.9
44	Kamil	EEC106	LaevaBirch	0	EEC106-0-2022-10	2022	10	24	22-10-24	11:25	1	1	1	4.0	5.8	6.5	7.4	8.1	0.555	3.0	147.0	103.0	44.0	#N/A	8.20	7.7
45	Kamil	EEC106	LaevaBirch	A	EEC106-A-2022-10	2022	10	24	22-10-24	11:35	1	1	1	4.0	6.2	6.9	8.0	8.7	0.344	2.6	152.0	38.0	114.0	#N/A	#N/A	#N/
46	Kamil	EEC106	LaevaBirch	B	EEC106-B-2022-10	2022	10	24	22-10-24	01:50	1	1	1	4.0	6.2	6.7	7.8	8.5	0.406	2.3	150.0	35.0	115.0	#N/A	9.00	7.2
47	Kamil	EEC106	LaevaBirch	C	EEC106-C-2022-10	2022	10	24	22-10-24	12:05	1	1	1	4.0	5.8	6.9	8.1	8.6	0.443	2.9	146.0	30.5	115.5	#N/A	8.70	7.0
83	Kamil	EEC106	LaevaBirch	0	EEC106-0-2022-11	2022	11	8	22-11-08	11:20	2	1	2	9.0	6.8	6.9	7.2	7.7	0.565	8.9	128.5	103.0	25.5	#N/A	8.00	7.5
84	Kamil	EEC106	LaevaBirch	A	EEC106-A-2022-11	2022	11	8	22-11-08	11:30	2	1	2	9.0	7.0	7.4	7.4	7.9	0.471	8.6	151.0	38.5	112.5	#N/A	#N/A	#N/
85	Kamil	EEC106	LaevaBirch	B	EEC106-B-2022-11	2022	11	8	22-11-08	11:35	2	1	2	9.0	7.2	7.1	7.3	7.9	0.435	9.0	151.0	35.0	116.0	#N/A	#N/A	#N/
86	Kamil	EEC106	LaevaBirch	C	EEC106-C-2022-11	2022	11	8	22-11-08	11:50	2	1	2	9.5	8.0	7.2	7.5	7.8	0.443	9.3	151.0	31.0	120.0	#N/A	#N/A	#N/
22	Joosep	EEC106	LaevaBirch	0	EEC106-0-2022-11	2022	11	22	22-11-22	11:40	3	1	1	-3.0	2.4	3.5	5.0	6..1	0.544	-0.1	120.0	103.0	17.0	#N/A	5.80	7.5
23	Joosep	EEC106	LaevaBirch	A	EEC106-A-2022-11	2022	11	22	22-11-22	12:00	3	1	1	-3.0	2.4	3.8	5.1	6.3	0.352	-0.1	114.0	38.5	75.5	15.0	8.10	7.1
24	Joosep	EEC106	LaevaBirch	B	EEC106-B-2022-11	2022	11	22	22-11-22	12:20	3	1	2	-3.0	2.0	3.3	5.0	6.1	0.465	-0.1	117.0	35.0	82.0	16.0	8.00	7.1
25	Joosep	EEC106	LaevaBirch	C	EEC106-C-2022-11	2022	11	22	22-11-22	12:40	3	1	2	-3.0	2.7	3.9	5.4	6.3	0.406	-0.1	112.0	30.5	81.5	12.0	7.80	7.2
79	Thomas	EEC106	LaevaBirch	0	EEC106-0-2022-12	2022	12	8	22-12-08	12:05	3	2	2	-0.5	1.0	2.1	3.6	4.3	0.524	0.1	138.0	103.0	35.0	#N/A	4.70	7.2
80	Thomas	EEC106	LaevaBirch	A	EEC106-A-2022-12	2022	12	8	22-12-08	12:25	3	2	2	0.1	1.5	2.8	3.8	4.7	0.382	0.2	138.0	38.5	99.5	24.0	7.60	7.3
81	Thomas	EEC106	LaevaBirch	B	EEC106-B-2022-12	2022	12	8	22-12-08	12:45	3	2	2	0.1	1.9	2.7	4.1	4.8	0.314	0.3	123.0	34.0	89.0	25.0	7.40	6.9
82	Thomas	EEC106	LaevaBirch	C	EEC106-C-2022-12	2022	12	8	22-12-08	13:00	3	2	2	0.1	1.4	2.4	3.7	4.6	0.274	0.2	126.0	31.0	95.0	24.0	7.50	6.9
22	Kamil	EEC106	LaevaBirch	0	EEC106-0-2022-12	2022	12	28	22-12-28	11:30	1	1	1	-1.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	113.0	103.0	10.0	#N/A	3.10	7.2
23	Kamil	EEC106	LaevaBirch	A	EEC106-A-2022-12	2022	12	28	22-12-28	11:45	1	1	1	-1.0	0.9	1.9	2.6	3.3	0.450	0.1	101.0	38.5	62.5	12.0	6.40	7.0
24	Kamil	EEC106	LaevaBirch	B	EEC106-B-2022-12	2022	12	28	22-12-28	12:00	1	1	1	-1.0	0.7	1.4	2.3	3.0	0.488	-0.1	103.0	36.0	67.0	7.0	6.40	6.9
25	Kamil	EEC106	LaevaBirch	C	EEC106-C-2022-12	2022	12	28	22-12-28	12:15	1	1	1	-1.0	1.0	1.9	2.7	3.5	0.424	0.1	86.0	31.0	55.0	6.0	6.50	6.9

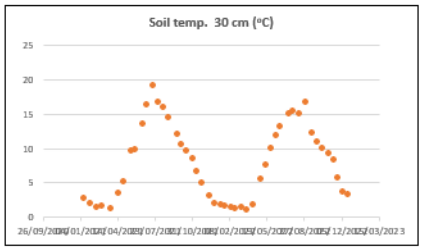
All partners uploaded measured datasets – several 1000s of data lines

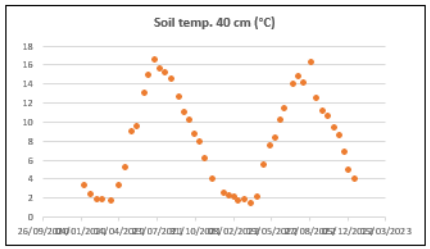
Environmental Parameters

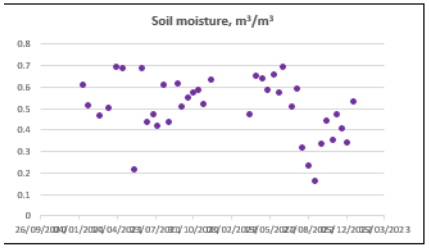


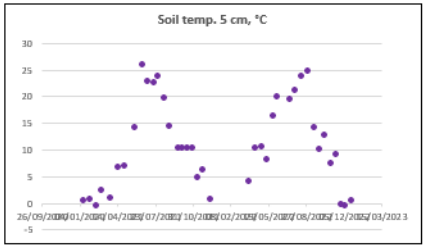


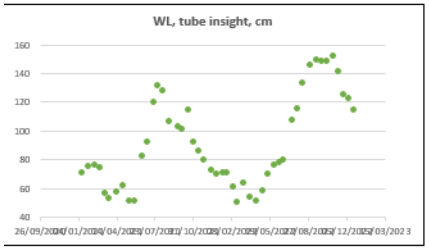


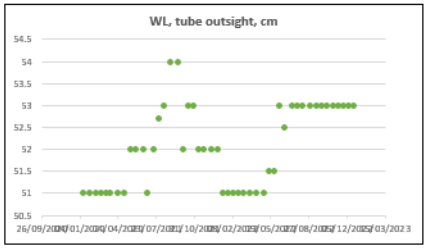


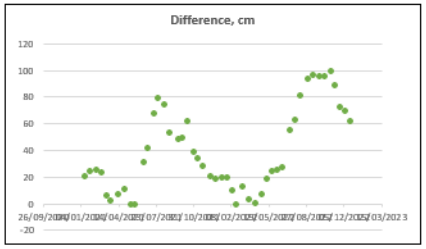


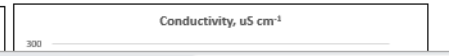






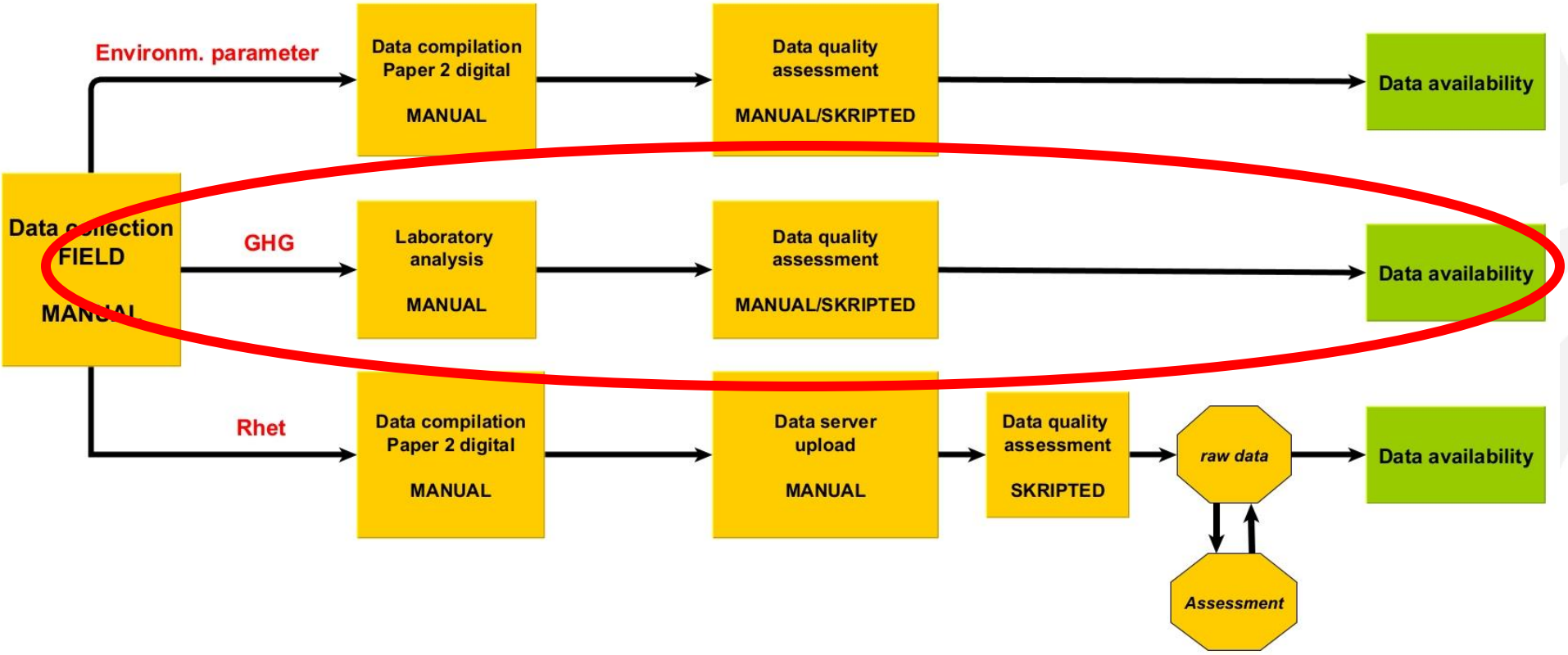




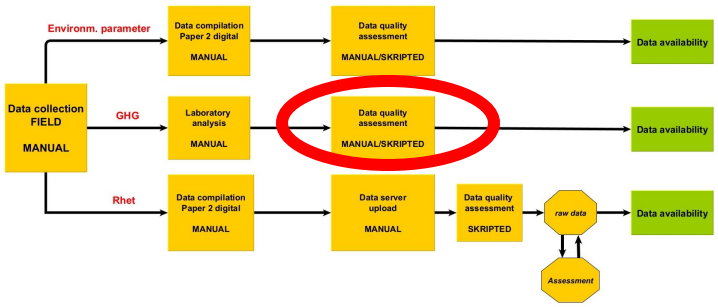


Data quality assessment per each enviro parameter – visual inspection

Data gathering and processing – process flow scheme



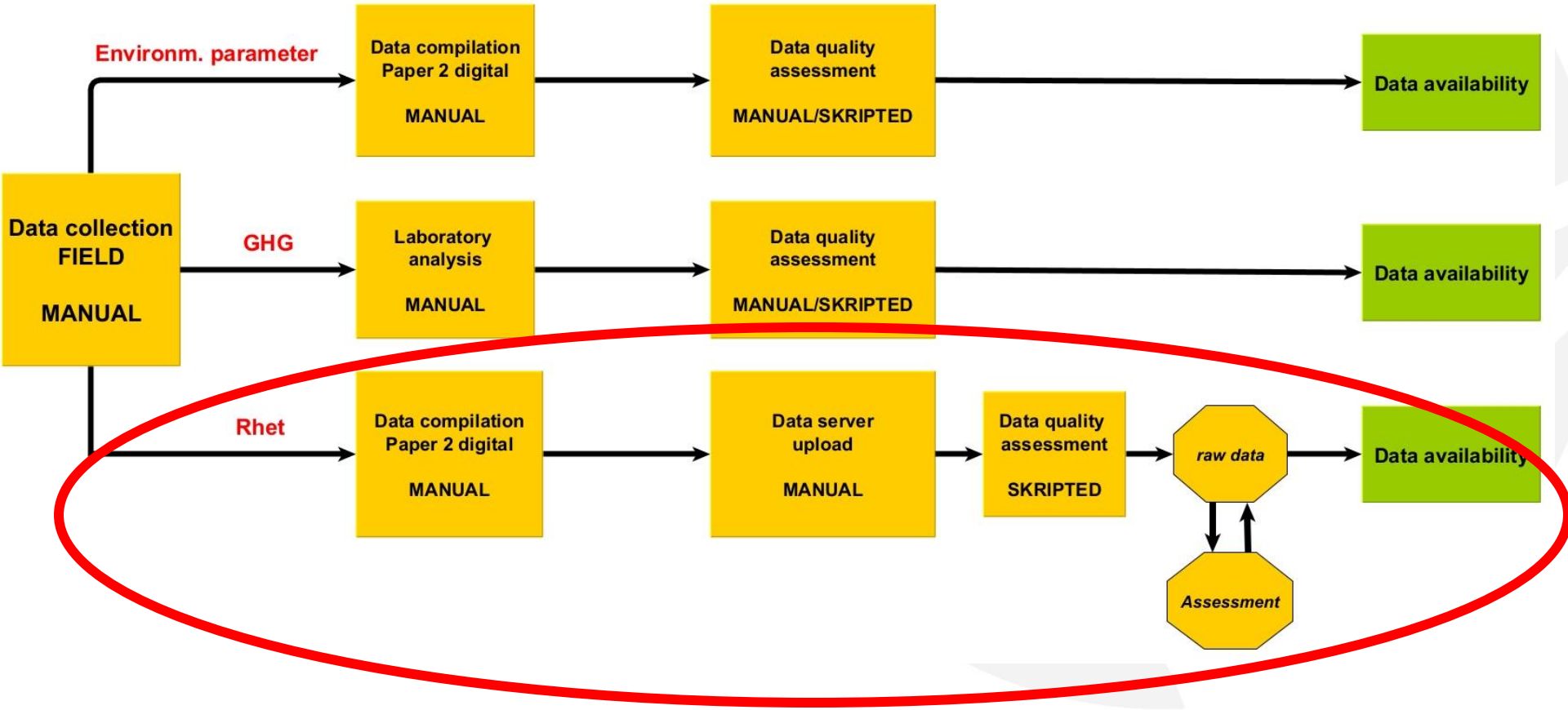
GHG – manual chambers/dark cha



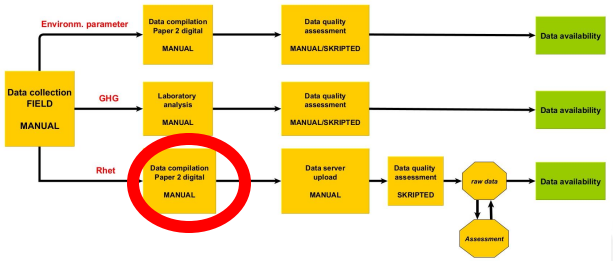
5	41	0	463.000	339.512	2052.066	y = 420.35x + 475.79 R² = 0.9891	δv [ppm(v)] =	420.3452691	y = 4.9377x + 340.54 R² = 0.6746	δv [ppb(v)] =	4.937697894			
	42	0.33	621.733	344.243	1971.711									
	43	0.66	776.611	342.720	1857.185									
	44	1	878.317	345.500	1786.435									
6	45	0	437.209	335.153	2072.583	y = 527.04x + 448.93 R² = 0.9939	δv [ppm(v)] =	527.0380678	y = 29.777x + 335.7 R² = 0.9716	δv [ppb(v)] =	29.77655002			
	46	0.33	629.180	344.720	1945.305									
	47	0.66	818.803	358.522	1814.329									
	48	1	959.349	363.642	1709.218									
1_La Pine	49	0	448.503	346.195	2110.684	y = 749.68x + 449.12 R² = 0.9969	δv [ppm(v)] =	749.6780978	y = 306.57x + 339.95 R² = 0.9899	δv [ppb(v)] =	306.5716463			
	50	0.33	684.419	424.559	1992.142									
	51	0.66	969.547	556.530	1852.009									
	52	1	1185.864	642.579	1733.664									
2	53	0	415.563	349.583	2098.929	y = 581.1x + 420.05 R² = 0.999	δv [ppm(v)] =	581.096603	y = 219.57x + 350.06 R² = 0.9955	δv [ppm(v)] =	219.5723428			
	54	0.33	613.231	418.627	1963.087									
	55	0.66	813.954	504.066	1836.204									
	56	1	993.820	564.924	1715.495									

Data quality assessment per each sampling scripted (Excel)

Data gathering and processing – process flow scheme



Rhet – measurements with EGM



EGM DATA FILE

A	B	C	D	E	F	G	H	I
M5	14/09/2022	13:59:21	3	1371	424	1003.1	495	
M5	14/09/2022	13:59:22	3	1372	424	1003.1	495	
A5	14/09/2022	13:59:22	3	1372	424	1003.1	495	
End								
Zero								
Start								
M5	14/09/2022	14:00:14	3	1423	409	1003.1	494	
M5	14/09/2022	14:00:15	3	1424	408	1003.1	495	
M5	14/09/2022	14:00:16	3	1425	408	1003.1	495	
M5	14/09/2022	14:00:17	3	1426	408	1003.1	495	
M5	14/09/2022	14:00:18	3	1427	408	1003.1	494	
M5	14/09/2022	14:00:19	3	1428	408	1003.1	493	
M5	14/09/2022	14:00:20	3	1429	408	1003.1	493	
M5	14/09/2022	14:00:21	3	1430	408	1003.1	494	
M5	14/09/2022	14:00:22	3	1431	408	1003.1	495	
M5	14/09/2022	14:00:23	3	1432	408	1003.1	496	
M5	14/09/2022	14:00:24	3	1433	408	1003.1	496	
M5	14/09/2022	14:00:25	3	1434	409	1003.1	495	
M5	14/09/2022	14:00:26	3	1435	409	1003.1	494	
M5	14/09/2022	14:00:27	3	1436	410	1003.1	494	
M5	14/09/2022	14:00:28	3	1437	410	1003.1	495	
M5	14/09/2022	14:00:29	3	1438	410	1003.1	496	
M5	14/09/2022	14:00:30	3	1439	411	1003.1	496	
M5	14/09/2022	14:00:31	3	1440	411	1003.1	496	
M5	14/09/2022	14:00:32	3	1441	411	1003.1	494	
M5	14/09/2022	14:00:33	3	1442	412	1003.1	493	

EE20220914dataC

FIELD FORM FILE - TRANSFORMED

	E	F	G	H	I	J	K	L	M	N
	Site description	Monitoring point type	Monitored gas(es)	Start time	Start ppm	End time	End ppm	Chamber start T, C	Chamber end T, C	T at 05, C
2	Adjustment formula	Droplist	Droplist	HH:MM:SS	ppm val	HH:MM:SS	ppm val	value	value	value
14	Perennial grassland on semi-hyd	Trenched	CO2	12:52:14	397	12:55:25	600	16.2	16.8	
15	Perennial grassland on semi-hyd	Trenched	CO2	13:00:13	397	13:03:24	495	17.2	18	
16	Perennial grassland on semi-hyd	Trenched	CO2	13:04:22	397	13:07:33	576	17.7	17.8	
17	Perennial grassland on semi-hyd	Trenched	CO2	13:08:34	396	13:11:44	503	17.7	16.9	
18	Perennial grassland on semi-hyd	Trenched	CO2	13:14:38	396	13:17:49	489	15.8	16.5	
19	Perennial grassland on semi-hyd	Trenched	CO2	13:18:41	407	13:21:55	465	16.1	15.9	
20	Perennial grassland on semi-hyd	Trenched	CO2	13:22:47	401	13:25:58	453	15.4	15.1	
21	Grassland on drained fens soil	Trenched	CO2	13:45:36	406	13:53:03	564	14.5	14.9	
22	Grassland on drained fens soil w	Trenched	CO2	13:54:36	401	13:57:46	474	14.7	14.9	
23	Grassland on drained fens soil w	Trenched	CO2	14:00:14	409			14.5	14.6	
24	Grassland on drained fens soil w	Trenched	CO2					13.9	14.2	
25	Grassland on drained fens soil w	Trenched	CO2					14.2	14.5	
26	Grassland on drained fens soil w	Trenched	CO2					14.3	14.2	
27	Grassland on drained fens soil w	Trenched	CO2					13.3	13.4	
28	Grassland on drained fens soil w	Trenched	CO2					13.3	13.6	
29	Grassland on drained fens soil w	Trenched	CO2					13.6	14.6	
30	0	Trenched	CO2							
31	0	Trenched	CO2							
32	0	Trenched	CO2							
33	0	Trenched	CO2							
34	0	Trenched	CO2							
35	0	Trenched	CO2							
36	0	Trenched	CO2							

Measurements | Formulas | Instructions

matching pair of two files

Rhet – common data platform / server / web frontend

Welcome user thomas

Log Out

Submit new measurement files

- Uploaded files EE20221012dataC.csv, EE20221012form.xlsx

Soil: ---------

Chamber: ---------

Device: Licor

Project: ---------

Fftype: ---------

Comment:

Measurement date: January 1 2022

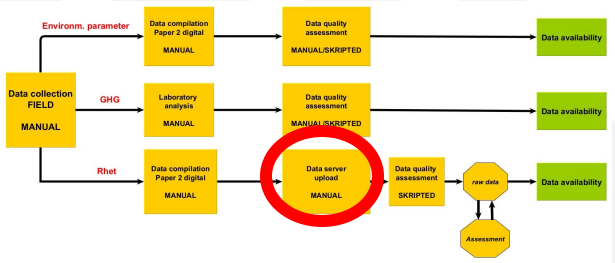
Data file: Datei auswählen Keine ausgewählt

Field form: Datei auswählen Keine ausgewählt

UPLOAD

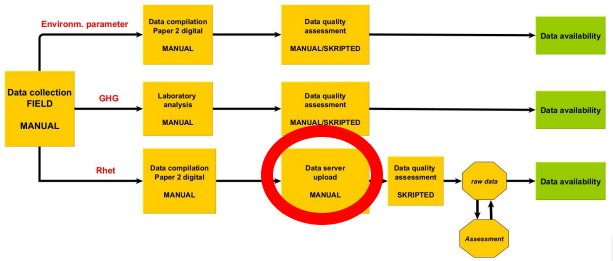
Your submitted files

fsid	Project	Submission date Filename *Comment*	Submission status File status	**Measurement date** Details	Chamber, Soil Download
875	LIFE OrgBalt	2022-12-11 22:24:01 EE20221110form.xlsx EE20221110data.csv *Est 10.11.2022*	submitted valid valid	**2022-11-10** details details	dark , forested download download
876	LIFE OrgBalt	2022-12-11 22:25:06 EE20221108form.xlsx EE20221108dataA.csv *Est 08.11.2022 a*	submitted valid valid	**2022-11-08** details details	dark , forested download download
877	LIFE OrgBalt	2022-12-11 22:25:34 EE20221108form.xlsx EE20221108dataB.csv	submitted valid valid	**2022-11-08** details details	dark , forested download download



LOGIN SCREEN For NEW SUBMITS

Rhet – Data upload



Data server

Downloads Measurement sets Logout

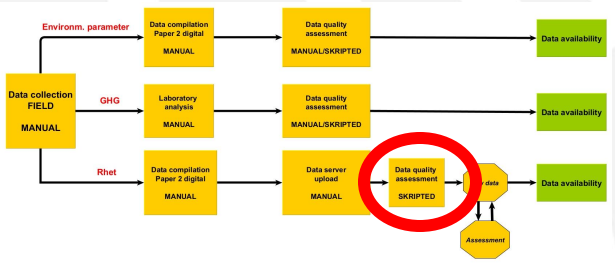
Data on this server:

Measurements datasets

WELCOME SCREEN for SUBMITTED DATA

local_id	fileserver_id	siteids	measure_date	submission_date	fetch_date	device	chamber	soil	fs_state	successful	show_data
748	754	Ala-Akkunus	2022-06-21	2022-11-24 08:56:32	2022-11-25 04:00:23	licor	dark	forested	True	True	show data
751	757	Ala-Akkunus	2022-07-09	2022-11-25 07:44:46	2022-11-26 04:00:13	licor	dark	forested	True	True	show data
749	755	Ala-Akkunus	2022-07-28	2022-11-24 09:28:51	2022-11-25 04:01:48	licor	dark	forested	True	True	show data
750	756	Ala-Akkunus	2022-08-01	2022-11-24 09:30:06	2022-11-25 04:02:25	licor	dark	forested	True	True	show data
752	758	Ala-Akkunus	2022-10-19	2022-11-25 07:45:23	2022-11-26 04:01:30	licor	dark	forested	True	True	show data
540	541	Ansasaari	2022-06-21	2022-11-01 08:57:30	2022-11-02 04:08:40	licor	dark	forested	True	True	show data
539	540	Ansasaari	2022-07-07	2022-11-01 08:56:25	2022-11-02 04:07:38	licor	dark	forested	True	True	show data
538	539	Ansasaari	2022-07-18	2022-11-01 08:55:41	2022-11-02 04:06:40	licor	dark	forested	True	True	show data
537	538	Ansasaari	2022-08-01	2022-11-01 08:50:07	2022-11-02 04:05:48	licor	dark	forested	True	True	show data
536	537	Ansasaari	2022-08-16	2022-11-01 08:49:13	2022-11-02 04:04:47	licor	dark	forested	True	True	show data
535	536	Ansasaari	2022-08-23	2022-11-01 08:48:23	2022-11-02 04:03:46	licor	dark	forested	True	True	show data
534	535	Ansasaari	2022-08-29	2022-11-01 08:47:34	2022-11-02 04:02:53	licor	dark	forested	True	True	show data
533	534	Ansasaari	2022-09-15	2022-11-01 08:42:10	2022-11-02 04:02:01	licor	dark	forested	True	True	show data
531	532	Ansasaari	2022-09-27	2022-11-01 08:09:25	2022-11-02 04:00:57	licor	dark	forested	True	True	show data
614	617	Dobroc	2021-08-18	2022-11-18 11:42:02	2022-11-19 04:02:24	licor	dark	forested	True	True	show data

Rhet – quality assessment – script solution



102_before.R

```
}
if(pdfout) dev.off()

## subset the data from the 'susceptible' fits
hi_indices <- unique(c(hi_resid$id,hi_rsq$id))
hi_series <- eec102 %>% filter(id %in% hi_indices)
hi_subset <- data %>% filter(id %in% hi_indices)

pdfout <- FALSE
if(pdfout){
    cairo_pdf(file='fluxes_eec102_before.pdf',width=2*3,height=4*2,pointsize=
}
par(mfrow=c(4,2),mar=c(3.8,3.1,1.6,0.5),mgp=c(1.8,0.6,0.0))
for(i in 1:length(hi_indices)){
    sub_row <- hi_series %>% filter(id==hi_indices[i])
    sub_data <- hi_subset %>% filter(id==hi_indices[i])
    trim_data <- sub_data %>% filter(index >= 30)
    lmfit <- lm(trim_data$co2_ppm ~ trim_data$index)
    maintxt <- paste('id =',sid,
                     ' rsq =',round(sub_row[1,'rsq']$rsq,3),
                     ' rmse = ',round(sqrt(sub_row[1,'co2_a_resid']$co2_a_res
                     ' flux = ',round(sub_row[1,'co2_a_flux']$co2_a_flux,3))
    plot(sub_data$index,sub_data$co2_ppm,main=maintxt,xlab='time, s',ylab='ppm
    abline(v=30,lty=3)
    abline(lmfit,col='violetred',lwd=2)
}
if(pdfout) dev.off()
```

107:1 (Top Level) R Script

Console Markers Background Jobs

R 4.2.2 · C:/Users/obeli/Downloads/

```
3),
+                     ' flux = ',round(sub_row[1,'co2_a_flux']$co2_a_flux,3))
+     plot(sub_data$index,sub_data$co2_ppm,main=maintxt,xlab='time, s',ylab='ppm')
+     abline(v=30,lty=3)
+     abline(lmfit,col='violetred',lwd=2)
+ }
>
```

Environment History Connections Tutorial

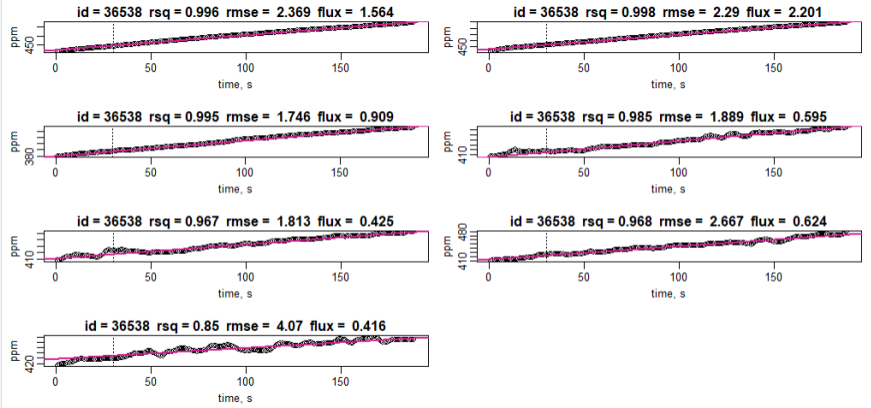
Import Dataset 226 MiB List

R Global Environment

subset	188 obs. of 3 variables
temp	188 obs. of 3 variables
trim_data	159 obs. of 3 variables
Values	
hi_indices	int [1:31] 16953 22012 22050 22335 22382 22383 22384 22385 22386 223…
i	31L
maintxt	"id = 36538 rsq = 0.85 rmse = 4.07 flux = 0.416"
pdfout	FALSE
ppms	int [1:159] 419 419 419 419 419 419 419 419 419 420 ...
rsqs	num [1:270] 0.996 0.998 0.997 0.995 0.994 ...
sid	36538L

Files Plots Packages Help Viewer Presentation

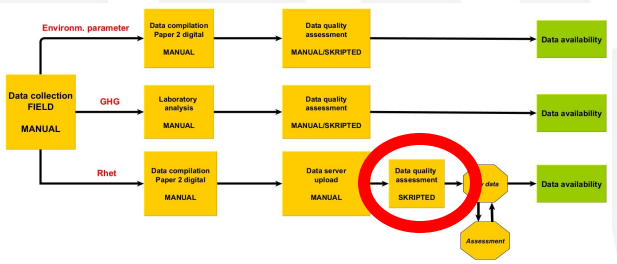
Zoom Export Publish

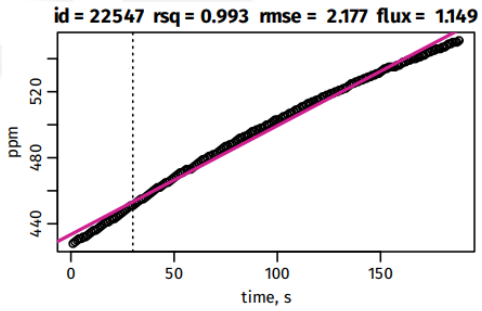


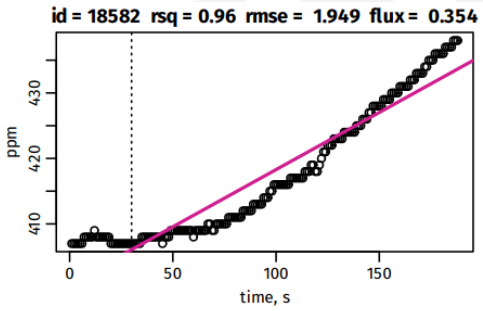
Rhet – quality assessment – script solution

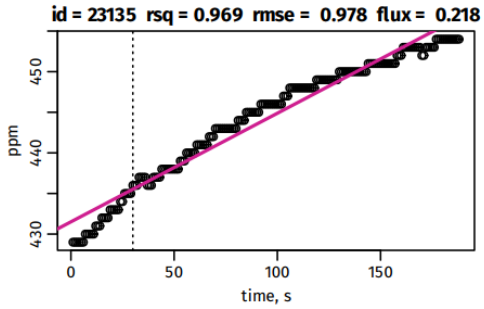
```
81  }
82  if(pdfout) dev.off()
83
84  ## subset the data from the 'susceptible' fits
85  hi_indices <- unique(c(hi_resid$id,hi_rsq$id))
86  hi_series <- eec102 %>% filter(id %in% hi_indices)
87  hi_subset <- data %>% filter(id %in% hi_indices)
88
89  pdfout <- FALSE
90  if(pdfout){
91      cairo_pdf(file='fluxes_eec102_before.pdf',width=2*3,height=4*2,pointsize=
92  }
93  par(mfrow=c(4,2),mar=c(3.8,3.1,1.6,0.5),mgp=c(1.8,0.6,0.0))
94  for(i in 1:length(hi_indices)){
95      sub_row <- hi_series %>% filter(id==hi_indices[i])
96      sub_data <- hi_subset %>% filter(id==hi_indices[i])
97      trim_data <- sub_data %>% filter(index >= 30)
98      lmfit <- lm(trim_data$co2_ppm ~ trim_data$index)
99      maintxt <- paste('id =',sid,
100                       ' rsq =',round(sub_row[1,'rsq']$rsq,3),
101                       ' rmse = ',round(sqrt(sub_row[1,'co2_a_resid']$co2_a_res
102                       ' flux = ',round(sub_row[1,'co2_a_flux']$co2_a_flux,3))
103     plot(sub_data$index,sub_data$co2_ppm,main=maintxt,xlab='time, s',ylab='pp
104     abline(v=30,lty=3)
105     abline(lmfit,col='violetred',lwd=2)
106 }
107 if(pdfout) dev.off()
108
109
110
```

```
3),
+                     ' flux = ',round(sub_row[1,'co2_a_flux']$co2_a_flux,3))
+     plot(sub_data$index,sub_data$co2_ppm,main=maintxt,xlab='time, s',ylab='ppm')
+     abline(v=30,lty=3)
+     abline(lmfit,col='violetred',lwd=2)
+ }
>
```

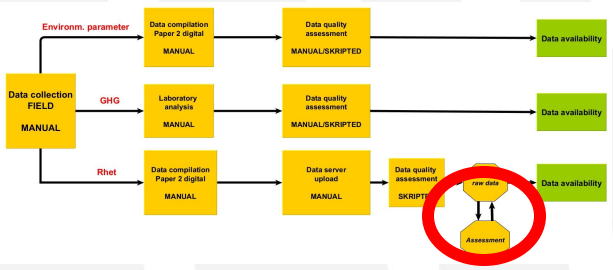






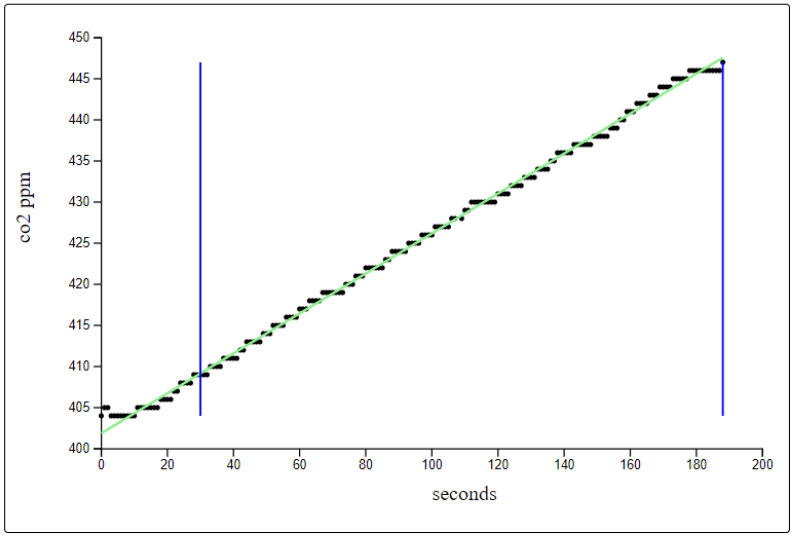


Rhet – individual measurement visualization/adjustment



View point data

Site: EEC109 A 1 Date: 2022-05-28 Start time: 12:19 CO2: True CH4: False N2O: False



autotrimmed flux:

- trim head: 30 tail: 0
- flux: 0.476245795
- bad: False

personal flux:

- trim head: NA tail: NA
- flux: NA
- bad: NA

good bad

0 trim head

0 trim tail

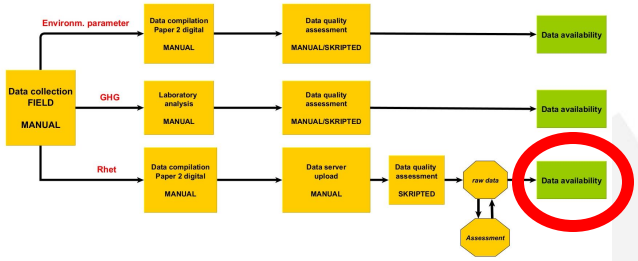
set personal flux clear

Site: EEC109 A 2 Date: 2022-05-28 Start time: 12:23 CO2: True CH4: False N2O: False

autotrimmed flux:

- trim head: 30 tail: 0
- flux: 0.389908531
- bad: False

Rhet – Data download, site specific



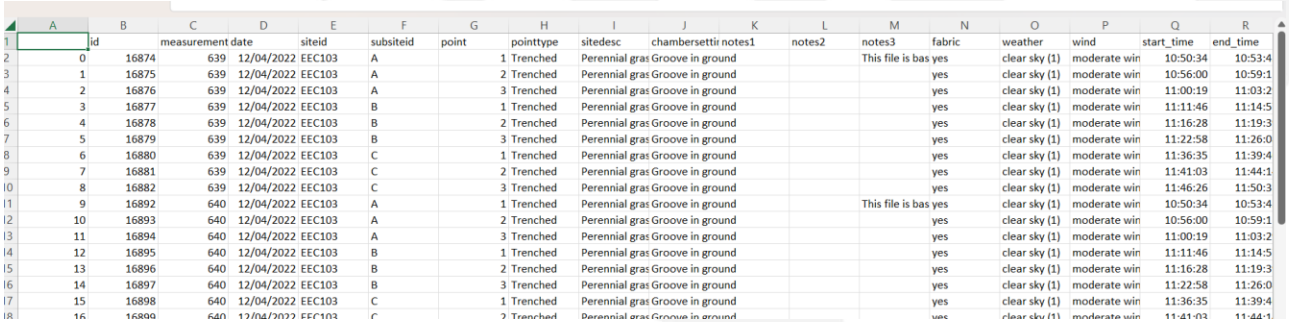
SITE SPECIFIC DATA DOWNLOAD

Data download

Back to Index

Download data for a specific site id

Siteid	Count	Download
Nastola	684	download
Enäsuo	197	download
LVC109	9	download
Hyytiälä	68	download
Polvensuo	444	download
Ylimysneva	220	download
Kivisalmenneva_pohj	205	download
Karstula76	1148	download
EEC103	54	download
Karkkila	528	download
Kelheim-Parsberg	449	download

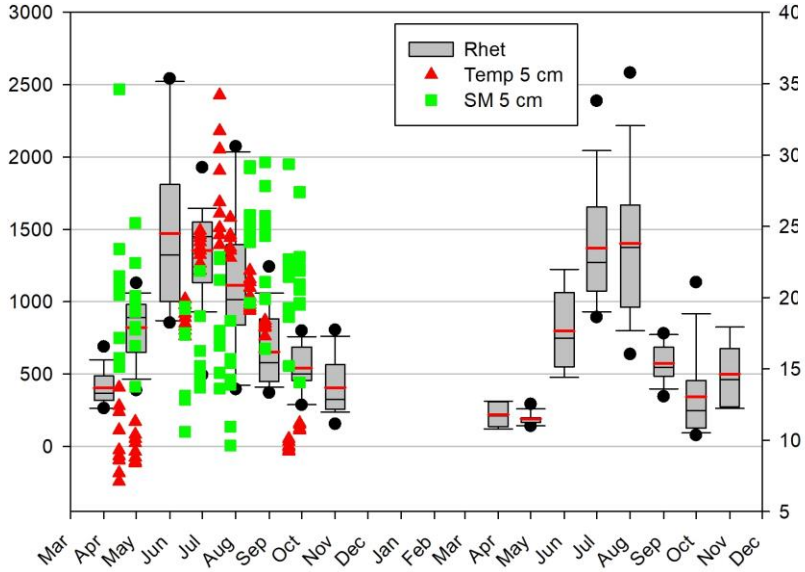


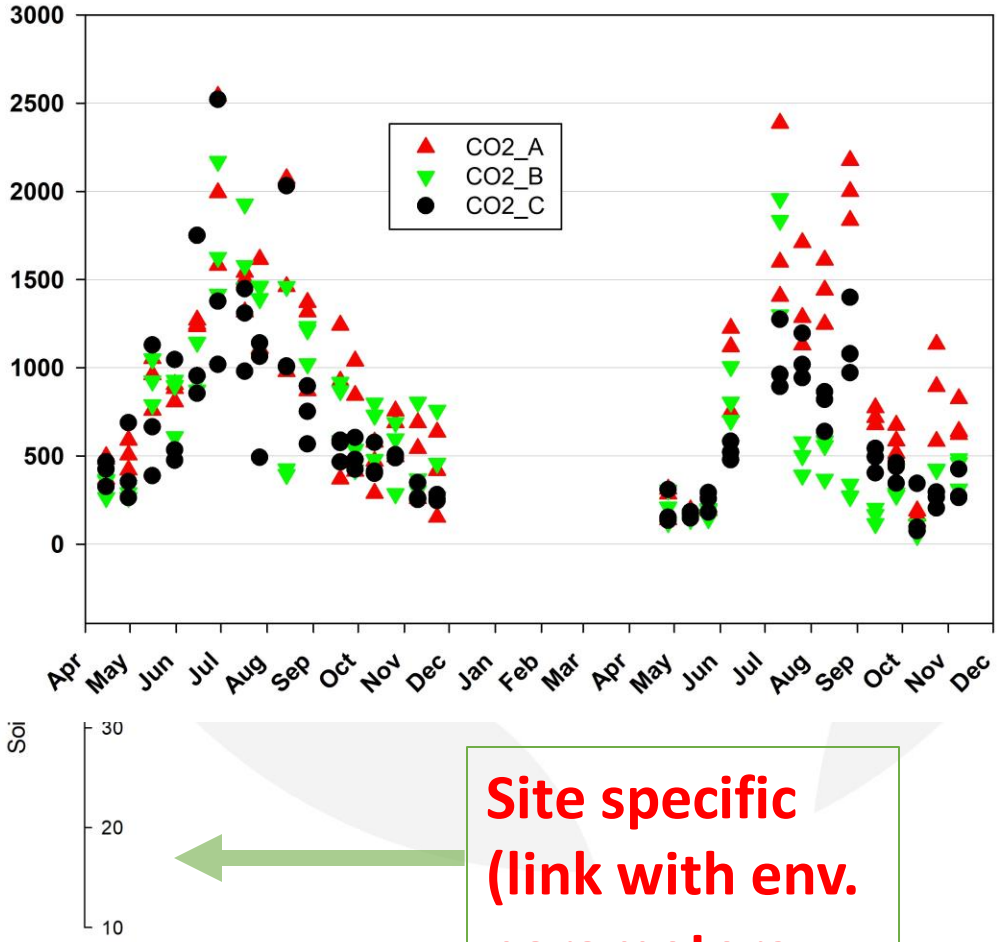
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1		id	measurement	date	siteid	subsiteid	point	pointtype	sitedesc	chambersettir	notes1	notes2	notes3	fabric	weather	wind	start_time	end_time
2	0	16874	639	12/04/2022	EEC103	A	1	Trenched	Perennial gras	Groove in ground			This file is bas	yes	clear sky (1)	moderate win	10:50:34	10:53:4
3	1	16875	639	12/04/2022	EEC103	A	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	10:56:00	10:59:1
4	2	16876	639	12/04/2022	EEC103	A	3	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:00:19	11:03:2
5	3	16877	639	12/04/2022	EEC103	B	1	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:11:46	11:14:5
6	4	16878	639	12/04/2022	EEC103	B	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:16:28	11:19:3
7	5	16879	639	12/04/2022	EEC103	B	3	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:22:58	11:26:0
8	6	16880	639	12/04/2022	EEC103	C	1	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:36:35	11:39:4
9	7	16881	639	12/04/2022	EEC103	C	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:41:03	11:44:1
10	8	16882	639	12/04/2022	EEC103	C	3	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:46:26	11:50:3
11	9	16892	640	12/04/2022	EEC103	A	1	Trenched	Perennial gras	Groove in ground			This file is bas	yes	clear sky (1)	moderate win	10:50:34	10:53:4
12	10	16893	640	12/04/2022	EEC103	A	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	10:56:00	10:59:1
13	11	16894	640	12/04/2022	EEC103	A	3	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:00:19	11:03:2
14	12	16895	640	12/04/2022	EEC103	B	1	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:11:46	11:14:5
15	13	16896	640	12/04/2022	EEC103	B	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:16:28	11:19:3
16	14	16897	640	12/04/2022	EEC103	B	3	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:22:58	11:26:0
17	15	16898	640	12/04/2022	EEC103	C	1	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:36:35	11:39:4
18	16	16899	640	12/04/2022	EEC103	C	2	Trenched	Perennial gras	Groove in ground				yes	clear sky (1)	moderate win	11:41:03	11:44:1

Detailed .csv file per site

Rhet – preliminary analysis – output examples

Sub-site specific (spatial variation)





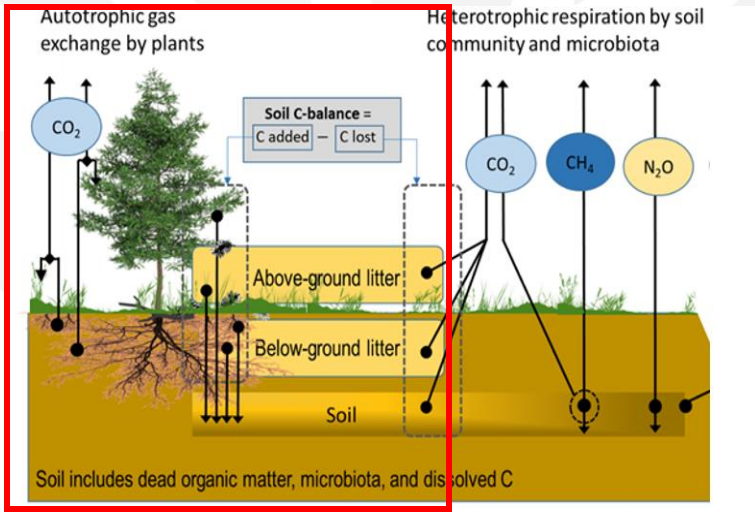
Site specific (link with env. parameters

Outlook – upcoming tasks

- Continue and finish gas sampling campaigns (LT)
- Continue and finish data transfer / upload
- Continue the data quality assessment
- Provide, improve and adjust reliable, sustainable tools,

Beside the "gases" – once in project sampling / on-going sub-experiments

- Continue with outstanding or ongoing sub-experiments / lab. analysis / calculations …
- Soil chemistry, microbial data evaluation,
- biomass + production + decomposition // aboveground, belowground, studies et al.



All guestions or recommendations are WELCOME!

BACKUP