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Temporary waterlogging alters CO_2 flux dynamics but not cumulative emissions in cultivated mineral soils

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Results of the statistical analyses

Table S1. The summary statistics from the linear mixed effects model on the effect of soil type, and plant and water treatment on CO_2 fluxes (g CO_2-C m^{-2} d^{-1}) during and after waterlogging (n=4). Statistically significant terms are marked with asterisk. CI denotes confidence intervals (95%).

Timeperiod	Cycle	Coefficient	Value	95% CI	Std Error	z-value	p-value
During WL	2	Intercept	0.98	0.77, 1.18	0.11	9.19	0.000*
		Soil - Sandy loam	-0.13	-0.27, 0.01	0.07	-1.88	0.060
		Water - Saturation	-0.38	-0.52, -0.24	0.07	-5.47	0.000*
		Plant - Cover crop	0.18	0.04, 0.32	0.07	2.59	0.009*
	3	Intercept	0.62	0.34, 0.90	0.14	4.35	0.000*
		Soil - Sandy loam	-0.04	-0.21, 0.13	0.09	-0.45	0.652
		Water - Saturation	-0.27	-0.44, -0.10	0.09	-3.06	0.002*
		Plant - CC	0.87	0.69, 1.04	0.09	9.88	0.000*
After WL	2	Intercept	1.36	0.90, 1.81	0.23	5.86	0.000*
		Soil - Sandy loam	-0.07	-0.34, 0.20	0.14	-0.50	0.619
		Water - Saturation	0.76	0.49, 1.03	0.14	5.53	0.000*
		Plant - Cover crop	0.86	0.59, 1.12	0.14	6.23	0.000*
	3	Intercept	0.74	0.41, 1.07	0.17	4.36	0.000*
		Soil - Sandy loam	0.18	0.03, 0.33	0.08	2.29	0.022*
		Water - Saturation	0.40	0.18, 0.61	0.11	3.58	0.000*
		Plant - Cover crop	0.32	0.10, 0.54	0.11	2.89	0.004*
		Water Sat.:Plant CC	0.33	0.02, 0.63	0.16	2.09	0.037*

[a]WL=Waterlogging

Table S2. The summary statistics from the post-hoc tests on mean cumulative CO_2 fluxes (g CO_2-C m^{-2} d^{-1}) by study cycle and soil type. Statistically significant terms are marked with asterisk.

Cycle	Soil	Contrast	Estimate	SE	df	t-ratio	p-value
2	Silty clay	FC NoCC - Sat NoCC	-1.88	15.03	24	-0.12	0.999
		FC NoCC - FC CC	-37.33	15.03	24	-2.48	0.088
		FC NoCC - Sat CC	-45.87	15.03	24	-3.05	0.026*
		Sat NoCC - FC CC	-35.45	15.03	24	-2.36	0.113
		Sat NoCC - Sat CC	-43.99	15.03	24	-2.93	0.035*
		FC CC - Sat CC	-8.54	15.03	24	-0.57	0.941
	Sandy loam	FC NoCC - Sat NoCC	-1.67	15.03	24	-0.11	0.999
		FC NoCC - FC CC	-38.42	15.03	24	-2.56	0.076
		FC NoCC - Sat CC	-38.51	15.03	24	-2.56	0.075
		Sat NoCC - FC CC	-36.76	15.03	24	-2.44	0.095
		Sat NoCC - Sat CC	-36.84	15.03	24	-2.45	0.094
		FC CC - Sat CC	-0.08	15.03	24	-0.01	1.000
3	Silty clay	FC NoCC - Sat NoCC	14.58	11.33	24	1.29	0.580
		FC NoCC - FC CC	-46.02	11.33	24	-4.06	0.002*
		FC NoCC - Sat CC	-50.75	11.33	24	-4.48	0.001*
		Sat NoCC - FC CC	-60.60	11.33	24	-5.35	0.000*
		Sat NoCC - Sat CC	-65.33	11.33	24	-5.77	0.000*
		FC CC - Sat CC	-4.73	11.33	24	-0.42	0.975
	Sandy loam	FC NoCC - Sat No CC	6.13	11.33	24	0.54	0.948
		FC NoCC - FC CC	-54.04	11.33	24	-4.77	0.000*
		FC NoCC - Sat CC	-46.44	11.33	24	-4.10	0.002*
		Sat NoCC - FC CC	-60.17	11.33	24	-5.31	0.000*
		Sat NoCC - Sat CC	-52.57	11.33	24	-4.64	0.001*
		FC CC - Sat CC	7.61	11.33	24	0.67	0.907

Table S3. The summary statistics of the pairwise t-test used to test the statistical difference between the cumulative CO_2 efflux calculated with measured vs. modelled CO_2 fluxes (g CO_2-C m^{-2}). Statistically significant differences are marked with asterisk.

Cycle	Soil	Treatment	Group 1	Group 2	n	p-value
Cycle 2	Silty clay	CC-FC	Measured	Modelled	3	0.493
		CC-Sat	Measured	Modelled	3	0.352
		No CC-FC	Measured	Modelled	3	0.852
		No CC-Sat	Measured	Modelled	3	0.291
	Sandy loam	CC-FC	Measured	Modelled	3	0.977
		CC-Sat	Measured	Modelled	3	0.396
		No CC-FC	Measured	Modelled	3	0.63
		No CC-Sat	Measured	Modelled	3	0.739
Cycle 3	Silty clay	CC-FC	Measured	Modelled	3	0.532
		CC-Sat	Measured	Modelled	3	0.711
		No CC-FC	Measured	Modelled	3	0.022*
		No CC-Sat	Measured	Modelled	3	0.015*
	Sandy loam	CC-FC	Measured	Modelled	3	0.994
		CC-Sat	Measured	Modelled	3	0.831
		No CC-FC	Measured	Modelled	3	0.001*
		No CC-Sat	Measured	Modelled	3	0.001*

Table S4. The summary statistics from the linear mixed effects model on the total dissolved C (TDC) content in soil (mg C l^{-1} soil). Statistically significant differences are marked with asterisk. CI denotes confidence intervals.

C species	Cycle	Coefficient	Value	Std. Error	95% CI	DF	t-value	p-value
TDC	2	(Intercept)	14.13	2.55	9.09, 19.16	138	5.55	0.000*
		Days	0.33	0.04	0.24, 0.41	138	7.52	0.000*
		Depth_30	2.78	2.18	-1.54, 7.10	138	1.27	0.205
		Depth_50	1.05	2.16	-3.22, 5.32	138	0.49	0.627
		SoilSandy loam	-10.13	3.46	-18.11, -2.14	8	-2.92	0.019*
		PlantCover crop	9.97	3.06	2.93, 17.02	8	3.26	0.011*
		Days:SoilSandy loam	-0.25	0.06	-0.36, -0.14	138	-4.38	0.000*
		SoilSandy loam:PlantCover crop	-7.33	4.30	-17.24, 2.59	8	-1.70	0.127
		Days:Depth_30	-0.18	0.06	-0.29, -0.06	138	-3.10	0.002*
		Days:Depth_50	-0.33	0.06	-0.45, -0.22	138	-5.88	0.000*
		Depth_30:SoilSandy loam	1.42	3.04	-4.60, 7.43	138	0.47	0.642
		Depth_50:SoilSandy loam	5.75	2.88	0.06, 11.44	138	2.00	0.047*
		Depth_30:PlantCover crop	-7.60	1.87	-11.31, -3.90	138	-4.06	0.000*
		Depth_50:PlantCover crop	-2.42	1.88	-6.13, 1.29	138	-1.29	0.199
		Days:Depth_30:SoilSandy loam	0.19	0.08	0.03, 0.35	138	2.32	0.022*
		Days:Depth_50:SoilSandy loam	0.30	0.08	0.15, 0.46	138	3.90	0.000*
		Depth_30:SoilSandy loam:PlantCover crop	9.96	2.64	4.74, 15.19	138	3.77	0.000*
		Depth_50:SoilSandy loam:PlantCover crop	1.93	2.64	-3.28, 7.15	138	0.73	0.464
	3	(Intercept)	18.62	2.17	14.32, 22.92	117	8.58	0.000*
		Days	0.37	0.04	0.29, 0.45	117	8.83	0.000*
		SoilSandy loam	-13.23	3.07	-20.30, -6.15	8	-4.31	0.003*
		PlantCover crop	9.02	2.66	2.89, 15.16	8	3.39	0.009*
		Depth_30	-1.86	1.91	-5.66, 1.93	117	-0.97	0.332
		Depth_50	-7.53	1.95	-11.38, -3.67	117	-3.87	0.000*
		Days:SoilSandy loam	-0.17	0.06	-0.29, -0.05	117	-2.86	0.005*
		SoilSandy loam:PlantCover crop	-7.00	3.76	-15.67, 1.67	8	-1.86	0.100*
		Days:Depth_30	-0.26	0.06	-0.37, -0.14	117	-4.30	0.000*
		Days:Depth_50	-0.33	0.06	-0.45, -0.21	117	-5.47	0.000*
		SoilSandy loam:Depth_30	5.22	2.71	-0.14, 10.58	117	1.93	0.056
		SoilSandy loam:Depth_50	10.66	2.73	5.25, 16.07	117	3.90	0.000*
		PlantCover crop:Depth_30	-6.10	1.63	-9.31, -2.88	117	-3.75	0.000*
		PlantCover crop:Depth_50	-0.50	1.65	-3.76, 2.76	117	-0.30	0.761
		Days:SoilSandy loam:Depth_30	0.19	0.08	0.02, 0.36	117	2.25	0.026*
		Days:SoilSandy loam:Depth_50	0.15	0.09	-0.02, 0.32	117	1.73	0.086
		SoilSandy loam:PlantCover crop:Depth_30	7.94	2.30	3.39, 12.50	117	3.46	0.001*
		SoilSandy loam:PlantCover crop:Depth_50	4.40	2.31	-0.19, 8.98	117	1.90	0.060

Table S5. The summary statistics from the linear mixed effects model on the soil dissolved inorganic C (DIC) content mg C l^{-1} soil). CI denotes lower and upper confidence intervals.

C species	Cycle	Coefficient	Value	Std. Error	95% CI	DF	t-value	p-value
DIC	2	(Intercept)	4.54	1.87	0.84, 8.24	137	2.43	0.017*
		Days	0.33	0.03	0.27, 0.38	137	11.25	0.000*
		Depth_f30	2.04	1.37	-0.66, 4.75	137	1.49	0.137
		Depth_f50	5.28	1.35	2.61, 7.96	137	3.90	0.000*
		SoilSandy loam	-3.30	2.54	-9.15, 2.54	8	-1.30	0.229
		PlantCover crop	6.50	2.40	0.95, 12.04	8	2.70	0.027*
		Days:SoilSandy loam	-0.25	0.04	-0.32, -0.18	137	-7.04	0.000*
		Days:PlantCover crop	0.03	0.02	-0.01, 0.07	137	1.64	0.103
		SoilSandy loam:PlantCover crop	-5.18	3.27	-12.73, 2.36	8	-1.58	0.152
		Days:Depth_30	-0.21	0.04	-0.28, -0.14	137	-5.79	0.000*
		Days:Depth_50	-0.33	0.04	-0.40, -0.26	137	-9.37	0.000*
		Depth_30:SoilSandy loam	-1.73	1.91	-5.50, 2.04	137	-0.91	0.366
		Depth_50:SoilSandy loam	-2.82	1.80	-6.39, 0.75	137	-1.56	0.120
		Depth_30:PlantCover crop	-4.02	1.18	-6.34, -1.69	137	-3.42	0.001*
		Depth_50:PlantCover crop	0.10	1.18	-2.23, 2.42	137	0.08	0.934
		Days:Depth_30:SoilSandy loam	0.25	0.05	0.15, 0.35	137	4.94	0.000*
		Days:Depth_50:SoilSandy loam	0.29	0.05	0.19, 0.39	137	5.94	0.000*
		Depth_30:SoilSandy loam:PlantCover crop	4.76	1.66	1.48, 8.04	137	2.87	0.005*
		Depth_50:SoilSandy loam:PlantCover crop	-1.85	1.65	-5.12, 1.42	137	-1.12	0.265
	3	(Intercept)	8.83	1.06	6.73, 10.93	114	8.32	0.000*
		Days	0.36	0.03	0.30, 0.41	114	12.08	0.000*
		SoilSandy loam	-6.71	1.37	-9.86, -3.56	8	-4.91	0.001*
		PlantCover crop	3.16	1.37	0.01, 6.31	8	2.32	0.049*
		Depth_30	-2.37	1.26	-4.87, 0.12	114	-1.89	0.062
		Depth_50	-2.33	1.26	-4.83, 0.17	114	-1.85	0.067
		Days:SoilSandy loam	-0.21	0.03	-0.28, -0.14	114	-6.17	0.000*
		Days:PlantCover crop	0.12	0.03	0.06, 0.19	114	3.67	0.000*
		SoilSandy loam:PlantCover crop	-3.13	1.48	-6.54, 0.29	8	-2.11	0.068
		Days:Depth_30	-0.24	0.04	-0.33, -0.16	114	-5.84	0.000*
		Days:Depth_50	-0.31	0.04	-0.39, -0.22	114	-7.30	0.000*
		SoilSandy loam:Depth_30	3.22	1.55	0.15, 6.29	114	2.08	0.040*
		SoilSandy loam:Depth_50	2.29	1.56	-0.80, 5.39	114	1.47	0.145
		PlantCover crop:Depth_30	-1.84	1.55	-4.91, 1.23	114	-1.19	0.236
		PlantCover crop:Depth_50	3.24	1.55	0.17, 6.31	114	2.09	0.039*
		Days:SoilSandy loam:Depth_30	0.21	0.05	0.11, 0.31	114	4.36	0.000*
		Days:SoilSandy loam:Depth_50	0.21	0.05	0.11, 0.31	114	4.33	0.000*
		Days:PlantCover crop:Depth_30	-0.09	0.05	-0.19, 0.00	114	-1.91	0.059
		Days:PlantCover crop:Depth_50	-0.16	0.05	-0.26, -0.07	114	-3.33	0.001*
		SoilSandy loam:PlantCover crop:Depth_30	3.57	1.31	0.96, 6.17	114	2.71	0.008*
		SoilSandy loam:PlantCover crop:Depth_50	-0.67	1.32	-3.29, 1.96	114	-0.50	0.615

Table S6. The summary statistics from the linear mixed effects model on the dissolved organic C (DOC) content in soil (mg C l^{-1} soil). CI denotes confidence intervals.

C species	Cycle	Coefficient	Value	Std. Error	95% CI	DF	t-value	p-value
DOC	2	(Intercept)	3.81	0.29	3.23, 4.40	143	12.95	0.000*
		SoilSandy loam	-2.47	0.39	-3.36, -1.58	8	-6.39	0.000*
		PlantCover crop	0.54	0.39	-0.37, 1.44	8	1.36	0.210
		Depth_f30	0.47	0.26	-0.05, 0.98	143	1.79	0.076
		Depth_f50	-1.42	0.26	-1.93, -0.91	143	-5.46	0.000*
		Days	0.00	0.00	-0.01, 0.00	143	-1.01	0.315
		SoilSandy loam:PlantCover crop	-0.36	0.55	-1.63, 0.90	8	-0.66	0.526
		SoilSandy loam:Depth_30	0.81	0.37	0.09, 1.53	143	2.22	0.028*
		SoilSandy loam:Depth_50	3.31	0.36	2.60, 4.01	143	9.23	0.000*
		PlantCover crop:Depth_30	-0.83	0.37	-1.55, -0.10	143	-2.25	0.026*
		PlantCover crop:Depth_50	-0.49	0.37	-1.22, 0.23	143	-1.34	0.181
		SoilSandy loam:PlantCover crop:Depth_30	1.34	0.52	0.31, 2.36	143	2.58	0.011*
		SoilSandy loam:PlantCover crop:Depth_50	0.82	0.52	-0.20, 1.84	143	1.58	0.116
	3	(Intercept)	9.97	1.43	7.14, 12.80	121	6.97	0.000*
		Days	0.01	0.02	-0.02, 0.04	121	0.52	0.601
		SoilSandy loam	-5.50	1.93	-9.95, -1.05	8	-2.85	0.021*
		PlantCover crop	3.78	2.02	-0.89, 8.44	8	1.87	0.099
		Depth_30	0.20	0.79	-1.36, 1.75	121	0.25	0.801
		Depth_50	-5.93	0.79	-7.48, -4.37	121	-7.55	0.000*
		Days:PlantCover crop	-0.04	0.02	-0.09, 0.00	121	-1.86	0.065
		SoilSandy loam:PlantCover crop	-3.87	2.73	-10.16, 2.42	8	-1.42	0.193
		SoilSandy loam:Depth_30	1.48	1.11	-0.72, 3.68	121	1.33	0.186
		SoilSandy loam:Depth_50	6.73	1.11	4.54, 8.93	121	6.06	0.000*
		PlantCover crop:Depth_30	-1.89	1.11	-4.09, 0.31	121	-1.70	0.092
		PlantCover crop:Depth_50	0.33	1.12	-1.89, 2.56	121	0.30	0.767
		SoilSandy loam:PlantCover crop:Depth_30	4.38	1.57	1.27, 7.49	121	2.79	0.006*
		SoilSandy loam:PlantCover crop:Depth_50	5.17	1.58	2.04, 8.30	121	3.27	0.001*

Table S7. The summary statistics from the linear model used to test the effects of treatments on total CO_2 production (g C m^{-2}) during the waterlogging treatment.

Cycle	Coefficient	Estimate	SE	t-value	p-value
2	Intercept	52.40	4.03	13.01	0.000*
	Soil - Sandy loam	-8.30	4.03	-2.06	0.052
	Plant - CC	6.95	4.03	1.73	0.100
	Water - Saturation	-14.09	4.03	-3.50	0.002*
3	Intercept	23.46	4.28	5.48	0.000*
	Soil - Sandy loam	-5.25	4.28	-1.23	0.234
	Plant - CC	34.57	4.28	8.08	0.000*
	Water - Saturation	-7.44	4.28	-1.74	0.098

Table S8. The summary statistics from the post-hoc tests comparing the mean CO_2 production (g C m^{-2}) in the two water treatments (<FC, Saturation) during waterlogging by study cycle, soil type and plant treatment. Statistically significant differences are marked with asterisk.

Cycle	Soil	Plant	Estimate	SE	df	t-ratio	p-value
2	Silty clay	No CC	18.89	8.88	16.00	2.13	0.049*
		CC	13.85	8.88	16.00	1.56	0.138
	Sandy loam	No CC	11.17	8.88	16.00	1.26	0.226
		CC	12.45	8.88	16.00	1.40	0.180
3	Silty clay	No CC	8.73	9.31	16.00	0.94	0.362
		CC	1.31	9.31	16.00	0.14	0.890
	Sandy loam	No CC	6.93	9.31	16.00	0.75	0.467
		CC	12.78	9.31	16.00	1.37	0.189

Table S9. Summary statistics from the repeated measures correlation (r_{rm}) analysis of porewater dissolved Fe and C concentrations (μmol l^{-1}).

Cycle	Soil	C species	Plant	Depth	r_{rm}	95% CI_r low	95% CI_r high	df	p-value	Intercept	Slope
2	Sandy loam	DOC	No cover crop	10 cm	0.59	0.19	0.83	17	0.007	394.34	289.55
2	Sandy loam	DOC	No cover crop	30 cm	0.44	0.00	0.74	18	0.053	819.24	448.72
2	Sandy loam	DOC	No cover crop	50 cm	0.07	-0.36	0.48	20	0.750	1704.48	76.37
2	Sandy loam	DOC	Cover crop	10 cm	0.71	0.38	0.88	17	0.001	421.11	661.57
2	Sandy loam	DOC	Cover crop	30 cm	0.34	-0.12	0.68	18	0.140	1415.52	221.83
2	Sandy loam	DOC	Cover crop	50 cm	-0.19	-0.60	0.31	16	0.460	2035.85	-87.56
2	Sandy loam	DIC	No cover crop	10 cm	-0.22	-0.61	0.26	17	0.370	800.30	-148.84
2	Sandy loam	DIC	No cover crop	30 cm	0.04	-0.41	0.47	18	0.870	1041.61	41.41
2	Sandy loam	DIC	No cover crop	50 cm	0.18	-0.26	0.56	20	0.420	1110.35	168.98
2	Sandy loam	DIC	Cover crop	10 cm	-0.22	-0.61	0.26	17	0.360	1248.75	-106.40
2	Sandy loam	DIC	Cover crop	30 cm	0.32	-0.15	0.67	18	0.170	1212.43	254.73
2	Sandy loam	DIC	Cover crop	50 cm	0.53	0.09	0.8	16	0.022	888.44	576.24
2	Sandy loam	TDC	No cover crop	10 cm	0.2	-0.28	0.6	17	0.410	1194.65	140.71
2	Sandy loam	TDC	No cover crop	30 cm	0.41	-0.04	0.72	18	0.070	1860.86	490.12
2	Sandy loam	TDC	No cover crop	50 cm	0.21	-0.24	0.58	20	0.360	2814.83	245.35
2	Sandy loam	TDC	Cover crop	10 cm	0.58	0.17	0.82	17	0.009	1669.87	555.17
2	Sandy loam	TDC	Cover crop	30 cm	0.59	0.19	0.82	18	0.007	2627.95	476.56
2	Sandy loam	TDC	Cover crop	50 cm	0.42	-0.06	0.74	16	0.086	2924.29	488.68
2	Silty clay	DOC	No cover crop	10 cm	-0.3	-0.66	0.18	17	0.220	1809.26	-181.71
2	Silty clay	DOC	No cover crop	30 cm	-0.22	-0.60	0.23	19	0.340	2176.20	-19.40
2	Silty clay	DOC	No cover crop	50 cm	-0.22	-0.60	0.25	18	0.360	1126.43	-121.30
2	Silty clay	DOC	Cover crop	10 cm	-0.36	-0.69	0.1	18	0.120	2527.18	-97.32
2	Silty clay	DOC	Cover crop	30 cm	0.03	-0.41	0.45	19	0.900	2127.95	5.27
2	Silty clay	DOC	Cover crop	50 cm	-0.1	-0.53	0.37	17	0.680	955.37	-82.71
2	Silty clay	DIC	No cover crop	10 cm	0.51	0.08	0.79	17	0.024	1497.01	761.71
2	Silty clay	DIC	No cover crop	30 cm	0.76	0.48	0.9	19	7.2e-05	1653.41	145.73
2	Silty clay	DIC	No cover crop	50 cm	0.52	0.10	0.78	18	0.018	2036.25	290.01

2	Silty clay	DIC	Cover crop	10 cm	0.54	0.13	0.79	18	0.013	2856.82	505.70
2	Silty clay	DIC	Cover crop	30 cm	0.62	0.26	0.83	19	0.003	2589.04	234.51
2	Silty clay	DIC	Cover crop	50 cm	0.24	-0.24	0.63	17	0.320	3038.05	343.86
2	Silty clay	TDC	No cover crop	10 cm	0.46	0.00	0.75	17	0.049	3306.27	580.01
2	Silty clay	TDC	No cover crop	30 cm	0.58	0.20	0.81	19	0.006	3829.61	126.33
2	Silty clay	TDC	No cover crop	50 cm	0.2	-0.26	0.59	18	0.390	3162.69	168.70
2	Silty clay	TDC	Cover crop	10 cm	0.51	0.08	0.78	18	0.023	5384.00	408.38
2	Silty clay	TDC	Cover crop	30 cm	0.58	0.20	0.81	19	0.005	4716.98	239.78
2	Silty clay	TDC	Cover crop	50 cm	0.15	-0.32	0.57	17	0.530	3993.42	261.16
3	Sandy loam	DOC	No cover crop	10 cm	-0.32	-0.79	0.39	8	0.370	993.18	-95.58
3	Sandy loam	DOC	No cover crop	30 cm	0.52	-0.16	0.87	8	0.120	1158.40	296.97
3	Sandy loam	DOC	No cover crop	50 cm	0.62	-0.01	0.9	8	0.054	1105.16	329.16
3	Sandy loam	DOC	Cover crop	10 cm	0.53	-0.15	0.87	8	0.110	538.72	239.88
3	Sandy loam	DOC	Cover crop	30 cm	-0.54	-0.87	0.13	8	0.100	1787.84	-39.01
3	Sandy loam	DOC	Cover crop	50 cm	-0.12	-0.70	0.55	8	0.750	2103.23	-45.06
3	Sandy loam	DIC	No cover crop	10 cm	0.18	-0.51	0.73	8	0.620	797.38	344.82
3	Sandy loam	DIC	No cover crop	30 cm	0.64	0.03	0.91	8	0.044	409.41	985.31
3	Sandy loam	DIC	No cover crop	50 cm	0.19	-0.50	0.73	8	0.600	719.20	107.68
3	Sandy loam	DIC	Cover crop	10 cm	-0.27	-0.77	0.43	8	0.440	2370.44	-591.41
3	Sandy loam	DIC	Cover crop	30 cm	0.71	0.14	0.92	8	0.022	1275.25	206.88
3	Sandy loam	DIC	Cover crop	50 cm	0.19	-0.50	0.73	8	0.600	990.55	117.39
3	Sandy loam	TDC	No cover crop	10 cm	0.12	-0.55	0.7	8	0.740	1790.56	249.24
3	Sandy loam	TDC	No cover crop	30 cm	0.62	-0.01	0.9	8	0.055	1567.82	1282.28
3	Sandy loam	TDC	No cover crop	50 cm	0.7	0.13	0.92	8	0.024	1824.36	436.84
3	Sandy loam	TDC	Cover crop	10 cm	-0.2	-0.74	0.49	8	0.580	2909.16	-351.53
3	Sandy loam	TDC	Cover crop	30 cm	0.7	0.12	0.92	8	0.025	3063.09	167.87
3	Sandy loam	TDC	Cover crop	50 cm	0.14	-0.54	0.71	8	0.710	3093.78	72.32
3	Silty clay	DOC	No cover crop	10 cm	0.34	-0.37	0.8	8	0.340	1571.01	34.52
3	Silty clay	DOC	No cover crop	30 cm	-0.29	-0.78	0.41	8	0.410	2090.26	-198.08
3	Silty clay	DOC	No cover crop	50 cm	0.29	-0.42	0.78	8	0.420	863.41	156.76
3	Silty clay	DOC	Cover crop	10 cm	-0.86	-0.97	-0.51	8	0.001	2679.75	-263.30
3	Silty clay	DOC	Cover crop	30 cm	-0.57	-0.88	0.09	8	0.085	2453.20	-148.93

3	Silty clay	DOC	Cover crop	50 cm	0.02	-0.65	0.68	7	0.950	1222.70	42.08
3	Silty clay	DIC	No cover crop	10 cm	0.59	-0.06	0.89	8	0.070	2267.58	472.91
3	Silty clay	DIC	No cover crop	30 cm	0.26	-0.44	0.76	8	0.470	1567.35	316.61
3	Silty clay	DIC	No cover crop	50 cm	0.48	-0.22	0.85	8	0.160	1483.31	627.02
3	Silty clay	DIC	Cover crop	10 cm	0.75	0.22	0.94	8	0.013	2969.80	906.09
3	Silty clay	DIC	Cover crop	30 cm	0.88	0.56	0.97	8	0.001	1587.92	783.19
3	Silty clay	DIC	Cover crop	50 cm	0.53	-0.21	0.88	7	0.150	2130.53	1289.82
3	Silty clay	TDC	No cover crop	10 cm	0.62	-0.01	0.9	8	0.055	3838.59	507.43
3	Silty clay	TDC	No cover crop	30 cm	0.09	-0.57	0.68	8	0.810	3657.61	118.53
3	Silty clay	TDC	No cover crop	50 cm	0.44	-0.26	0.84	8	0.200	2346.72	783.78
3	Silty clay	TDC	Cover crop	10 cm	0.63	0.00	0.9	8	0.051	5649.55	642.79
3	Silty clay	TDC	Cover crop	30 cm	0.83	0.42	0.96	8	0.003	4041.12	634.26
3	Silty clay	TDC	Cover crop	50 cm	0.38	-0.38	0.83	7	0.310	3353.23	1331.90

Supplementary figures

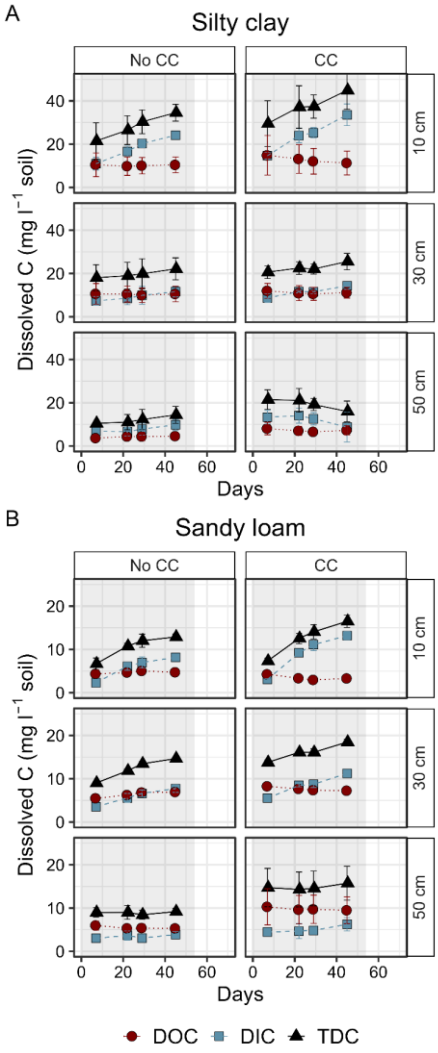

Figure S1. Timeseries of dissolved organic carbon (DOC), inorganic carbon (DIC) and total dissolved carbon (TDC) as mg C l^{-1} soil (mean±sd, n=1-3) during (shaded area) waterlogging in silty clay (A) and sandy loam (B) soil profiles with and without cover crops (No CC = No cover crops, CC = Cover crops) in cycle three. Days on the x-axis represent the days since the beginning of excess irrigation/waterlogging. Note the differing scales on y-axis in the two soils.

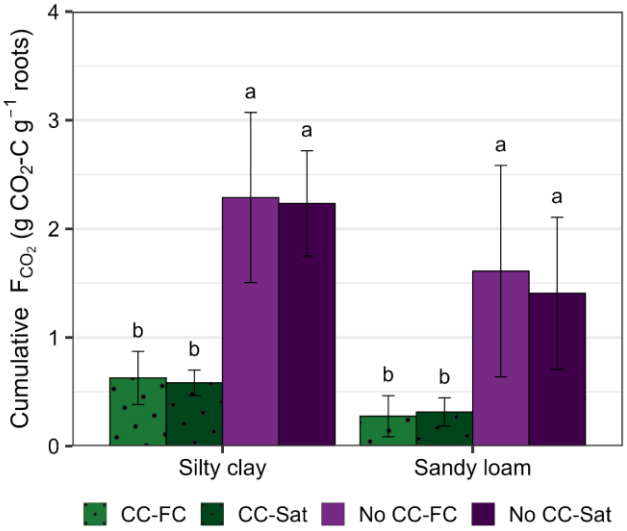

Figure S2. Off-season (beginning of the water treatment until the last CO_2 measurement day, 67 days) cumulative CO_2 efflux per g dry roots (mean±sd, n=4) in the top 20 cm soil layer. The g roots g^{-1} soil was multiplied with soil bulk density and the depth (20 cm) of the soil layer. For a description of the root washing methodology, the reader is referred to the publication by Kronberg et al. (2024). The letters indicate the statistical differences between the means within each soil type.

References

Kronberg, R., Kanerva, S., Koskinen, M., Polvinen, T., Heinonsalo, J., Pihlatie, M., 2024. Controlled soil monolith experiment for studying the effects of waterlogging on redox processes. Geoderma 452, 117110. https://doi.org/10.1016/j.geoderma.2024.117110