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Supplement of

Macroalgal metabolism and lateral carbon flows can create significant carbon sinks

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Line 1

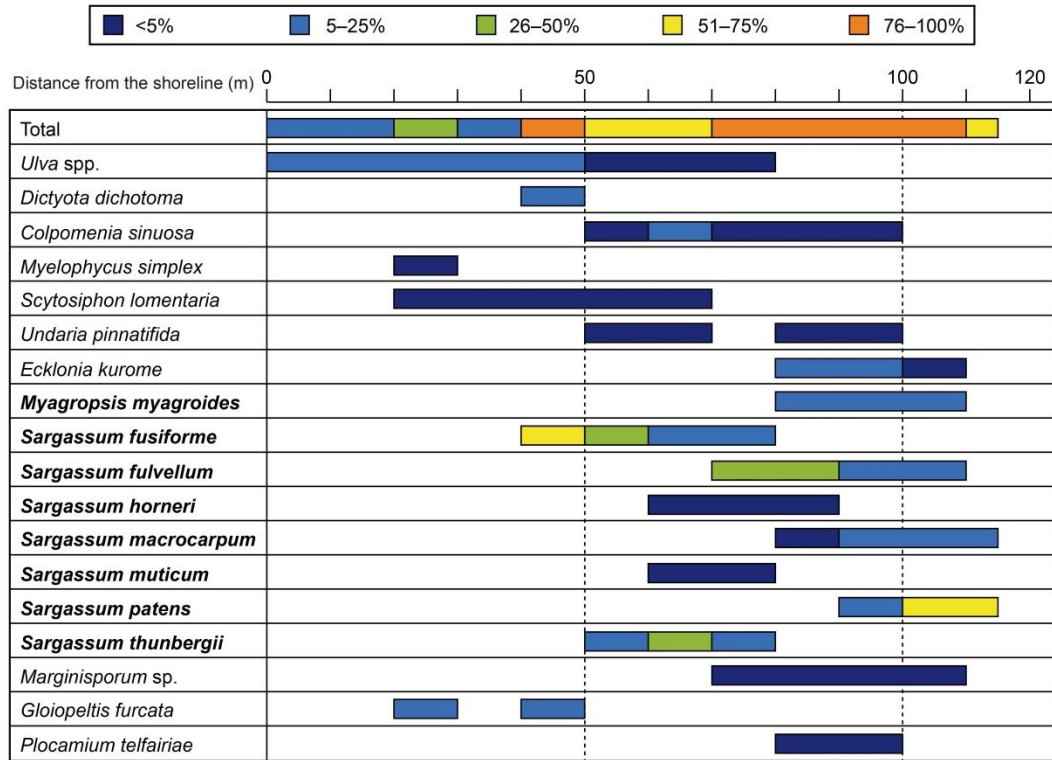


Figure S1: Species composition and percent bottom coverage by each macroalgal species along transect line 1. Species shown in bold italic font are *Sargassum* algae.

Line 2

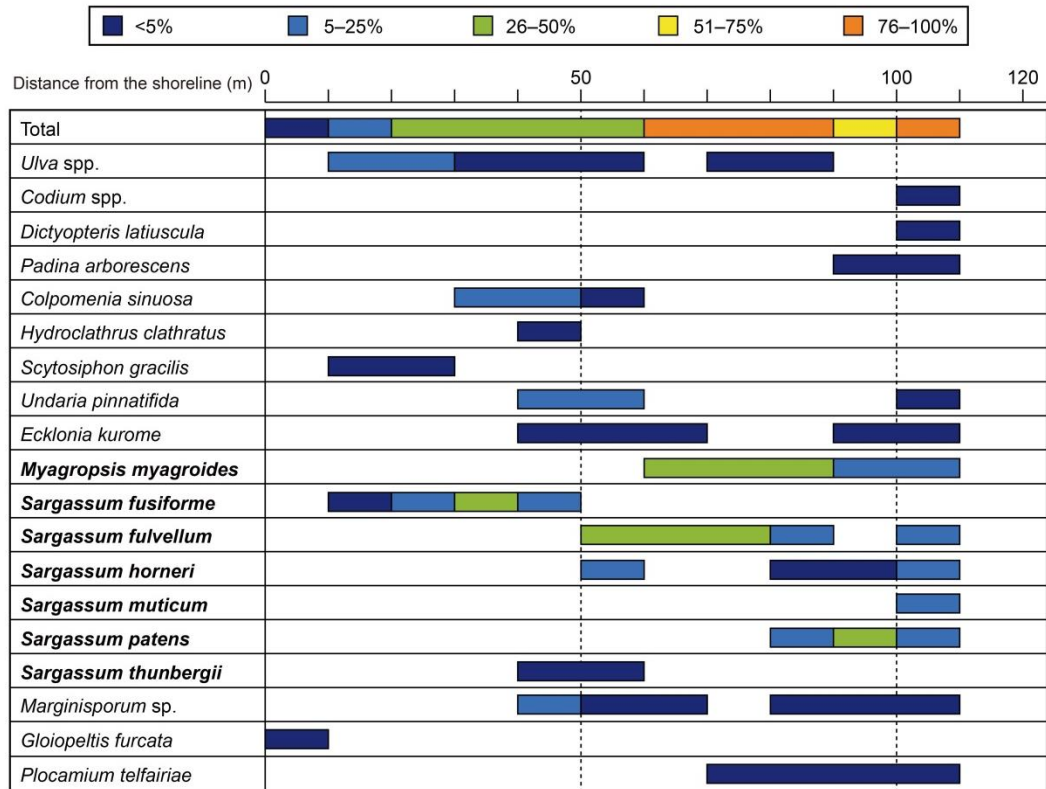


Figure S2: Species composition and percent bottom coverage by each macroalgal species along transect line 2. Species shown as bold italic font are *Sargassum* algae.

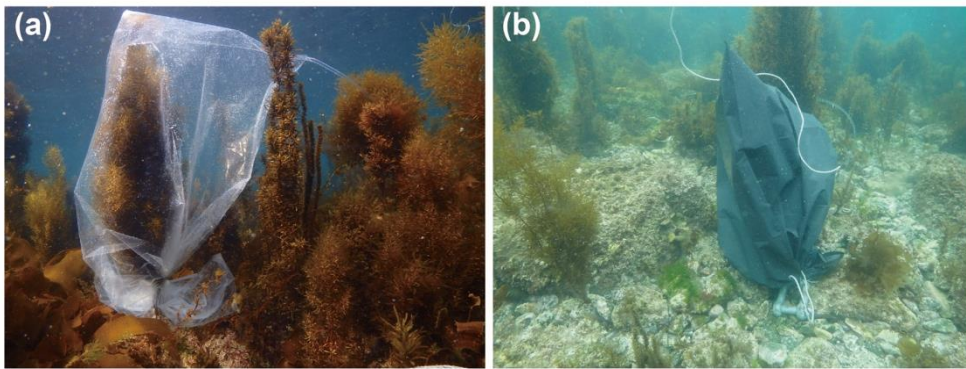


Figure S3: Photographs showing examples of the field bag experiments conducted to estimate macroalgal metabolism via in situ incubations. (a) Transparent and (b) dark bags were installed.

Table S1: Carbon metabolism estimated from field bag experiments for macroalgae and phytoplankton. For macroalgae, means \pm standard deviations are shown. Average water depth and biomass in the bed were used for calculating metabolic rates.

Variables	Units	February 2019	March 2019
Macroalgae			
Gross community production	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	11.1 ± 2.5	27.9 ± 11.0
Community respiration	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	2.4 ± 0.2	2.3 ± 1.2
Net community production	$\mu\text{mol-C g WW}^{-1} \text{ d}^{-1}$	64.3 ± 27.7	293.7 ± 140.6
DOC release (light)	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	1.31 ± 0.65	0.87 ± 0.28
DOC release (dark)	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	0.64 ± 0.23	0.68 ± 0.61
DOC release per day	$\mu\text{mol-C g WW}^{-1} \text{ d}^{-1}$	22.8 ± 7.7	18.7 ± 7.8
Calcification (light)	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	0.21 ± 0.02	0.10 ± 0.38
Calcification (dark)	$\mu\text{mol-C g WW}^{-1} \text{ h}^{-1}$	0.00 ± 0.11	0.28 ± 0.05
Calcification per day	$\mu\text{mol-C g WW}^{-1} \text{ d}^{-1}$	2.3 ± 1.4	4.5 ± 4.8
Control (phytoplankton)			
Gross community production	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.98	0.17
Community respiration	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.31	-0.37
Net community production	$\mu\text{mol-C L}^{-1} \text{ d}^{-1}$	3.35	10.93
DOC release (light)	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.66	0.32
DOC release (dark)	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.20	0.13
DOC release per day	$\mu\text{mol-C L}^{-1} \text{ d}^{-1}$	9.94	5.52
Calcification (light)	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.10	0.19
Calcification (dark)	$\mu\text{mol-C L}^{-1} \text{ h}^{-1}$	0.02	-0.73
Calcification per day	$\mu\text{mol-C L}^{-1} \text{ d}^{-1}$	1.47	-6.08

Table S2: Salinity, dissolved inorganic carbon (DIC), total alkalinity (TAlk), fugacity of CO₂ (fCO₂), and dissolved organic carbon (DOC) measured in the surface layer of the macroalgal bed and the offshore site. Mean \pm standard deviation and the range of each variable are shown.

Survey and site	Salinity	DIC ($\mu\text{mol L}^{-1}$)	TAlk ($\mu\text{mol L}^{-1}$)	fCO ₂ (μatm)	DOC ($\mu\text{mol L}^{-1}$)
February 2019					
Macroalgal bed (<i>n</i> = 12)	33.6 \pm 0.1 (33.6–33.7)	1964 \pm 22 (1912–1986)	2216 \pm 3 (2211–2222)	265 \pm 31 (196–298)	68.6 \pm 4.4 (59.3–74.6)
Offshore (<i>n</i> = 3)	33.6 \pm 0.1 (33.6–33.7)	1991 \pm 1 (1990–1992)	2216 \pm 0 (2215–2216)	305 \pm 3 (302–307)	64.6 \pm 3.3 (60.8–67.0)
March 2019					
Macroalgal bed (<i>n</i> = 12)	33.5 \pm 0.1 (33.5–33.7)	1962 \pm 43 (1851–1996)	2215 \pm 5 (2202–2221)	272 \pm 49 (154–318)	76.0 \pm 4.6 (67.9–84.9)
Offshore (<i>n</i> = 3)	33.5 \pm 0.0 (33.5–33.6)	1992 \pm 1 (1991–1993)	2219 \pm 1 (2218–2220)	309 \pm 1 (308–310)	69.3 \pm 2.3 (66.7–70.7)