

# Carbon Dynamic in Rewetted Tropical Peatlands

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## Supplementary Information

**Table. S1.** List of formula to convert tree DBH and wood debris data into dry biomass

**Table. S2.** Before and after dam building ground water table in rewetted site and undrained site. The rainfall data was collected from the Katingan-Mentaya project weather station.

**Table. S3.** The properties of peat in the undrained site. The data was expressed in mean  $\pm$  SE

**Table. S4.** The properties of peat in the rewetted site. The data was expressed in mean  $\pm$  SE

**Figure S1.** Daily ground water table and daily rainfall in the study site from Mid-July 2018 – March 2020

**Table S1.** Formula to estimate the dry biomass

Data	Equation	Result	Reference
Overstory DBH (cm)	$0.136 \times \text{DBH}^{2.513}$	Dry biomass (kg)	Manuri et al. (2014)
Sapling DBH (cm)	$0.136 \times \text{DBH}^{2.513}$	Dry biomass (kg)	Manuri et al. (2014)
<b>Standing dead wood – DBH (cm) and Height (m)</b>			
DC 1	$0.975 \times 0.081 \times \text{DBH}^{2.049} \times \text{H}^{0.672}$	Dry biomass (kg)	Manuri et al. (2014) and Novita et al. (2020)
DC 2	$0.8 \times 0.081 \times \text{DBH}^{2.049} \times \text{H}^{0.672}$	Dry biomass (kg)	
DC 3	$0.7 \times 0.081 \times \text{DBH}^{2.049} \times \text{H}^{0.672}$	Dry biomass (kg)	
Dry biomass from overstory and Sapling	$0.33 \times (\text{overstory} + \text{Sapling})$	Root dry biomass (kg)	Suwarna et al. (2012)
<b>Wood debris with diameter</b>			
2.5 – 7.5 cm	$\text{sg} \times [\mu^2 \times (\text{NQMD}^2) / (8 \times \text{L})]$	Dry biomass (Mg)	Novita et al., (2020)
7.5 cm	$\text{sg} \times [(\mu^2 \times \Sigma \text{D}^2) / (8 \times \text{L})]$	Dry biomass (Mg)	Novita et al., (2020)

Note: D: diameter, DC: decomposition class, DBH: Diameter at breast high, H: height, N: numbers, QMD: quadratic mean diameter, L: length of transect (m), and sg: specific gravity ( $\text{gr cm}^{-3}$ ) (sound wood debris = 0.5, rooten wood debris = 0.23).

**Table S2.** Before and after dam building ground water table in rewetted site and undrained site. The rainfall data was collected from the Katingan-Mentaya project weather station.

Period		Rewetted (cm)		Undrained (cm)		Gap (cm)		Rainfall (mm)
		Mean	SD	Mean	SD	Mean	SD	
July - October 2018	Before	-32.89	18.33	-15.35	15.18	17.55	6.74	540.60
November - December 2018		9.08	4.89	13.62	4.07	4.54	1.94	914.76
January - March 2019	After	5.76	4.91	10.80	4.30	5.04	1.47	790.49
April - June 2019		3.30	8.43	7.79	6.98	4.50	2.40	828.76
July - October 2019		-55.53	24.93	-44.19	22.22	11.44	3.92	452.33
November - December 2019		-33.10	10.59	-11.68	12.77	21.41	3.46	440.74

**Table S3.** The properties of peat in the undrained site. The data was expressed in mean  $\pm$  SE

No	Initial section (cm)	End Section (cm)	incremental	Bulk Density (gr cm <sup>-3</sup> )	Carbon Content (%)	Nitrogen Content (%)	C/N	Carbon Density (kg m <sup>-3</sup> )	N (sample)
1	0	15	15	0.09 $\pm$ 0.02	49.46 $\pm$ 1.02	2.56 $\pm$ 0.09	20.33 $\pm$ 0.66	43.09 $\pm$ 6.18	24
2	15	30	15	0.07 $\pm$ 0.02	50.39 $\pm$ 1.18	2.43 $\pm$ 0.09	22.07 $\pm$ 0.78	32.35 $\pm$ 5.72	24
3	30	50	20	0.06 $\pm$ 0.01	51.89 $\pm$ 0.88	2.36 $\pm$ 0.09	23.53 $\pm$ 0.93	32.11 $\pm$ 5.03	24
4	50	100	50	0.06 $\pm$ 0.01	53.41 $\pm$ 0.64	2.36 $\pm$ 0.11	23.49 $\pm$ 0.93	29.92 $\pm$ 3.59	24
5	100	200	100	0.06 $\pm$ 0.01	54.98 $\pm$ 0.50	2.14 $\pm$ 0.11	28.02 $\pm$ 1.32	31.79 $\pm$ 2.49	24
6	200	300	100	0.06 $\pm$ 0.01	54.77 $\pm$ 0.59	2.02 $\pm$ 0.11	29.80 $\pm$ 1.46	32.28 $\pm$ 3.20	24
7	300	400	100	0.10 $\pm$ 0.01	53.68 $\pm$ 0.65	1.95 $\pm$ 0.11	30.36 $\pm$ 1.50	52.65 $\pm$ 3.68	24
8	400	410	10	0.34 $\pm$ 0.03	33.17 $\pm$ 2.16	1.51 $\pm$ 0.14	24.82 $\pm$ 1.19	109.39 $\pm$ 10.53	22

**Table S4.** The properties of peat in the rewetted site. The data was expressed in mean  $\pm$  SE

No	Initial section (cm)	End Section (cm)	Incremental (cm)	Bulk Density (gr cm <sup>-3</sup> )	Carbon Content (%)	Nitrogen Content (%)	C/N	Carbon Density (Kg m <sup>-3</sup> )	N (sample)
	0	15	15	0.07 $\pm$ 0.01	50.47 $\pm$ 0.90	3.05 $\pm$ 0.11	16.98 $\pm$ 0.61	34.46 $\pm$ 3.62	24
	15	30	15	0.05 $\pm$ 0.01	52.51 $\pm$ 0.52	2.98 $\pm$ 0.10	18.13 $\pm$ 0.75	26.08 $\pm$ 2.34	24
	30	50	20	0.04 $\pm$ 0.01	52.66 $\pm$ 0.45	2.77 $\pm$ 0.11	19.90 $\pm$ 1.16	22.99 $\pm$ 2.14	24
	50	100	50	0.06 $\pm$ 0.01	53.51 $\pm$ 0.57	2.81 $\pm$ 0.08	19.39 $\pm$ 0.52	32.59 $\pm$ 4.29	24
	100	200	100	0.07 $\pm$ 0.01	55.01 $\pm$ 0.54	2.70 $\pm$ 0.09	20.79 $\pm$ 0.62	40.86 $\pm$ 2.57	24
	200	300	100	0.06 $\pm$ 0.01	52.73 $\pm$ 0.97	2.63 $\pm$ 0.09	20.46 $\pm$ 0.62	28.35 $\pm$ 4.79	24
	300	400	100	0.15 $\pm$ 0.02	41.75 $\pm$ 2.49	2.41 $\pm$ 0.09	17.69 $\pm$ 1.09	55.18 $\pm$ 3.35	24
	400	410	10	0.26 $\pm$ 0.03	30.28 $\pm$ 4.96	2.25 $\pm$ 0.02	14.79 $\pm$ 1.36	73.95 $\pm$ 1.20	4

**Tabel S5.** Post hoc analysis using Tukey HSD to test the difference of peat properties within plots in rewetted and undrained site.

*Rewetted Site*

	Peat depth	Bulk Density	Carbon Content	Nitrogen Content	C/N ratio	SOC
R1 vs R2	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05
R1 vs R3	P > 0.05	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05
R1 vs R4	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05
R2 vs R3	P < 0.05 <sup>a</sup>	P > 0.05	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05	P > 0.05
R2 vs R4	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05
R3 vs R4	P > 0.05	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05

<sup>a</sup>: significant difference

SOC = Soil organic carbon

R = Rewetted

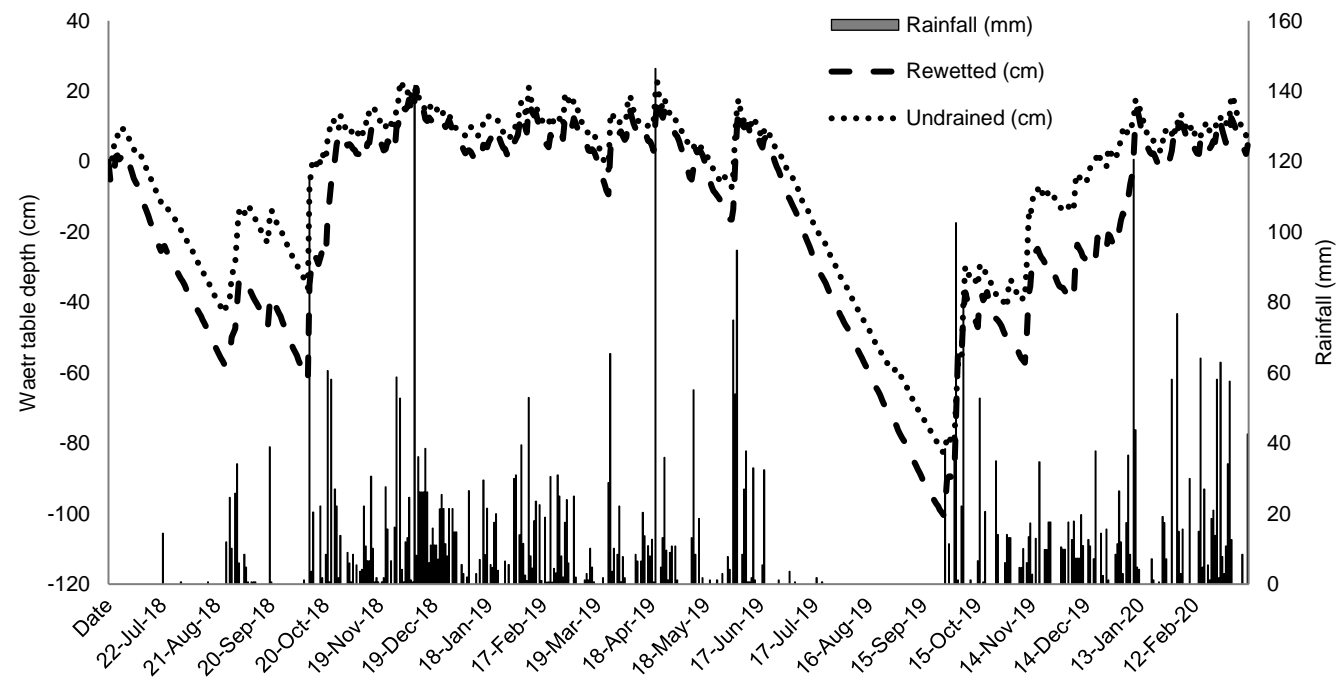
*Undrained Site*

	Peat depth	Bulk Density	Carbon Content	Nitrogen Content	C/N ratio	SOC
U1 vs U2	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05
U1 vs U3	P > 0.05	P < 0.05 <sup>a</sup>	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>
U1 vs U4	P > 0.05	P < 0.05 <sup>a</sup>	P > 0.05	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>
U2 vs U3	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>
U2 vs U4	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P < 0.05 <sup>a</sup>
U3 vs U4	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05	P > 0.05

<sup>a</sup>: significant difference

SOC = Soil Organic Carbon

U = Undrained



*Figure S1. Daily ground water table and daily rainfall in the study site from Mid-July 2018 – March 2020.*