

Investigating Salinity Effect on Temperate Coastal Wetland Soil Microbes and Greenhouse Gas Emissions.

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Introduction

In this supporting information tables about morphological features of soils profiles analyzed for this research can be found. Also, results for diversity index of the microbial community in the three different studied locations are reported, along ANOVA results. This section also reports the bibliography used to identify ecological function of the most abundant genus in the soil profiles analyzed.

Original data and statistical analysis processes are freely available at at Chiapponi, E., Zannoni, D., Giambastiani, B. M. S., Silvestri, S., Buscaroli, A., & Costantini, F. (2024). Dataset and supplementary material for "Investigating Salinity Effect on Temperate Coastal Wetland Soil Microbes and Greenhouse Gas Emissions." [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.10479630>

Tab. S 1 Morphological features of soil profiles

Profile	Horizon		Boundary (D/T)	Matrix Munsell Color (Wet)	Field texture class	Structure (T/G/S)	Fluidity class	Mottles/RMFs (K/Q/S/Sh)	Mottles/RMFs Munsell Color (WET)	Peroxide Color Change (Y/N)	Organic frag/Roots (Q/S)	Odor (K/I)
	Depth (cm)	Master										
PIR	0 - 6/7	Oi/Ase	AS	2.5Y 2.5/1	nd	gr/1/f	VF			N	3/f	S/ST
	6/7 - 15	Ase	CS	10YR 2/2	SaL	gr/1/f	MF			N	2/f	S/ST
	15 - 20	A/Cse	CS	5Y 5.2.5/2	Sa	sg/0	VF			N	1/m	S/ST
	20 - 31	Cse	CS	5Y 3/1	Sa	sg/0	VF	F3M/c/3/P	5Y 2.5/2	N	1/vf	S/ST
	31 - 50+	Cg	-	Gley1 3/10Y	Sa	sg/0	VF	OSF/c/3/D	Gley1 2.5/10Y	N	1/f	S/SM
CER	0 - 5	Ase	CW	Gley1 2.5/5GY	SiL	pl/1/f	VF			Y		S/ST
	5 - 10	Ag	CW	Gley1 4/10Y	SiL	pl/1/m	SF	F2M/c/2/P	Gley1 3/5GY	Y	1/vf	S/SM
	10 - 23	Cse	AW	Gley1 3/5GY	SiCL	pl/1/m	SF	F2M/m/3/P	Gley2 2.5/5PB	Y	1/vf	S/SM
	23 - 35	2Cse	-	Gley1 3/N	LSa	sg/0	MF	F2M/m/4/P	Gley1 2.5/N	Y		S/ST
PA	0 - 4	Ase	CW	5Y 2.5/1	SiL	gr/1/m	VF	OSF/m/1/D	5Y 3/1	Y	2/f	S/SM
	4 - 10	Ag	AW	5Y 3/1	SiL	gr/1/m	MF	OSF/m/1/D	5Y 2.5/1	Y	1/f	S/SL
	10 - 17	Cg1	AW	5Y 4/1	SiCL	sbk/2/f	SF	F3M/c/3/P	5Y 4/2	Y	1/f	S/SL
	17 - 32+	Cg2	-	5Y 5/1	SiCL	sbk/2/f	SF	F3M/m/3/P	5Y 5/3; 2.5Y 5/4	Y		S/SL

Horizon master: se = presence of sulfide; g = gleying. **Horizon boundary:** (D) Distinctness: A = abrupt, C = clear, G = gradual, D = diffuse / (T) Topography: S = smooth, W = wavy, I = irregular, U = unknown; **Field texture class:** Sa = sand, SaL = Sandy Loam, L = Loam, LSa = Loamy Sand, SiL = Silty Loam; SiCL = Silty Clay Loam; **Structure:** (T) Type: gr = granular, abk = angular blocky, sbk = subangular blocky, pl = platy, sg = single grain / (G) Grade: 0 = structureless, 1 = weak, 2 = moderate / (S) Size: vf = very fine, f = fine, m = medium; **Fluidity classes:** SF = Slightly Fluid, MF = Moderately Fluid, VF = Very Fluid; **Mottles/redoximorphic features (RMFs):** (K) Kind: F2M = reduced iron, F3M = oxidated iron, OSF = organic stains / (Q) Quantity: f = few, c = common, m = many / (S) size: 1 = fine, 2 = medium, 3 = coarse, 4 = very coarse, 5 = extremely coarse / (Sh) Shape: D = dendritic, P = platy; **Roots:** (Q) Quantity: 1 = few, 2 = common, 3 = many / (S) Size: vf= very fine, f = fine, m = medium, co = coarse; **Odor:** (K) Kind: N = none, S = sulfurous / (I) Intensity: SL= slight, MD= moderate, ST= strong.

Tab. S2 – Table reporting different diversity indices for the three sites. S=total taxa richness; J= Pielou's index; H= Shannon's index.

		PA	CER	PIR
S	Mean	2690.5	2920.67	2742.67
	St.Dev	140.5	56.41	193.77
	Min	2550	2841	2481
	Max	2831	2964	2944
J'	Mean	0.96	0.96	0.95
	St.Dev	0	0	0.01
	Min	0.95	0.96	0.94
	Max	0.96	0.96	0.96
H	Mean	7.57	7.66	7.52
	St.Dev	0.09	0.02	0.12
	Min	7.48	7.63	7.36
	Max	7.65	7.68	7.65

Tab. S3 - Results of ANOVA analysis testing difference in : total taxa richness (S between sites). Df = Degree of Freedom; Sum.Sq = Sum of Squares; Mean Sq.= Mean Square; Pseudo F = pseudo-F statistic; P (perm)= Permutation test .

S	df	SS	MS	Pseudo-F	P(perm)
Site	2	77418	38709	1.1972	0.3341
Res	5	1.6167E+05	32334		
Total	7	2.3909E+05			

Tab.S4 - Results of ANOVA analysis testing difference in Pielou's index (J).between sites. Df = Degree of Freedom; Sum.Sq = Sum of Squares; Mean Sq.= Mean Square; Pseudo F = pseudo-F statistic; P (perm)= Permutation test .

J	df	SS	MS	Pseudo-F	P(perm)
Site	2	0.00013921	6.9604E-05	1.8722	0.1853
Res	5	0.00018589	3.7177E-05		
Total	7	0.0003251			

Tab.S5 - Results of ANOVA analysis testing difference in Shannon's index (H).between sites. Df = Degree of Freedom; Sum.Sq = Sum of Squares; Mean Sq.= Mean Square; Pseudo F = pseudo-F statistic; P (perm)= Permutation test .

H	df	SS	MS	Pseudo-F	P(perm)
Site	2	0.028593	0.014297	1.1586	0.3506
Res	5	0.061699	0.01234		
Total	7	0.090292			

Tab. S6– Results of Permanova results testing differences among the three study sites

	Df	SumOfSqs	R2	F	Pr(>F)
permanova_var\$Group	2	0.354333	0.54102	2.946866	0.0043
Residual	5	0.300602	0.45898	NA	NA
Total	7	0.654934	1	NA	NA

Tab. S7— References used to identify ecological functions of most abundant genus

Genus	Function	Reference	DOI
<i>Thiobacillus</i>	Sulfur oxidation	Haaijer et al., 2007	10.1080/01490450701436489
<i>Sulfovorum</i>	Sulfur oxidation	Sharma et al., 2020	10.1186/s12866-020-01923-3
<i>Sulfuricurvum</i>	Sulfur oxidation	Cron B et al., 2019	10.3389/fmicb.2019.02710
<i>Desulfatiglans</i>	Sulfate reduction	Galushko et al., 2019	https://doi.org/10.1002/9781118960608.gbm01679
<i>Desulfosarcina</i>	Sulfate reduction	Watanabe et al., 2020	https://doi.org/10.1002/9781118960608.gbm01020.pub2
<i>Desulforomonas</i>	Sulfate reduction	Widdel et al. 1992	https://doi.org/10.1007/978-1-4757-2191-1_22
<i>Syntrophus</i>	Syntrophic relationships	Galushko et al., 2019	https://doi.org/10.1002/9781118960608.gbm01064.pub2