



Supplement of

Seasonal carbon fluxes from vegetation and soil in a Mediterranean non-tidal salt marsh

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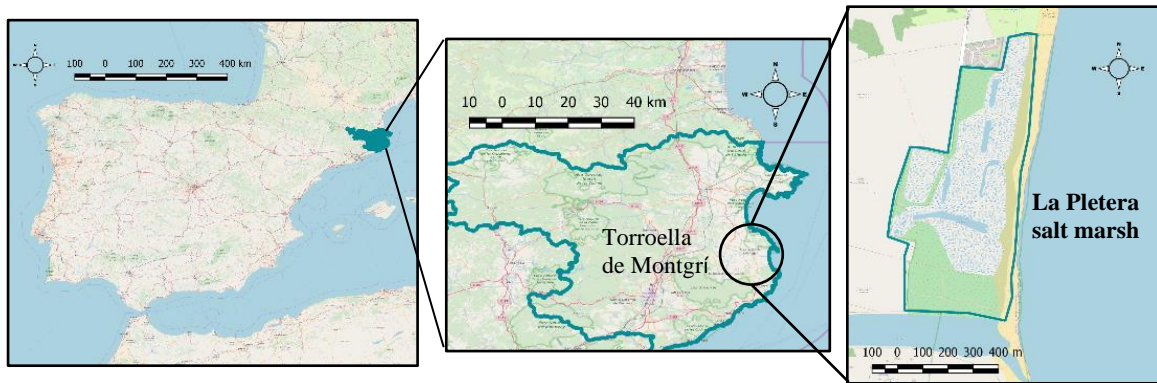


Figure S1. Geographical location of La Pletera salt marsh. On the left, Girona province (NE of the Iberian Peninsula); at the center, Torroella de Montgrí municipality; on the right, La Pletera salt marsh (from © OpenStreetMap contributors 2018. Distributed under the Open Data Commons Open Database License (ODbL) v1.0.).

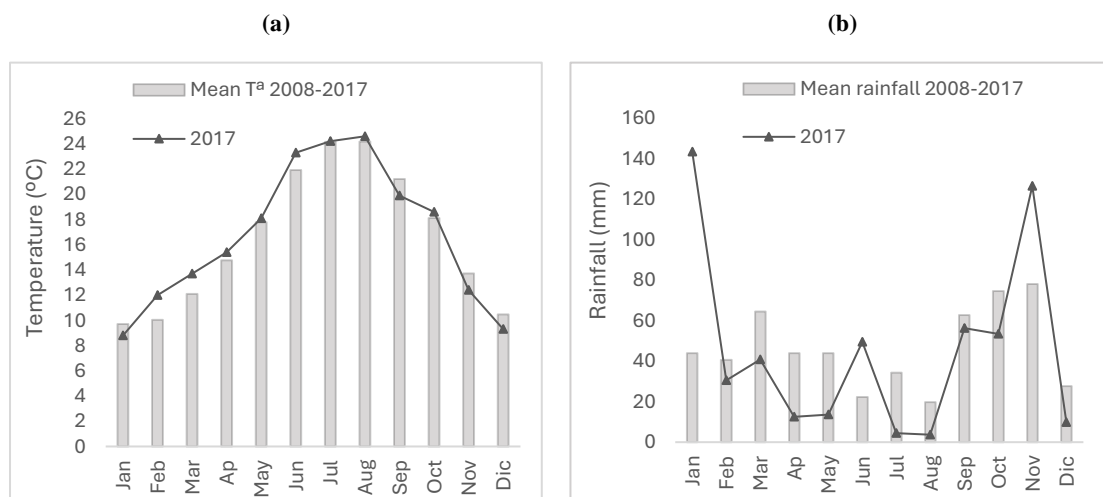


Figure S2. Monthly mean daily temperature (a) and monthly total rainfall (b) for the year in which sampling was performed (2017) and 10-year average (2008–2017) for both variables (a, b). Climate data was obtained from l'Estartit meteorological station located at 2.5 km from La Pletera salt marsh.



Figure S3. Opaque chambers used to take the measurements of net soil CO₂ and CH₄ fluxes under non-flooded (a, b) and flooded (c, d) conditions. When soil was not flooded, soda lime was placed inside the chamber (a) and then it was hermetically closed (b).

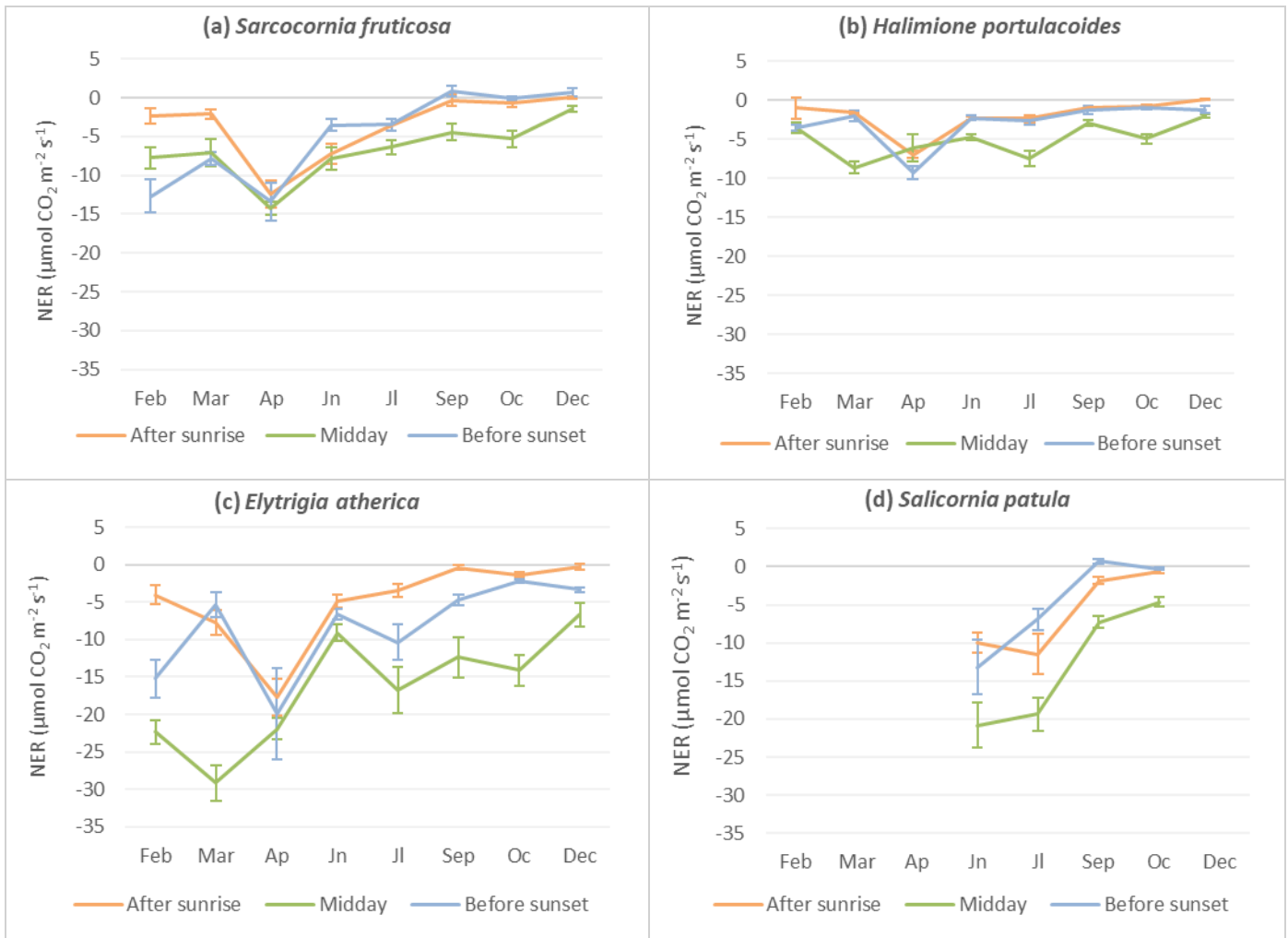


Figure S4. Instantaneous net CO₂ exchange rates (NER) at three daily periods (after sunrise, at midday and before sunset) for the green tissues of *S. fruticosa* (a), *H. portulacoides* (b), *E. atherica* (c) and *S. patula* (d). Negative values indicate net photosynthetic activity, while positive values indicate net respiration. Bars represent standard errors (n = 4 after sunrise, before sunset and at night, while n = 6 at midday).

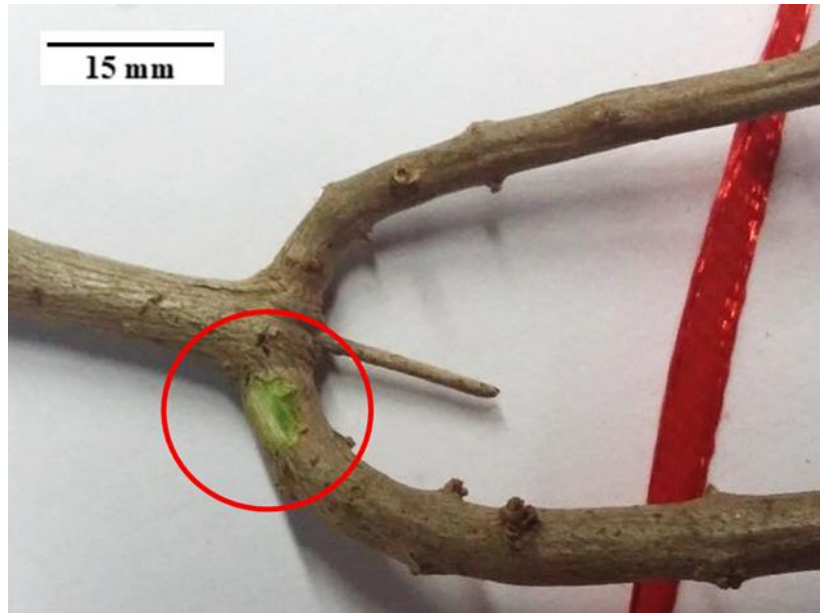


Figure S5. Thin woody stems of *S. fruticosa* where the green tissue under the bark can be observed.

Table S1. Summary of the samplings performed to determine CO₂ fluxes from green and thin woody ($\varnothing \leq 3\text{mm}$) plant tissues throughout one year (2017). The frequency of samplings per season and the number of plants measured per species (n) are shown for the different times of the day when measurements were taken.

Time of the day	n	Frequency of samplings	
		Green tissues	Thin woody tissues
After sunrise	4	Every month and a half approximately (twice/season): 9 February, 10-16 March, 19-20 April, 8-13 June, 10-12 July, 4-11 September, 23 October, 6 December	Every three months approximately (once/season): 10 March, 15-16 May, 24-28 August, 7-15 November
Midday	6		
Before sunset	4		
Night	4	Every three months approximately (once/season): 10 February, 13 June, 28 August, 15 November	

Table S2. Summary of the samplings conducted to determine soil CO₂ fluxes throughout 2017. It includes the number of flooded and non-flooded plots in every sampling day and the method used in each flood state.

Habitat	Flood state	Method	Winter		Spring		Summer		Autumn	
			Feb	Mar	Apr	Jun	Jul	Sep	Oct	Dec
Halophilous scrub	Non-flooded	Soda-lime		5	5	5	5	5	5	5
	Flooded	Gas chromatography	5							
Salt meadow	Non-flooded	Soda-lime		5	5	5	5	5	5	5
	Flooded	Gas chromatography	5							
Glasswort sward	Non-flooded	Soda-lime		2	5	5	5	5	5	2
	Flooded	Gas chromatography	5	3						3

Table S3. Mean \pm SE of soil organic carbon (SOC), total nitrogen (TN) and bulk density (BD) obtained in a parallel study performed by Carrasco-Barea et al. (2023) for the same plots used in the present study.

Habitat	SOC (%)	TN (%)	BD (g cm ⁻³)
Halophilous scrub	3.24 \pm 0.83	0.143 \pm 0.038	1.09 \pm 0.09
Salt meadow	2.07 \pm 0.36	0.097 \pm 0.013	1.03 \pm 0.04
Glasswort sward	0.55 \pm 0.05	0.034 \pm 0.006	1.17 \pm 0.02

Table S4. Maximum, minimum and mean (\pm SE; n=8) instantaneous net CO₂ exchange rates (NER) ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$) for green and woody tissues of the four studied species after sunrise, at midday, before sunset and at night. Negative values indicate net photosynthetic activity, while positive values indicate net respiration.

		<i>S. fruticosa</i>		<i>E. atherica</i>	<i>H. portulacoides</i>		<i>S. patula</i>
		green	woody	green	green	woody	green
NER after sunrise	Max	0.06	2.45	-0.34	0.08	1.56	-0.59
	Min	-12.42	-3.05	-17.65	-6.96	-1.93	-11.47
	Mean \pm SE	-3.57 \pm 1.51	-0.24 \pm 1.12	-4.98 \pm 2.01	-1.96 \pm 0.77	-0.45 \pm 0.77	-5.99 \pm 2.78
NER midday	Max	-1.42	1.73	-6.64	-2.02	1.15	-4.61
	Min	-14.31	-7.24	-29.11	-8.60	-3.46	-20.80
	Mean \pm SE	-6.82 \pm 1.30	-2.36 \pm 1.92	-16.54 \pm 2.66	-5.03 \pm 0.80	-1.35 \pm 0.98	-13.01 \pm 4.14
NER before sunset	Max	0.85	3.26	-2.25	-0.98	1.81	0.72
	Min	-13.39	-6.35	-19.90	-9.30	-9.57	-13.17
	Mean \pm SE	-4.93 \pm 2.04	-2.39 \pm 2.34	-8.48 \pm 2.20	-2.90 \pm 0.96	-4.56 \pm 2.88	-4.91 \pm 3.24
NER night	Max	1.69	2.00	1.67	0.63	1.66	0.93
	Min	0.28	0.25	0.13	0.25	0.39	0.46
	Mean \pm SE	1.06 \pm 0.31	1.04 \pm 0.43	0.99 \pm 0.40	0.49 \pm 0.08	1.12 \pm 0.31	0.70 \pm 0.16

Table S5. Maximum, minimum and mean (\pm SE; n=8) stomatal conductance (g_s) and intrinsic water-use efficiency (iWUE) for the green tissues of the four studied species at midday.

		<i>S. fruticosa</i>	<i>E. atherica</i>	<i>H. portulacoides</i>	<i>S. patula</i>
G_s midday ($\text{mmol H}_2\text{O m}^{-2} \text{ s}^{-1}$)	Max	107.1	381.3	97.0	73.4
	Min	15.1	25.1	9.0	42.4
	Mean \pm SE	41.0 \pm 1.6	163.6 \pm 15.5	33.7 \pm 2.0	56.9 \pm 2.9
iWUE midday ($\mu\text{mol CO}_2 \text{ mol}^{-1} \text{ H}_2\text{O}$)	Max	767.5	842.8	623.9	331.0
	Min	26.8	28.4	93.4	119.2
	Mean \pm SE	271.5 \pm 95.6	319.3 \pm 103.4	292.5 \pm 68.1	232.1 \pm 53.8

Table S6. Maximum, minimum and mean (\pm SE; n=7) soil respiration (SR), soil methane flux (SMF) and mineralization quotient (Qmin) from non-flooded soils.

		Halophilous scrub	Salt meadow	Glasswort sward
SR (g CO ₂ m ⁻² d ⁻¹)	Max	19.4	17.2	13.2
	Min	6.1	4.5	4.0
	Mean \pm SE	12.3 \pm 1.9	10.7 \pm 1.7	8.4 \pm 1.3
SMF (mg CH ₄ m ⁻² d ⁻¹)	Max	270.5	161.1	109.6
	Min	-15.6	-7.5	-11.3
	Mean \pm SE	36.5 \pm 39.3	26.7 \pm 22.7	22.0 \pm 15.7
Qmin	Max	0.0025	0.0024	0.0044
	Min	0.0007	0.0006	0.0016
	Mean \pm SE	0.00016 \pm 0.0002	0.014 \pm 0.0002	0.0030 \pm 0.0004