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An analysis of the variability in $\delta^{13}C$ in macroalgae from the Gulf of California: indicative of carbon concentration mechanisms and isotope discrimination during carbon assimilation

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Table List

Table S1. The signal $\delta^{13}C$ values in macroalgae of the Gulf of California. The asterisk in the specie's name means that specie is endemic or its origin is in the Gulf of California, according to Espinoza-Avalos, (1994). Strategies of dissolved inorganic carbon use are follows the classification by Díaz-Pulido e al., (2016) based on $\delta^{13}C$ signatures: Strategy 1: $\delta^{13}C$ >10‰ (CCM-only (i.e., HCO_3^- use only)); strategy 2: $\delta^{13}C$= -30 to -10‰ (CCM activity by mix of HCO_3^-/CO_2); strategy 3: <30‰ (Non-CCM: CO_2 uptake by diffusion only); strategy 4: Calcifiers from three phyla, possibly with different carbon-use strategies related to different modes of calcification. Vertical habitat: S=Subtidal and Intertidal are divided in Rp= Rockpool, Ee= Eventually exposed. Coastal sectors: Continental coast: C1: south, C2: Central, C3: north and peninsula coast: P1: south, P2: Central and P3: north. Season: Rain (from june to october) and Dry (from november to may).

Table S2. Comparison of $\delta^{13}C$ values in macroalgae species of the Gulf of California in different seasons and coastal regions.

Table S3. Comparison of $\delta^{13}C$ values in macroalgae genus of the Gulf of California in different seasons and coastal regions.

Table S4. Comparison of different methods to identify DIC sources used by macroalgae.

Table S5. Temperature mean by regions and seasons in the Gulf of California based on time series data (1981 to 2016) by Escalante et al. (2013) and Robles-Tamayo (2018).

Table S1. The signal $\delta^{13}C$ values in macroalgae of the Gulf of California. The asterisk in the specie's name means that specie is endemic or its origin is in the Gulf of California, according to Espinoza-Avalos, (1994). Strategies of dissolved inorganic carbon use are follows the classification by Díaz-Pulido e al., (2016) based on $\delta^{13}C$ signatures: Strategy 1: $\delta^{13}C$ >10‰ (CCM-only (i.e., HCO_3^- use only)); strategy 2: $\delta^{13}C$= -30 to -10‰ (CCM activity by mix of HCO_3^-/CO_2); and strategy 3: <30‰ (Non-CCM: CO_2 uptake by diffusion only). Vertical habitat: S=Subtidal and Intertidal are divided in Rp= Rockpool, Ee= Eventually exposed. Coastal sectors: Continental coast: C1: south, C2: Central, C3: north and peninsula coast: P1: south, P2: Central and P3: north. Season: Rain (from june to October) and Dry (from november to May).

Specie	$\delta^{13}C$ Mean±S.D.	Range: (Min to Max)	Strategies of dissolved inorganic carbon use	Habitat	Coastal region	Season and collecting year
Chlorophyta						
Bryopsis sp.	-15.3±0.8‰	-15.9 to -14.7‰	Strategy 2	Rp, Ee	C2, C3	Rain (2013)
Caulerpa cupressoides (Vahl) C.Agardh	-16.3‰	-16.3‰	Strategy 2	*Rp*	C1	Dry (2009)
Caulerpa mexicana Sonder ex Kützing	-19.9‰	-19.91‰	Strategy 2	S	C1	Dry (2009)
Caulerpa peltata J.V. Lamouoroux	-10.7±4.5‰	-13.8 to -5.6‰	Strategies 1 and 2	Rp, Ee	C1	Rain (2013)
Caulerpa sertularioides (S.G.Gmelin) M.A.Howe	-18.5±0.1‰	-18.5 to -18.3‰	Strategy 2	Ee	C2	Rain (2013)
Chaetomorpha antennina (Bory de Saint-Vincent) Kützing	-14.5±1.07‰	-16.3 to -12.8‰	Strategy 2	*Rp, Ev, S*	C1, C3	Dry (2009), Rain (2013)
Chaetomorpha linum (O.F. Müller) Kützing	-16.8±1.6‰	-18.4 to-14.6‰	Strategy 2	Ee	C1, C2	Dry (2009), Rain (2013)
Chaetomorpha sp.	-13.7±0.8‰	-14.6 to -12.9‰	Strategy 2	*Rp, Ee*	C1, C2	Dry (2009), Rain (2013)
Chaetomorpha sp.2	-17.2‰	-17.24‰	Strategy 2	*Ee*	C2	Rain (2013)
Cladophora albida (Nees) Kutzing	-19.4±6.1‰	-31.3 to -13.8‰	Strategy 2	*Ee*	C2, C3	Dry (2009)
Cladophora columbiana F.S. Collins	-13.7‰	-13.7‰	Strategy 2	*Rp*	C3	Dry (2009)
Cladophora microcladioides F.S. Collins	-18.6±3.6‰	-22.2 to -12.9‰	Strategy 2	*Rp*	C1	Dry (2009)
Cladophora sp.	-12.8± 2.6‰	-15.4 to -8.3‰	Strategies 1 and 2	*Rc, Ee,S*	C1,C2,C3, P2	Dry (2008, 2009), Rain (2013)
Cladophora sp.2	-15.3‰	-15.3‰	Strategy 2	*Ee*	C2	Rain (2013)
Cladophora sp.3	-14.1‰	-14.1‰	Strategy 2	*Ee*	C2	Rain (2013)
Cladophora sp.4	-14.8±1.4‰	-15.8 to -13.8‰	Strategy 2	*Ee*	C2	Rain (2013)
Cladophoropsis sp.	-12.2‰	-12.2‰	Strategy 2	*Ee*	C1	Rain (2013)
*Codium amplivesiculatum** Setchell & N.L.Gardner	-14.4±2.7‰	-20.4 to -11.3‰	Strategy 2	*S*	C2, P2, P3	Dry (2008, 2009)
Codium brandegeei Setchell & N.L.Gardner	-11.8±1.2‰	-13.7 to -10.4‰	Strategy 2	*S*	C2, P2, P3	Dry (2009)
Codium fragile Setchell & N.L.Gardner	-13.0±2.7‰	-14.8 to -9‰	Strategies 1 and 2	*S*	P2, P3	Dry (2009)
*Codium simulans** Setchell & N.L.Gardner	-12.4±2.2‰	-14.9 to -8.3‰	Strategies 1 and 2	*S*	C3, P1, P2, P3	Dry (2009)
Codium sp.	-11.6±3.0‰	-14.1 to 6.7‰	Strategies 1 and 2	*Ee, S*	C1, C3, P2, P3	Dry (2009), Rain (2013)
Phyllodictyon robustum Setchell & N.L.Gardner	-13.0±2.0‰	-14.1 to -13.0‰	Strategy 2	*Ee*	P2, P3	Dry (2009)

Rhizoclonium riparium (Roth) Harvey	-19.6±1.9‰	-21.7 to -17.8‰	Strategy 2	*Ee*	C2	Dry (2008, 2009)
Rhizoclonium sp.	-13.7±2.7‰	-16.3 to -9.8‰	Strategies 1 and 2	*Ee, S*	C2, C3	Rain (2013)
Struveopsis sp.	-10.6±1.5‰	-14 to -8.8‰	Strategies 1 and 2	*Rp,Ee*	C3	Rain (2013)
Struveopsis sp2.	-10.4‰	-10.46‰	Strategy 2	*Ee*	C3	Rain (2013)
Ulva acanthophora (Kützing) Hayden Blomster, Maggs, P.C.Silva, Stanhope & J.R.Waaland	-15.8±1.7‰	-18.3 to -11.4‰	Strategy 2	*Ee*	P1, P2, P3	Dry (2008, 2009)
Ulva clathrata (Roth) C. Agardh	-16.4±2.0‰	-20.5 to -14.5‰	Strategy 2	*Ee*	C2, C3, P2	Dry (2008, 2009)
Ulva compressa Linnaeus	-17.8±2.4‰	-20.6 to -15.4‰	Strategy 2	*Ee*	C2, C3, P2	Dry (2009), Rain (2013)
Ulva flexuosa Wulfen	-16.0±3.7‰	-25.9 to -10.4‰	Strategy 2	Ee	C1,C2, P2	Dry (2009), Rain (2013)
Ulva intestinalis Linnaeus	-15.3±2.5‰	-20.3 to -8.9‰	Strategies 1 and 2	Ee, S	C1,C2, C3, P1,P2, P3	Dry (2008. 2009), Rain (2013)
Ulva lactuca Linnaeus	-14.1±3.1‰	-19.6 to -7.7	Strategies 1 and 2	Ee, S	C1,C2, C3, P1,P2, P3	Dry (2008. 2009), Rain (2013)
Ulva linza Linnaeus	-15.6±2.4‰	-19.4 to -13.2‰	Strategy 2	Ee	C2,C3, P1,P3	Dry (2009)
Ulva lobata (Kützing) Harvey	-13.2±1.9‰	-15.3 to -11.1‰	Strategy 2	Ee	C1, P1	Dry (2009)
Ulva prolifera O.F.Müller	-14.2±1.8‰	-15.5 to -12.2‰	Strategy 2	Ee	C3, P2	Dry (2008, 2009)
Ulva rigida C.Agardh	-13.7‰	-13.67‰	Strategy 2	Ee	P2	Dry (2009)
Ulva sp.	-14.0±3.9‰	-19.2 to -7.1‰	Strategies 1 and 2	Ee, S	C1, C2, P1, P2, P3	Dry (2009)
Ulva stenophylla Setchell & N.L.Gardner	-17.4‰	-17.4‰	Strategy 2	Ee	P2	Dry (2009)
Valoniopsis pachynema (G.Martens) Børgesen	-11.9‰	-11.9‰	Strategy 2	Rp	C3	Dry (2009)
Ochrophyta						
Colpomenia ramosa W.R. Taylor	-11.4±2.6‰	-13.8 to -7.8‰	Strategies 1 and 2	Ee, S	C1, P2	Dry (2008, 2009)
Colpomenia sinuosa (Mertens ex Roth) Derbès & Solier	-10.2±3‰	-16.3 to -7.2‰	Strategies 1 and 2	*Rp, Ee, S*	C2, C3, P2, P3	Dry (2008, 2009)
Colpomenia sp.	-11.0±3.7‰	-19.0 to -5.4‰	Strategies 1 and 2	*Ee*	C1, C2, C3, P2, P3	Dry (2009)
Colpomenia tuberculata De A. Saunders	-8.7 ±3.2‰	-19.3 to -2.2‰	Strategies 1 and 2	*Ee, S*	C1,C2, C3, P1,P2, P3	Dry (2008. 2009), Rain (2013)
*Cutleria hancockii** E.Y.Dawson	-14.64‰	-14.6‰	Strategy 2	*S*	C3	Dry (2009)
Dictyota concrescen W.R.Taylor	-16.5‰	-16.5‰	Strategy 2	*Rp*	C1	Dry (2009)
Dictyota coriacea (Holmes) I.K.Wang, H. S.Kim & W.J.Lee	-18.1‰	-18.1‰	Strategy 2	*S*	C3	Dry (2009)
Dictyota dichotoma (Hudson) J.V. Lamouroux	-22.2±6.2‰	-15.2 to -6.5‰	Strategies 1 and 2	*Ee, S*	C3, P2	Dry (2009)
Dictyota flabellata (F.S.Collins) Setchell & N.L.Gardner	-16.7‰	-16.7‰	Strategy 2	*S*	P3	Dry (2009)
Dictyota implexa (Desfontaines) J.V.Lamouroux	-17.3±3.0‰	-17.8 to -16.9‰	Strategy 2	*S*	C3, P3	Dry (2009)
Dictyota sp.	-14.5±3.7‰	-21.5 to -7.0‰	Strategies 1 and 2	*Rp, Ee, S*	C1, C3, P2, P3	Dry (2009), Rain (2013)
Dictyota sp2.	-12.8‰	-12.8‰	Strategy 2	*Ee*	C3	Rain (2013)
Ectocarpus sp.	-15.4±1.9‰	-17.1 to -12.3 ‰	Strategy 2	*Rp, Ee, S*	C1, C2, C3	Dry (2009), Rain (2013)
Endarachne sp.	-12.2±0.5‰	-12.5 to -11.8‰	Strategy 2	*Ee*	P3	Dry (2009)

Hydroclathrus clathratus (C.Agardh) M.A.Howe in N.L.Britton & C.F.Millspaugh	-7.4± 4.1‰	-15.6 to -4.4‰	Strategies 1 and 2	*Ee, S*	P1, P2	Dry (2008. 2009)
Hydroclathrus sp.	-7.2‰	-7.2‰	Strategy 1	S	P2	Dry (2009)
Ishige foliacea Okamura	-13.3‰	-13.3‰	Strategy 2	*S*	C3	Dry (2009)
Pachydictyon coriaceum (Holmes) Okamura	-18.2‰	-18.2‰	Strategy 2	*S*	C3	Dry (2009)
Padina concrescens Thivy in W.R. Taylor	-11.68‰	-11.68‰	Strategy 2	S	P2	Dry (2009)
Padina crispata Thivy in W.R. Taylor	-11.3±1.7‰	-12.5 to -10.1‰	Strategies 1 and 2	Rp, S	P2, P3	Dry (2009)
Padina durvillei Bory Saint-Vincent	-13.2±2.6‰	-20. To -9.2‰	Strategies 1 and 2	*Rp, Ee, S*	C1, C2, C3, P1, P2, P3	Dry (2008, 2009), Rain (2013)
Padina sp.	-11.1±1.5‰	-13.1 to -7.9‰	Strategies 1 and 2	*Rp, Ee, S*	C1, C3, P1, P2, P3	Dry (2008, 2009), Rain (2013)
Rosenvingea intricata (J.Agardh) Børgesen	-11.4±2.2‰	-12.9 to -9.8‰	Strategies 1 and 2	*Ee, S*	P2	Dry (2009)
Rosenvingea sp.	-16.0±0.04‰	-16.0 to -16.0‰	Strategy 2	Ee, S	C3, P3	Dry (2009)
Sargassum brandegeei Setchell & N.L.Gardner	-16.36‰	-16.4‰	Strategy 2	S	P2	Dry (2009)
*Sargassum herphorizum** Setchell et Gardner	-13.7±1.6‰	-16.6 to -11.5‰	Strategy 2	S	C3, P2, P3	Dry (2009)
*Sargassum horridum** Setchell & N.L.Gardner	-15.5±2.9‰	-19.17 to -9.5‰	Strategies 1 and 2	S	C3, P2, P3	Dry (2009)
Sargassum johnstonii Setchell & N.L.Gardner	-15.4±2.0‰	-17.7 to -11.8‰	Strategy 2	S	C3, P2, P3	Dry (2009)
Sargassum lapazeanum Setchell & N.L.Gardner	-14.5±1.6‰	-17.2 to -12.8‰	Strategy 2	S	C3, P2	Dry (2008, 2009)
Sargassum liebmannii J.Agardh	-13.7‰	-13.7‰	Strategy 2	*S*	C1	Dry (2009)
Sargassum muticum	-19.2‰	-19.2‰	Strategy 2	*S*	P2	Dry (2008)
Sargassum sinicola Setchell & N.L.Gardner	-15.1±2.4‰	-21.1 to -12.1‰	Strategy 2	*S*	C2, C3, P2, P3	Dry (2008, 2009)
Sargassum sinicola subsp. camouii (E.Y.Dawson) J.N.Norris & Yensen	-12.7±3.1‰	-14.8 to -10.7 ‰	Strategy 2	*S*	C3, P1	Dry (2009)
Sargassum sp.	-14.3±2.4‰	-18.7 to -8.0‰	Strategies 1 and 2	*Ee, S*	C2, C3, P1, P2, P3	Dry (2008, 2009), Rain (2013)
Sargassum sp.2	-16.5‰	-16.5‰	Strategy 2	*S*	C3	Rain (2013)
Sargassum sp.3	-15.3‰	-15.3‰	Strategy 2	*Ee*	C3	Rain (2013)
Spatoglossum howellii	-18.2±3.6‰	-20.8 to -15.7‰	Strategy 2	*S*	C1	Dry (2009)
Sphacelaria califórnica Setchell & N.L.Gardner	-10.8‰	-10.8‰	Strategy 2	*Ee*	C3	Dry (2009)
Taonia lennebackerae Farlow ex J.Agardh	-15.3‰	-15.3‰	Strategy 2	S	C3	Dry (2009), Rain (2013)
Zonaria sp.	-16.0± 1.6‰	-17.6 to -13.4‰	Strategy 2	*Ee, S*	C2, C3, P2	Dry (2009), Rain (2013)
Rhodophyta						
Acanthophora sp.	-16.3±0.5‰	-16.7 to -15.9‰	Strategy 2	Rp, S	P2, P3	Dry (2009)
Acanthophora spicifera (M.Vahl) Børgesen	-14.5‰	-14.5‰	Strategy 2	Rp	P1	Dry (2009)
Ahnfeltiopis leptophylla (J. Agardh) P.C. Silva y DeCew	-14.4±2.4‰	-17.9 to -10.7‰	Strategy 2	Rp, Ee	C1, P2, P3	Dry (2008, 2009)
Ahnfeltiopis sp.1	-15.9±2.6‰	-18.7 to -13.5‰	Strategy 2	Ee, S	C2, C3	Rain (2013)
Ahnfeltiopis sp.2	-16.9‰	-16.9‰	Strategy 2	S	C3	Rain (2013)
Amphiroa beauvoisii J.V.Lamouroux	-8.6±0.4‰	-8.9 to -8.4‰	Strategy 1	*S*	C3, P3	Dry (2009)
Amphiroa misakiensis Yendo	-7.5‰	-7.5‰	Strategy 1	S	C1	Dry (2009)
Amphiroa sp. J.V.Lamouroux	-6.5± 1.1‰	-8.5 to 4.5‰	Strategy 1	*Rp, Ee, S*	C1, C2, C3, P3	Dry (2009), Rain (2013)
Amphiroa sp.2	-8.0±2.1‰	-10.0 to -5.8‰	Strategy 1	*Rp, Ee*	C1, C3	Rain (2013)
Amphiroa sp.3	-6.4‰	-6.4‰	Strategy 1	*Rp*	C1	Rain (2013)
Bostrychia radicans	-25.8‰	-25.8‰	Strategy 2	*Rp*	C1	Dry (2009)

Centroceras clavulatum (C.Agardh) Montagne	-15.3±2‰	-16.6 to -13.8‰	Strategy 2	*S*	C1	Dry (2009),
Centroceras sp.	-16.1±0.4‰	-16.3 to -15.8‰	Strategy 2	*Rp, Ee*	C1	Dry (2008, 2009)
Ceramium sp.	-12.5±2.7‰	-15.4 to -8.2‰	Strategies 1 and 2	*Rp, Ee, S*	C2, C3	Rain (2013)
Ceratodictyon tenue (Setchell & N.L.Gardner) J.N.Norris	-14.2±1.4‰	-15.1 to -12.6‰	Strategy 2	*Rp, Ee*	C1	Rain (2013)
Champia sp.	-14.9‰	-14.9‰	Strategy 2	S	P2	Dry (2009)
Chondracanthus squarrulosus (Setchell & N.L.Gardner) J.R.Hughey, P.C.Silva & Hommersand	-12.6‰	-12.6‰	Strategy 2	S	P2	Dry (2009)
Chondracanthus tepidus (Hollenberg) Guiry	-17.6‰	-17.6‰	Strategy 2	S	P2	Dry (2009)
Chondria acrorhizophora Setchell & N.L.Gardner	-14.2‰	-14.2‰	Strategy 2	S	P2	Dry (2009)
Chondria californica (Collins) Kylin	-18.8‰	-18.8‰	Strategy 2	*S*	P2	Dry (2009)
Corallina vancouverensis Yendo	-8.3‰	-8.3‰	Strategy 1	*S*	P3	Dry (2009)
Dasya baillouviana (S.G.Gmelin) Montagn	-18.1±2.9‰	-20.1 to -16.0‰	Strategy 2	*S*	P1, P2	Dry (2009)
Dermonema sp.	-15.8‰	-15.8‰	Strategy 2	*Rp*	C1	Rain (2013)
Digenia simplex (Wulfen) C. Agardh	-11.5‰	-11.5‰	Strategy 2	*Rp*	P2	Dry (2009)
Digenia sp.	-15.8±1.1‰	-16.7 to -15.0‰	Strategy 2	*S*	P2	Dry (2009)
Eucheuma sp.	-17.9±1.4‰	-19.0 to -16.9‰	Strategy 2	Ee, S	P3	Dry (2009)
Gelidium sclerophyllum W.R. Taylor	-15.2±3.1‰	-11.7 to -10.6‰		*Ee*	C1, P3	Dry (2009)
Gelidium sp.	-14.3±2.0‰	-16.9 to -12.5‰	Strategy 2	*Rp, Ee, S*	C1, C3, P2	Dry (2009), Rain (2013)
Gigartina sp.	-16.9±6.6‰	-31.8 to -12.8‰	Strategies 2 and 3	*Es, S*	C2, C3, P3	Dry (2008, 2009)
Gracilaria crispata (Bory de Saint-Vincent) D.H.Kim.	-15.0±2.9‰	-19.1 to -10.1‰	Strategies 1 and 2	Ee, S	P2	Dry (2008, 2009)
*Gracilaria marcialana** Dawson	-16.6‰	-16.6‰	Strategy 2	S	P3	Dry (2009)
Gracilaria pacifica. Kjellman	-16.5±1.6‰	-18.6 to -13.6‰	Strategy 2	S	C2, C3, P2	Dry (2009)
Gracilaria sp.	-15.5±2.4‰	-21.8 to -12.2‰	Strategy 2	Rp,Ee, S	C2, C3, P1, P2, P3	Dry (2008, 2009), Rain (2013)
Gracilaria sp.2	-14.4±3.7‰	-18.7 to -12.3‰	Strategy 2	Ee, S	C2, C3	Rain (2013)
*Gracilaria spinigera** E.Y.Dawson	-14.9±3.8‰	-17.7 to -12.2‰	Strategy 2	S	C2	Dry (2009)
Gracilaria subsecundata Setchell & N.L.Gardner	-15.9±2.8‰	-20.3 to -12.8‰	Strategy 2	S	P1, P2, P3	Dry (2008, 2009)
Gracilaria tepocensis E.Y.Dawson	-15.1±1.9‰	-17.0 to -13.2‰	Strategy 2	S	P1, P3	Dry (2009)
Gracilaria textorii (Suringar) De Toni	-16.2±2.6‰	-18.0 to -14.3‰	Strategy 2	S	C1, P2	Dry (2008, 2009)
Gracilaria textorri var. Textorii (Suringar) De Toni	-15.1±0.2‰	-15.2 to -15.0‰	Strategy 2	S	P2	Dry (2009)
Gracilaria turgida E.Y.Dawson	-15.3±3.5‰	-20.7 to -12.0‰	Strategy 2	Rp, S	C3, P2, P3	Dry (2008, 2009)
Gracilaria vermiculophylla (Ohmi) Papenfuss	-15.9±3.8 ‰	-23.4 to -8.8‰	Strategies 1 and 2	*Ee, S*	C1,C2, C3, P1, P2, P3	Dry (2009), Rain (2013)
Gracilariopsis lemaneiformis (Bory de Saint-Vincent) E.Y.Dawson, Acleto & Foldvik	-16.0‰	-16.0‰	Strategy 2	*S*	P2	Dry (2008)
Gracilariopsis longissima (S.G.Gmelin) M.Steentoft, L.M.Irvine & W.F.Farnham	-16.8±1.8‰	-18.1 to -15.0‰	Strategy 2	*S*	P2, P3	Dry (2009)
Grateloupia doryphora (Montagne) M.A.Howe	-13.6±0.6‰	-13.9 to -13.1‰	Strategy 2	*Ee*	P2	Dry (2009)

Grateloupia filicina (J.V. Lamouroux) C. Agardh	-17.0±2.5‰	-19.9 to -14.1‰	Strategy 2	*Ee*	C1, C2, C3	Dry (2008, 2009), Rain (2013)
Grateloupia Howeii Setchell y Gardner	-14.7±1.5‰	-15.8 to -13.7‰	Strategy 2	*Ee*	C1	Dry (2009)
Grateloupia sp.	-16.4±4.4‰	-22.6 to -12.6‰	Strategy 2	*S*	C3, P2, P3	Dry (2009)
Grateloupia versicolor (J. Agardh) J. Agardh	-12.6±1.3‰	-13.8 to -11.2‰	Strategy 2	*Ee*	C1	Dry (2009)
Gymnogongrus guadalupensis E.Y.Dawson	-13.1‰	-13.1‰	Strategy 2	*S*	C3	Dry (2009)
Gymnogongrus sp.	-14.1±3.8‰	-23.2 to -10.1‰	Strategies 1 and 2	*Rp, Ee, S*	C1, C3, P2, P3	Dry (2009), Rain (2013)
Gymnogongrus sp.2	-12.8‰	-12.8‰	Strategy 2	*Rp*	C3	Rain (2013)
Gymnogongrus sp.3	-13.1‰	-13.1‰	Strategy 2	*Rp*	C3	Rain (2013)
Halymenia actinophysa M.A.Howe	-24.5‰	-24.5‰	Strategy 2	S	P3	Dry (2009)
Halymenia sp.	-23.7±13.6‰	-33.4 to -14.1‰	Strategies 2 and 3	S	P2	Dry (2009)
Hypnea johnstonii Setchell y Gardner	-11.2±3.5‰	-13.8 to -6.5‰	Strategies 1 and 2	*Rp, Ee*	C1, P1, P2	Dry (2008, 2009)
Hypnea pannosa J. Agardh	-11.8±3.3‰	-15.0 to -6.4‰	Strategies 1 and 2	*Rp, Ee*	C1, P2	Dry (2009), Rain (2013)
Hypnea sp.	-14.9±2.3‰	-20.8 to -11.4‰	Strategy 2	*Rp, Ee, S*	C1, C2, C3, P2, P3	Dry (2009), Rain (2013)
Hypnea sp.2	-14.1‰	-14.1‰	Strategy 2	*Ee*	C3	Rain (2013)
Hypnea spinella (C.Agardh) Kützing	-16.4±1.8‰	-19.2 to -14.9‰	Strategy 2	*Rp, Ee, S*	C1, P2, P3	Dry (2008, 2009), Rain (2013)
Hypnea valentiae (Turner) Montagne	-15.2±2.3‰	-19.2 to -13.6‰	Strategy 2	*Ee, S*	C1, C3, P1, P2	Dry (2008, 2009)
Jania sp.	-9.5±1.0‰	-10.2 to -8.8‰	*Strategy 1*	*Ee, S*	C3	Rain (2013)
Jania sp.*2*	-10.7‰	-10.7‰	*Strategy 1*	*S*	C3	Rain (2013)
Laurencia pacifica Kylin	-14.9±2.2‰	-19.0 to -12.7‰	Strategy 2	*Ee, S*	P1, P2, P3	Dry (2009)
*Laurencia papillosa** (C.Agardh)	-15.7±0.3‰	-15.9 to -15.6‰	Strategy 2	*Ee*	P1, P2	Dry (2008, 2009)
Laurencia sp.	-12.9±1.2‰	-14.7 to -10.5‰	Strategies 1 and 2	*Rp, Ee*	C1, C3, P2, P3	Dry (2009), Rain (2013)
Lomentaria hakodatensis Yendo	-12.8‰	-12.8‰	Strategy 2	Ee	P2	Dry (2009)
Lomentaria sp.	-15.7‰	-15.8‰	Strategy 2	*S*	P3	Dry (2009)
Mazzaella leptorhynchos (J.Agardh) Leister	-19.9‰	-19.9‰	Strategy 2	*S*	P3	Dry (2009)
Neosiphonia johnstonii Setchell y N.L Gardner	-13.4±6.0‰	-19.0 to -6.9‰		*Ee, S*	C3, P1, P2	Dry (2009)
Neosiphonia paniculat Montagne	-17.8±1.3‰	-18.7 to -16.9‰	Strategy 2	*S*	C2, P2	Dry (2009)
Palisada paniculata (Kützing) J.N.Norris	-12.4‰	-12.4‰	Strategy 2	*S*	P3	Dry (2009)
Polysiphonia mollis. J.D. Hooker y Harvey	-19.8±1.8‰	-21.4 to -15.8‰	Strategy 2	*Ee, S*	C2, C3, P1, P2, P3	Dry (2009)
Polysiphonia nathaniellii	-18.6‰	-18.6‰	Strategy 2	*S*	C1	Dry (2009)
Polysiphonia pacifica. Hollenberg	-14.0±7.9‰	-21.5 to -5.7‰		*Ee, S*	C2, P2	Dry (2009)
Polysiphonia sp.	-19.4±3.5‰	-23.0 to -15.6‰	Strategy 2	*Ee, S*	P2, C3	Dry (2009), Rain (2013)
Prionitis abbreviata Setchell & E.Y.Dawson	-13.9±2.7‰	-15.8 to -12.0‰	Strategy 2	*Rp*	C3, P3	Dry (2009), Rain (2013)
Prionitis abbreviata var abreviata (E.Y.Dawson) E.Y	-13.4‰	-13.4‰	Strategy 2	*S*	C3	Dry (2009)
Prionitis abbreviata var guaymanensis (E.Y.Dawson) E.Y.Dawson	-11.4‰	-11.4‰	Strategy 2	*S*	C3	Dry (2009)
Prionitis sp.	-14.4±1.1‰	-15.7 to -13.6‰	Strategy 2	*Ee, S*	C3	Dry (2009), Rain (2013)
Prionitis sp.2	-13.8±1.1‰	-14.6 to -13.0‰	Strategy 2	*Rp, Ee*	P3	Dry (2009)

Pterocladia sp.	-13.5‰	-13.5‰	Strategy 2	*S*	P3	Dry (2009)
Pyropia thuretii (Setchell & E.Y.Dawson) J.E.Sutherland, L.E.Aguilar Rosas & R	-20.1‰	-20.1‰	Strategy 2	*S*	C3, P2, P3	Dry (2009)
Rhodoglossum sp.	-16.1±1.0‰	-17.1 to -15.0‰	Strategy 2	*S*	C3	Dry (2009)
Rhodymenia sp.	-18.7±2.4‰	-20.4 to -17.0‰	Strategy 2	*S*	P2	Dry (2009)
Schizymenia pacifica (Kylin) Kylin	-33.8±1.2‰	-34.6 to -33.0‰	Strategy 3	*S*	P2	Dry (2009)
*Scinaia johnstoniae** Setchell	-19.0‰	-19.0‰	Strategy 2	*S*	C3	Dry (2009)
Spyrida sp.	-17.0±1.2‰	-19.1 to -16.1‰	Strategy 2	*S*	P1, P2	Dry (2009)
Spyridia filamentosa (Wulfen) Harvey	-15.9±3.8‰	-26.2 to -11.5‰	Strategy 2	*Ee, S*	C2, C3, P1, P2, P3	Dry (2008, 2009), Rain (2013)
Tacanoosca uncinata (Setchell & N.L.Gardner) J.N.Norris, P.W.Gabrielson & D.P.Cheney	-10.9±4.7‰	-16.3 to -7.9‰	Strategy 2	*Ee, S*	C3, P3	Dry (2009)
Weeksia coccinea. (Harvey) S.C.Lindstrom	-13.8‰	-13.9‰	Strategy 2	Rp	P3	Dry (2009)
Zanardinula sp.	-13.3‰	-13.3‰	Strategy 2	Rp	C3	Rain (2013)

Table S2. Comparison of δ^{13}C values in macroalgae species of the Gulf of California in different seasons and coastal regions. Different letters indicate significant differences by kruskal wallis test at $p<0.05$.

Taxa	Specie	Collecting season by year	Coastal region	δ^{13}C mean±DS	n=
Chlorophyta	*Chaetomorpha antennina*	Dry (2009)	C1	-15.2±1.1^{a} ‰	4
		Rain (2013)	C1	-13.9±0.8^{a} ‰	5
Chlorophyta	*Ulva acanthophora*	Dry (2008)	P2	-16.7±1.1^{a} ‰	4
		Dry (2009)	P2	-15.9±1.6^{a} ‰	13
		Dry (2009)	P3	-14.3±2.0^{a} ‰	5
Chlorophyta	*U. flexuosa*	Dry (2009)	C1	-14.1±2.7^{a} ‰	4
		Dry (2009)	C2	-14.9±2.0^{a} ‰	3
Chlorophyta	*U. intestinalis*	Dry (2009)	P2	-14.9±1.5^{a} ‰	4
		Rain (2013)	C1	-17.6±2.4^{a} ‰	3
Chlorophyta	*U. lactuca*	Dry (2008)	P2	-15.3±3.3^{a} ‰	4
		Dry (2009)	P2	-14.5±3.3^{a} ‰	9
		Dry (2009)	C1	-12.6±2.7^{a} ‰	5
Ochrophyta	*Colpomenia tuberculata*	Dry (2008)	P1	-8.3±3.8^{a} ‰	4
		Dry (2008)	P2	-7.2±1.4^{a} ‰	4
		Dry (2009)	P2	-8.8±4.0^{a} ‰	28
		Dry (2009)	P3	-9.7±2.8^{a} ‰	13
		Dry (2009)	C1	-8.5±1.9^{a} ‰	12
		Dry (2009)	C3	-7.55±1.0^{a} ‰	3
Ochrophyta	*Sargassum sinicola*	Dry (2008)	P2	-14.2±1.6^{a} ‰	3
		Dry (2009)	P2	-15.0±2.7^{a} ‰	16
		Dry (2009)	P3	-15.3±2.5^{a} ‰	5
		Dry (2009)	C2	-15.2±0.7^{a} ‰	3
Ochrophyta	*Padina durvillaei*	Dry (2009)	P2	-12.5±2.2^{a} ‰	10
		Dry (2009)	P3	-11.8±1.2^{a} ‰	5
		Dry (2009)	C1	-12.7±2.2^{ab} ‰	6
		Rain (2013)	C1	-15.8±2.5^{b} ‰	7
Rhodophyta	*Spyridia filamentosa*	Dry (2009)	P1	-12.6±1.0^{a} ‰	4
		Dry (2009)	P2	-14.8±1.6^{a} ‰	4

Table S3. Comparison of δ^{13}C values in macroalgae genus of the Gulf of California in different seasons and coastal regions. Different letters indicate significant differences by kruskal wallis test at $p<0.05$.

Taxa	Genus	Collecting season and year	Coastal region	δ^{13}C mean±DS	n=
Chlorophyta	*Chaetomorpha*	Dry (2009)	C1	-14.2±1.3^{a} ‰	8
		Rain (2013)	C1	-15.5±1.3^{a} ‰	6
		Rain (2013)	C2	-15.9±2.3^{a} ‰	4
Chlorophyta	*Cladophora*	Dry (2009)	C1	-17.27±7.8^{a} ‰	3
		Rain (2013)	C2	-14.9±0.8^{a} ‰	6
Chlorophyta	*Codium*	Dry (2009)	P2	-13.3±1.4^{a} ‰	14
		Dry (2009)	P3	-9.8±1.8^{b} ‰	9
		Dry (2009)	C3	-12.3±1.4^{a} ‰	4
Chlorophyta	*Ulva*	Dry (2008)	P1	-15.6±1.8^{ab} ‰	6
		Dry (2009)	P1	-15.6±2.4^{ab} ‰	7
		Dry (2008)	P2	-16.6±2.2^{b} ‰	10
		Dry (2009)	P2	-15.2±2.4^{ab} ‰	35
		Dry (2009)	P3	-12.4±3.2^{a} ‰	11
		Dry (2009)	C1	-13.5±2.5^{ab} ‰	18
		Rain (2013)	C1	-17.4±2.0^{b} ‰	4
		Dry (2009)	C2	-14.8±1.6a^{b} ‰	13
		Dry (2009)	C3	-15.8±2.7^{b} ‰	10
Ochrophyta	*Colpomenia*	Dry (2008)	P1	-8.4±3.3^{a} ‰	5
		Dry (2008)	P2	-8.2±2.5^{a} ‰	5
		Dry (2009)	P2	-8.8±3.8^{a} ‰	32
		Dry (2009)	P3	-10.5±3.3^{a} ‰	20
		Dry (2009)	C1	-9.8±2.8^{a} ‰	16
		Dry (2009)	C2	-8.6±1.6^{a} ‰	3
		Dry (2009)	C3	-7.8±1.0^{a} ‰	5
Ochrophyta	*Dictyota*	Dry (2009)	P2	-12.3±5.0^{a} ‰	3
		Dry (2009)	P3	-15.9±2.4^{a} ‰	3
		Dry (2009)	C3	-16.7±1.5^{a} ‰	3
		Rain (2013)	C3	-14.3±1.0^{a} ‰	5
Ochrophyta	*Padina*	Dry (2009)	P2	-12.0±2.2^{a} ‰	13
		Dry (2009)	P3	-11.8±1.0^{a} ‰	9
		Dry (2009)	C1	-11.9±2.3^{a} ‰	8
		Rain (2013)	C1	-15.9±2.5^{b} ‰	7
		Rain (2013)	C3	-11.9±0.9^{a} ‰	6
Ochrophyta	*Sargassum*	Dry (2008)	P2	-14.7±2.4^{a} ‰	6
		Dry (2009)	P2	-14.9±2.5^{a} ‰	38
		Dry (2009)	P3	-14.6±2.4^{a} ‰	20
		Dry (2009)	C2	-14.9±1.5^{a} ‰	14
		Dry (2009)	C3	-15.2±2.6^{a} ‰	14
		Rain (2013)	C3	-15.2±1.1^{a} ‰	5
Rhodophyta	*Gracilaria*	Dry (2009)	P1	-13.8±1.7^{a} ‰	10
		Dry (2008)	P2	-14.3±2.4^{a} ‰	4
		Dry (2009)	P2	-15.8±2.2^{a} ‰	24
		Dry (2009)	P3	-16.0±4.0^{a} ‰	8
		Rain (2013)	C2	-15.9±2.7^{a} ‰	7
		Dry (2009)	C3	-17.0±3.5^{a} ‰	10
		Rain (2013)	C3	-14.0±1.4^{a} ‰	4
Rhodophyta	*Hypnea*	Dry (2009)	P2	-15.3±2.4^{a} ‰	9
		Dry (2009)	P3	-15.6±1.8^{a} ‰	4
		Dry (2009)	C1	-13.0±3.8^{a} ‰	11

Table S4. Comparison of different methods to identify DIC sources used by macroalgae.

Taxa	**Specie**	**Locality**	**Sampling date**	**Habitat**	**DIC source**	**Method**	**Comment**	**Source**
Chlorophyta	*Bryopsis* sp.	Gulf of California	2013	Rockpool, subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	15.3±0.8(2)‰	This study
	Bryopsis sp.	Great barrier reef, Australia	2008-2012	Subtidal (0.5-5.2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.2±6.9(5)‰	Lovelock et al., (2019)
	Caulerpa brownii	Shortlands Bluff, Australia	2002-2003	Exposed rock-pool faces and the rock-pool	CO_2	pH drift experiments, $\delta^{13}C$ signal	Final pH~8.9, -30.2‰	Kevekordes et al., (2006)
	C. cactoides	Shortlands Bluff, Australia	2002-2003	Exposed rock-pool faces and the rock-pool	HCO_3^-	pH drift experiments, $\delta^{13}C$ signal	Final pH>9, -21.7‰	Kevekordes et al., (2006)
	C. cupressoides	Gulf of California	2009	Intertidal (rockpool)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.3(1)‰	This study
	C. cupressoides	Great barrier reef, Australia	2008-2012		HCO_3^-	$\delta^{13}C$ signal	-10.5±3.4(4)‰	Lovelock et al., (2019)
	C. flexilis	Shortlands Bluff, Australia	2002-2003	Rock-pool faces, partially sheltered	CO_2	pH drift experiments, $\delta^{13}C$ signal	Final pH~8.9, -30.2(1)‰	Kevekordes et al., (2006)
	C. flexilis	Tazmania	2013-2014	Subtidal	CO_2	$\delta^{13}C$ signal	-30.6±1.1(2)‰	Cornwall et al., (2015)
	C.hodgkinsoniae	Tazmania	2013-2014	Subtidal	CO_2	$\delta^{13}C$ signal	-25.6±1(2)‰	Cornwall et al., (2015)
	C. longifolia	Shortlands Bluff, Australia	2002-2003	Rock-pool faces, partially sheltered	HCO_3^- / CO_2	pH drift experiments, $\delta^{13}C$ signal	Final pH~8.9, -28.55(1)‰	Kevekordes et al., (2006)
	C. mexicana	Gulf of California	2009	Subtidal (<2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-19.9(1)‰	This study
	C. obscura	Shortlands Bluff, Australia	2002-2003	Rock-pool faces, partially sheltered	HCO_3^- / CO_2	pH drift experiments, $\delta^{13}C$ signal	Final pH~8.9, -29.5(1)‰	Kevekordes et al., (2006)
	C. peltata	Gulf of California	2013	Subtidal (<2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-10.7±4.5(3)‰	This study
	C. prolifera	Cádiz, southern Spain	2004-2005	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.4± 0.4(3)‰	Mercado et al., (2009)
	C. prolifera	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.9±1.5(3)‰	Cornwall et al., (2017)
	C. racemosa	Egipt	2009	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.5±0.1(3) ‰	Marconi et al., (2011)
	C. racemosa	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.1±1.3(2)‰	Cornwall et al., (2017)
	C. racemosa	Great barrier reef, Australia	2008-2012	Intertidal (0m) to Subtidal (0.5-4.8m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.5±3.8(6)‰	Lovelock et al., (2019)
	C. scalpelliformis	Shortlands Bluff, Australia	2002-2003	Rock-pool faces, partially sheltered	HCO_3^-	pH drift experiments. $\delta^{13}C$ signal	Final pH~9, -19.4(1)‰	Kevekordes et al., (2006)
	C. scalpelliformis	Tazmania	2013-2014	Subtidal (5m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-17.8(1)‰	Cornwall et al., (2015)
	C. serrulata	Egyopt	2013-2014	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.21±0.03(3)‰	Marconi et al., (2011)
	C. serrulata	Great barrier reef, Australia	2008-2012	Intertidal (0m) to Subtidal (0.5-5.5m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.0±3.3(20)‰	Lovelock et al., (2019)

C. sertularioides	Gulf of California	2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.5±0.1(2)‰	This study
Caulerpa sp.	Mexican Caribbean	2016	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-11.4±3.0(5)‰	Cabanillas-Teran et al., (2019)
C. taxifolia			Subtidal(10-25m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.31±0.7‰	Marconi et al., (2011)
C. taxifolia	Great barrier reef, Australia	2008-2012	Subtidal (5.2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.1±5.1(6)‰	Lovelock et al., (2019)
C. trifaria	Shortlands Bluff, Australia	2002-2003		CO_2	$\delta^{13}C$ signal	-31.2(1)‰	Kevekordes et al., (2006
C. trifaria	Southern, Astralia	2013-2014	Subtidal (5-15m)	CO_2	$\delta^{13}C$ signal	-33±1.7(4)‰	Cornwall et al., (2015)
Chaetomorpha aerea	Cádiz, southern Spain	1995		CO_2	Measurement of the external Carbonic Anhydrase (CA) activity and photosynthetic rates with addition of acetazolamide (AZ) an inhibitor of CA activity.	The rate of O_2 evolution is ceased when CO_2 concentration dismiss. CA activity no detected	Mercado et al., (1997)
C. antennina	Gulf of California	2009,2913	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.5±1.07(10)‰	This study
C. coliformis	Southern, Astralia	2013-2014	Subtidal (5m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-20.6(1)‰	Cornwall et al., (2015)
C. linun	Denmark		upper sublittoral to 20 m	HCO_3^-	Photosynthetic rates at different pH	Low photosynthetic rates >9	Sand-Jensen and Gordon (1984)
C. linun	Kristineberg, Sweden		Subtidal (0.5-5m)	HCO_3^-	pH drift experiments	Final pH>10	Axelsson and Uusitalo (1988)
C. linun	Gulf of California	2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.8±1.6(4)‰	This study
Chaetomorpha sp.	Gulf of California	2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.7±0.8(3)‰	This study
Cladophora albida	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-19.4±6.1(2)‰	This study
C. columbiana	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.7(1)‰	This study
C. laetevirens	Cádiz, southern Spain	2004-2005	Intertidal (rockpool)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.6±0.8(3)‰	Mercado et al., (2009)
C. microcladioides	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.6±3.6(2)‰	This study
Cladophora sp.	Gulf of California	2008,2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.8± 2.6(7)‰	This study
Cladophora sp	UK			HCO_3^-	pH drift experiments, $\delta^{13}C$ signal	Final pH>10 -14.7±1(15)‰	Marconi et al., (2011)
C. glomerata	northern Baltic Sea	2002	Subtidal (0.3m)	HCO_3^-	pH drift experiments	Final pH>10	Choo et al (2005)

C. rupestris	Kristineberg, Sweden		Subtidal (0.5-5m)	HCO_3^-	pH drift experiments	Final pH>10	Axelsson and Uusitalo (1988)
C. rupestris	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990)
C. sericea	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990)
Cladophora sp.	Southeast France	2013		HCO_3^-	pH compesation point	Final pH>10	Maberly et al., (2015)
Codium adharens	Cádiz, southern Spain	2005-2005	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-7.7±0.8‰	Mercado et al., (2009)
C. amplivesicula-tum	Gulf of California	2008, 2009	Subtidal (<2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.4±2.7(8)‰	This study
C. brandegeei	Gulf of California	2009	Subtidal (<2m)	HCO_3^-	$\delta^{13}C$ signal	-11.8±1.2(7)‰	This study
C. bursa	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-21.2±1.2(3)‰	Cornwall et al., (2017)
C. bursa	Cádiz, southern Spain	2005-2005	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.4±0.8(3)‰	Mercado et al., (2009)
C. decorticatum	Cádiz, southern Spain	2005-2005	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.0±1.0(3)‰	Mercado et al., (2009)
C. fragile	Gulf of California	2009	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.0±2.7(4)‰	This study
C. fragile	Kristineberg, Sweden		Sublittoral (0.5-2m)	HCO_3^-	pH drift experiments	Final pH>10	Axelsson and Uusitalo (1988)
C. fragile	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>9.5	Maberly (1990)
C. fragile	Cádiz, southern Spain	1995	Intertidal and rockpools	HCO_3^-	Measurements of O_2 evolution curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.	The rate of O_2 evolution is ceased when CO_2 concentration dismiss. CA activity no detected	Mercado et al., (1997)
C. muelleri	Australia	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.2±0.0(3) ‰	Marconi et al., (2011)
C. simulans	Gulf of California	2009	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-12.4±2.2(9)‰	This study
Codium sp.	Gulf of California	2009, 2013	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-11.6±3.0(5)‰	This study
Codium sp.	Great barrier reef, Australia	2008-2012	Subtidal (0.5-1.5m)	HCO_3^-	$\delta^{13}C$ signal	-11.7±2.4(8)‰	Lovelock et al., (2019)

Ulva acantophora	Gulf of California	2008,2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	15.8±1.7(25)‰	This study
U. clathrata	Gulf of California	2008,2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.4±2.0(8)‰	This study
U. compressa	Cádiz, southern Spain	1995		HCO_3^-	Measurement of the external Carbonic Anhydrase (CA) activity and photosynthetic rates with addition of acetazolamide (AZ) an inhibitor of CA activity.	Photosynthesis depend of CO_2 and HCO_3^- with equal affinity. Low CA activity detected	Mercado et al., (1997)
U. comglobata	China		Intertidal	HCO_3^-	pH drift experiments	Final pH>10	Zou (2014)
U. flexuosa	Lizard Island, Queensland, Australia	1973	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-21.20(1)‰	Black and Bender (1976)
U. flexuosa	Gulf of California	2008,2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.0±3.7(13)‰	This study
U. intestinalis	Kristineberg, Sweden		tidal pools (0-1m)	HCO_3^-	pH drift experiments	Final pH>10	Axelsson and Uusitalo (1988)
U. intestinalis	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990)
U. intestinalis	Cádiz, southern Spain	2005-2005	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.01±0.01(3)‰	Mercado et al., (2009)
U. intestinalis	Gulf of California	2008,2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.3±2.5(16)‰	This study
U. lactuca	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990)
U. lactuca	Denmark			HCO_3^-	Photosynthetic rates at different pH	Low photosynthetic rates at pH >9	Sand-Jensen and Gordon (1984)
U. lactuca	Argentina	2007-2008		HCO_3^- / CO_2		-15.4±0.7(2)‰	Becherucci et al., (2019)
U. lobata	Gulf of California	2008,2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.2±1.9(5)‰	This study
U. procera	China		Subtidal (0.3m)	HCO_3^-	pH drift experiments	Final pH>10	Choo et al (2005)
Ulva sp.	Cádiz, southern Spain	2005-2005	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.8±0.1(3)‰	Mercado et al., (2009)
Ulva sp.	Portugal	2005-2006	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-12.5±1.0(16)	Baeta et al., (2009)
Ulva sp.				HCO_3^-	pH drift experiments	Final pH>10	Cornwall et al., (2012)
Ulva sp.	Great barrier reef, Australia	2008-2012	Intertidal (0m), subtidal (3m)	HCO_3^- / CO_2		-13.1±4.7(21)‰	Lovelock et al., (2019)
Ulva sp.			Subtidal (0.3m)	HCO_3^-	pH drift experiments	Final pH>10	Marconit et al., (2011)

	Ulva sp.	Ballina, Australia			HCO_3^-	$\delta^{13}C$ signal	-12.23±0.32(3)‰	Carvalho and Eyre, (2011)
	U. rigida	Cádiz, southern Spain			$CO_2 > HCO_3^-$	Measurement of the external Carbonic Anhydrase (CA) activity and photosynthetic rates with addition of acetazolamide (AZ) an inhibitor of CA activity.	The evolution of O_2 evolution was higher with CO_2 concentrations than HCO_3^-.	Mercado et al., (1997)
	U. rigida	Cádiz, southern Spain	1995		$CO_2 = HCO_3^-$	Measurement of the external Carbonic Anhydrase (CA) activity and photosynthetic rates with addition of acetazolamide (AZ) an inhibitor of CA activity.	Photosynthesis depend of CO_2 and HCO_3^- with equal affinity. Low CA activity detected	Mercado et al., (1997)
	U. rigida	Gulf of California	2008,2009,2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.7(1)‰	This study
Ochrophyta	*C. peregrina*	Cádiz, southern Spain	2004-2005			$\delta^{13}C$ signal	-10.4±0.7(3)‰	Mercado et al., (2009)
	C. ramosa	Gulf of California	2008,2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-11.4±2.6(4)‰	This study
	Colpomenia sp.	Great barrier reef, Australia	2008-2012	Intertidal (0.5m)	HCO_3^-	$\delta^{13}C$ signal	-8.9±3.5(8)‰	Lovelock et al., (2019)
	C. sinuosa	Cádiz, southern Spain	1995	Intertidal and rockpools	HCO_3^-	Measurements of O_2 evolution curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide	High initial slope of the O_2 evolution rate vs. Ci curve	Mercado et al., (1998)

					(EZ) an inhibitors of CA activity.		
C. sinuosa	Gulf of California	2008,2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-10.2±3(7)‰	This study
C. tuberculata	Gulf of California	2008,2009, 2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-8.7 ±3.2(65)‰	This study
Dictyota concrescen	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.5‰	This study
Dictyota dichotoma	Cádiz, southern Spain	1995	Intertidal and rockpools	$CO_2 > HCO_3^-$	Measurements of O_2 evolution curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.	Low O_2 evolution rates at pH 8.7 and low activity of CA detected	Mercado et al., (1998)
D. dichotoma	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-21.5±2.4(4)‰	Cornwall et al., (2017)
D. dichotoma	Cádiz, southern Spain	2004-2005	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.9±0.5(3)‰	Mercado et al., (2009)
D. dichotoma	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-22.2±6.2(2)‰	This study
D. dichotoma implexa	Cádiz, southern Spain	2004-2005	Subtidal		$\delta^{13}C$ signal	-18.6±0.8(3)‰	Mercado et al., (2009)
D. implexa	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-17.3±3.0(2)‰	This study
D. pinnatifida	Florida, EEUU	2003, 2005	Subtidal (<1m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.2±0.6(87)‰	Lamb et al. 2012
Dictyota sp.	Mexican Caribbean	2016	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.9±0.4(6)‰	Cabanillas-Teran et al., (2019)
Dictyota sp.	Great barrier reef, Australia	2008-2012	Subtidal (1-12.6m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.7±3.2(35)‰	Lovelock et al., (2019)
Hydroclathrus clathratus	Great barrier reef, Australia	2008-2012	Intertidal (0m), Subtidal (0.5-3m)	HCO_3^-	$\delta^{13}C$ signal	-10.4±3.2(13)‰	Lovelock et al., (2019))
H. clathratus	Gulf of California	2009	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-7.2(1)‰	This study
Padina crispate	Gulf of California	2008,2009, 2013	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-11.3±1.7(2)‰	This study
P. durvillei	Gulf of California	2008,2009, 2013	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.2±2.6(36)‰	This study
P. tenuis	Lizard Island, Queensland, Australia	1973	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-11.40(1)‰	Black and Bender (1976)
P. pavonia	Cádiz, southern Spain	1995	Intertidal and rockpools	$CO_2 > HCO_3^-$	Measurements of O_2 evolution	low O_2 evolution rates at pH 8.7	Mercado et al., (1998)

						curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.	and No activity of CA detected	
	Padina pavonia	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.4±4.5(5)‰	Cornwall et al., (2017)
	Padina sp.	Great barrier reef, Australia	2008-2012	Intertidal (0m), Subtidal (0.5-12.6m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-10.7±4.4(51)‰	Lovelock et al., (2019))
	Padina sp.	Bolinao, Pangasinan	2020		HCO_3^-	pH drift experiments	Final pH=9.89	Narvarte et al., (2020)
	Padina sp.	Gulf of California	2009	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-11.1±1.5(15)‰	This study
	Sargassum flavicans	Great barrier reef, Australia	2008-2012	Subtidal (0.5-6.7m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.5±2.3(16)‰	Lovelock et al., (2019))
	S. henslowianum	China	2007	Subtidal	HCO_3^-	pH drift experiments	Final pH=9.3	Zou et al., (2011)
	S. lacerifolium	Tasmania	2014	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.72±1.41(3)‰	Cornwall et al., (2015)
	S. muticum	Mediterranean	2014	Subtidal (2m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-19.7±0.5(6)‰	Cornwall et al., (2017)
	Sargassum sp.	Lizard Island, Queensland, Australia	1973	Subtidal	HCO_3^-	$\delta^{13}C$ signal	-14.10(1)‰	Black and Bender (1976)
	Sargassum sp.	Great barrier reef, Australia	2008-2012	Intertidal (0m), Subtidal (0.5-3.3m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.9±2.4(27)‰	Lovelock et al., (2019))
	Sargassum sp.	Ballina, Australia			HCO_3^-	$\delta^{13}C$ signal	-12.8±0.7(3) ‰	Carvalho and Eyre, (2011)
	S. spinifex	Great barrier reef, Australia	2008-2012	Subtidal (0.5m)		$\delta^{13}C$ signal	-15.1±1.0(6)‰	Lovelock et al., (2019)
	S. vulgare	Cádiz, southern Spain	2004-2005	Subtidal		$\delta^{13}C$ signal	-15.4±0.1(3)‰	Mercado et al., (2009)
Rhodophyta	*Acanthophora* sp.	Gulf of California	2009	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-16.3±0.5(2) ‰	This study
	Acanthophora spicifera	Lizard Island, Queensland, Australia	1973	Subtidal	HCO_3^-	$\delta^{13}C$ signal	-10.01(1)‰	Black and Bender (1976)
	A.spicifera	Great barrier reef, Australia	2008-2012	Subtidal (0.5-6.6m)	HCO_3^-	$\delta^{13}C$ signal	-12.1±2.8(11)‰	Lovelock et al., (2019)

Acanthophora spicifera	Gulf of California	2009	Intertidal	HCO_3^-	$\delta^{13}C$ signal	-14.5(1) ‰	This study
Ahnfeltiopsis leptophyllus	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	Final pH=9.56	Murru and Sandgreen (2004)
A. leptophyllus	Gulf of California	2008, 2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.4±2.4(7)‰	This study
Amphiroa anceps	Australia			HCO_3^-	Measurement of photosynthetic rates at different pH	High photosynthetic rates at pH>9	Borowitzka (1981)
A.beauvoisii	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-8.6±0.4(2)‰	This study
Amphiroa sp.	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-6.5± 1.1(9)‰	This study
Bostrychia radicans	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	C1	-25.8‰	This study
B. scorpioides	Cádiz, southern Spain	1998	Subtidal	$CO_2 > HCO_3^-$	Measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.		Mercado and Niell (2000)
B. scorpioides	Cádiz, southern Spain	2004-2005	Subtidal	CO_2		-30.9±0.4(3)‰	Mercado et al., (2009)
Ceramium pacificum	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	Final pH=10.15	Murru and Sandgreen (2004)
Ceramium rubrum	Kristineberg, Sweden		littoral to sublittoral (0.5-20 m)	HCO_3^-	pH drift experiments	Final pH= 9.6	Axelsson and Uusitalo (1988)
Ceramium rubrum	Roskilde Fjord			HCO_3^-	Photosynthetic rates at different pH	Low photosynthetic rates at pH>9	Sand-Jensen and Gordon (1984)
Ceramium rubrum	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>9.7	Maberly (1990)
Ceramium sp.	west coast of Sweden			HCO_3^-	Photosynthetic rates and their effect (inhibition in percentages) by addition of acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)

Ceramium sp.	Gulf of California	2013	Subtidal and Intertidal	HCO_3^-	$\delta^{13}C$ signal	-12.5±2.7‰	This study
Chondracanthus acicularis	France		upper inter-tidal and medium inter-tidal	HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)
C. acicularis	Cádiz, southern Spain	2004-2005		HCO_3^- / CO_2	$\delta^{13}C$ signal	-19.9±1.2(3)‰	Mercado et al., (2009)
C. exasperatus	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	Ph=9.71	Murru and Sandgreen (2004)
C. squarrulosus	Gulf of California	2009	Strategy 2	S	P2	-12.6‰	This study
C. tepidus	Gulf of California	2009	Strategy 2	S	P2	-17.6‰	This study
Chondria incrassata			Subtidal (15m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-20.7(1)‰	Cornwall et al., (2015)
C. acrorhizophora	Gulf of California	2009	Intertidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.2(2)‰	This study
Corallina officinalis	Cádiz, southern Spain	2004-2005		HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.8±0.5(3)‰	Mercado et al., (2009)
Corallina officinalis	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990)
Corallina officinalis	South Island, New Zealand	2009		HCO_3^- / CO_2	pH drift experiments	pH<9	Cornwall et al., (2012)
Corallina sp.	Cádiz, southern Spain		Upper intertidal and medium inter-tidal	HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)
Corallina elongata	Cádiz, southern Spain	1995		$CO_2 > HCO_3^-$	Measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide	The evolution of O_2 evolution was higher with CO_2 concentrations than HCO_3^-. The activity of CA was low	Mercado et al., (1997)

					(AZ) an inhibitor of CA activity.		
C. vancouverensis	Gulf of California	2008, 2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-8.3(1)‰	This study
Gelidiium. latifolium	west coast of Sweden			HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)
G. pusilum	Cádiz, southern Spain	1995	Intertidal and rockpools	$CO_2 > HCO_3^-$	Measurements of O_2 evolution curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.	Low O_2 evolution rates at pH 8.7 and no activity of CA detected.	Mercado et al., (1998)
G. sesquipedale	Cádiz, southern Spain	1995	Intertidal and rockpools	$CO_2 > HCO_3^-$	Measurements of O_2 evolution curves vs. Ci concentration and measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an	Low O_2 evolution rates at pH 8.7 and no activity of CA detected.	Mercado et al., (1998)

					inhibitors of CA activity.		
G. sclerophyllum	Gulf of California	2008, 2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-15.2±3.1(2)‰	This study
G. spinosum	Cádiz, southern Spain	2004-2005	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-17.3±0.7(3)‰	Mercado et al., (2009)
Gigartina exaxperata	California			HCO_3^-	Comparing photosynthetic rates of O_2 evolution with the photosynthetic rate which could be supported by CO_2 arising from the uncatalysed dehydration of HCO_3^- in the medium	At pH 9, the rates of photosynthetic O_2 evolution exceeded the CO_2 supply rate	Cook et al., (1986)
G. papillata	California			HCO_3^-	Comparing photosynthetic rates of O_2 evolution with the photosynthetic rate which could be supported by CO_2 arising from the uncatalysed dehydration of HCO_3^- in the medium	At pH 9, the rates of photosynthetic O_2 evolution exceeded the CO_2 supply rate	Cook et al., (1986)
Gigartina sp.	Gulf of California	2008, 2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-16.9±6.6(9)‰	This study
Gracilaria gracilis	west coast of Sweden			HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)

						buffer at pH 8.7 and both.		
	G. lemaneiformis	China			HCO_3^-	pH drift experiments	pH final = 9.58	Zou et al., (2004)
	G. pacifica	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	pH final= 9.43	Murru and Sandgreen (2004)
	G. secundata	Southern, Astralia	2013-2014		CO_2	$\delta^{13}C$ signal	-32.4±0.7‰	Cornwall et al., (2015)
	G.subsecundata	Gulf of California	2008,2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.9±2.8(8)‰	This study
	Gracilaria sp.	Great barrier reef, Australia	2008-2012	Subtidal (0.5-4.9m)		$\delta^{13}C$ signal	-19.8±1.5‰	Loveloeck et al., (2019)
	G. vermiculophylla	Gulf of California	2009,2013	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.9±3.8(23)‰	This study
	G. tenuistipitata	Cádiz, southern Spain	1995		$CO_2 > HCO_3^-$	Measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) an inhibitor of CA activity.	The evolution of O_2 was higher with CO_2 concentrations than HCO_3^-. The activity of CA was low.	Mercado et al., (1997)
	Gymnogongrus crenulatus	Cádiz, southern Spain	2004-2005	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-22.3±1.1‰	Mercado et al., (2009)
	G. guadalupensis	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-13.1(1)‰	This study
	G. linearis	California			HCO_3^-	Comparing photosynthetic rates of O_2 evolution with the photosynthetic rate which could be supported by CO_2 arising from the uncatalysed dehydration of HCO_3^- in the medium	At pH 9, the rates of photosynthetic O_2 evolution exceeded the CO_2 supply rate	Cook et al., (1986)
	Gymnogongrus spp.	Cádiz, southern Spain	1995	Intertidal and rockpools	$CO_2 > HCO_3^-$	Measurements of O_2 evolution curves vs. Ci concentration and	Low O_2 evolution rates at pH 8.7 and low activity of CA detected.	Mercado et al., (1998)

					measurement of the external Carbonic Anhydrase (CA) activity, with addition of acetazolamide (AZ) and/or 6-ethoxyzolamide (EZ) an inhibitors of CA activity.		
Gymnogongrus sp.	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.1±3.8(11)‰	This study
Halymenia duruillaei	Lizard Island, Queensland, Australia	1973	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-32.0(1)‰	Black and Bender (1976)
H. gardneri	San Juan Island, USA			HCO_3^-	pH drift experiments	pH final=9.35	Murru and Sandgreen (2004)
H. schizymenioides	San Juan Island, USA			HCO_3^-	pH drift experiments	pH final=9.38	Murru and Sandgreen (2004)
Halymenia sp.	Great barrier reef, Australia	2008-2012	Subtidal (1.5-5.1m)	CO_2	$\delta^{13}C$ signal	-27.7±6.8‰	Lovelock et al., (2019)
Halymenia sp.	Southern, Astralia	2013-2014	Subtidal (15m)	CO_2	$\delta^{13}C$ signal	-35.1±0.3(2)‰	Cornwall et al., (2015)
Halymenia sp.	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-23.7±13.6(2)‰	This study
Hypnea musciformis	Cádiz, southern Spain	2004-2005			$\delta^{13}C$ signal	-15.5±0.8(3)‰	Mercado et al., (2009)
Hypnea pannosa	Great barrier reef, Australia	2008-2012	Subtidal (0.5-4m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.4±2.8‰	Lovelock et al., (2019)
Hypnea spinella	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.4±1.8(6)‰	This study
Hypnea sp.	Great barrier reef, Australia	2008-2012	Intertidal (0m), Subtidal (0.5-3.7m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.2±2.4‰	Lovelock et al., (2019)
H. valentiae	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-15.2±2.3(6)‰	This study
Jania sp.	Great barrier reef, Australia	2008-2012	Subtidal (0.5-9.8m)	HCO_3^-	$\delta^{13}C$ signal	8.5±2.0‰	Lovelock et al., (2019)
Jania sp.	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-9.5±1.0(2)‰	This study
Laurencia pacifica	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-14.9±2.2(8)‰	This study
L. pinnafitida	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>9.7	Maberly (1990)
Laurencia sp.	Great barrier reef, Australia	2008-2012	Subtidal (0.5-7.1m)	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.0±4.7‰	Lovelock et al., (2019)
Polysiphonia elongata	west coast of Sweden		upper inter-tidal and medium inter-tidal	HCO_3^-	Measurements of photosynthetic rates and their	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)

						inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.		
	P. fucoides	west coast of Sweden		upper inter-tidal and medium inter-tidal	HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)
	P. mollis	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-14.0±7.9(3)‰	This study
	P. lanosa	Scotland		Subtidal	HCO_3^-	pH drift experiments	Final pH>10	Maberly (1990) Marconi et al., (2011)
	P. pacifica	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-19.8±1.8(7)‰	This study
	P. stricta	west coast of Sweden		upper inter-tidal and medium inter-tidal	HCO_3^-	Measurements of photosynthetic rates and their inhibition effect (%) by acetazolamide (AZ), TRIS buffer at pH 8.7 and both.	Photosynthetic rate was inhibited by TRIS and TRIS + AZ.	Moulin et al., (2011)
	P. violaceae	Denmark			HCO_3^-	Photosynthetic rates at different pH	Low Photosynthetic rates >9	Sand-Jensen and Gordon (1984)
	Prionitis lanceolata	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	pH final=9.46	Murru and Sandgreen (2004)
	P. lyalli	San Juan Island, USA		Subtidal	HCO_3^-	pH drift experiments	pH final=9.55	Murru and Sandgreen (2004)
	P. abbreviata var guaymanensis	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-11.4(1)‰	This study
	Prionitis sp.	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	δ^{13}C signal	-14.4±1.1(2)‰	This study
	Rhodoglossum affine	Californa			HCO_3^-	Comparing photosynthetic rates of O_2 evolution with the photosynthetic	At pH 9, the rates of photosynthetic O_2 evolution exceeded the CO_2 supply rate	Cook et al., (1986)

						rate which could be supported by CO_2 arising from the uncatalysed dehydration of HCO_3^- in the medium		
	Rhodoglossum sp.	Gulf of California	2009	Subtidal	HCO_3^- / CO_2	$\delta^{13}C$ signal	-16.1±1.0‰	This study
	Rhodymenia palmata	California			HCO_3^-	Comparing photosynthetic rates of O_2 evolution with the photosynthetic rate which could be supported by CO_2 arising from the uncatalysed dehydration of HCO_3^- in the medium	At pH 9, the rates of photosynthetic O_2 evolution exceeded the CO_2 supply rate	Cook et al., (1986)
	R. asutralis	Australia	1999-2000		CO_2	$\delta^{13}C$ signal	-32.2±0.7‰	Raven et al., (2002a)
	Rhodymenia sp.	Italy			CO_2	$\delta^{13}C$ signal	-29.2±0.5‰	Marconi et al., (2011)
	Rhodymenia sp	Gulf of California	2009	Subtidal	HCO_3^-	$\delta^{13}C$ signal	18.7±2.4(2)‰	This study
	Schizymenia pacifica	San Juan Island, USA		Subtidal	CO_2	pH drift experiments	pH final=9.02	Murru and Sandgreen (2004)
	S. pacifica	Catalina Island, CA, USA	2000		HCO_3^- / CO_2	$\delta^{13}C$ signal	-18.46(1) ‰	Raven et al., (2002a)
	S. pacifica	Gulf of California	2009	Subtidal	CO_2	$\delta^{13}C$ signal	-33.8±1.2(2)‰	This study

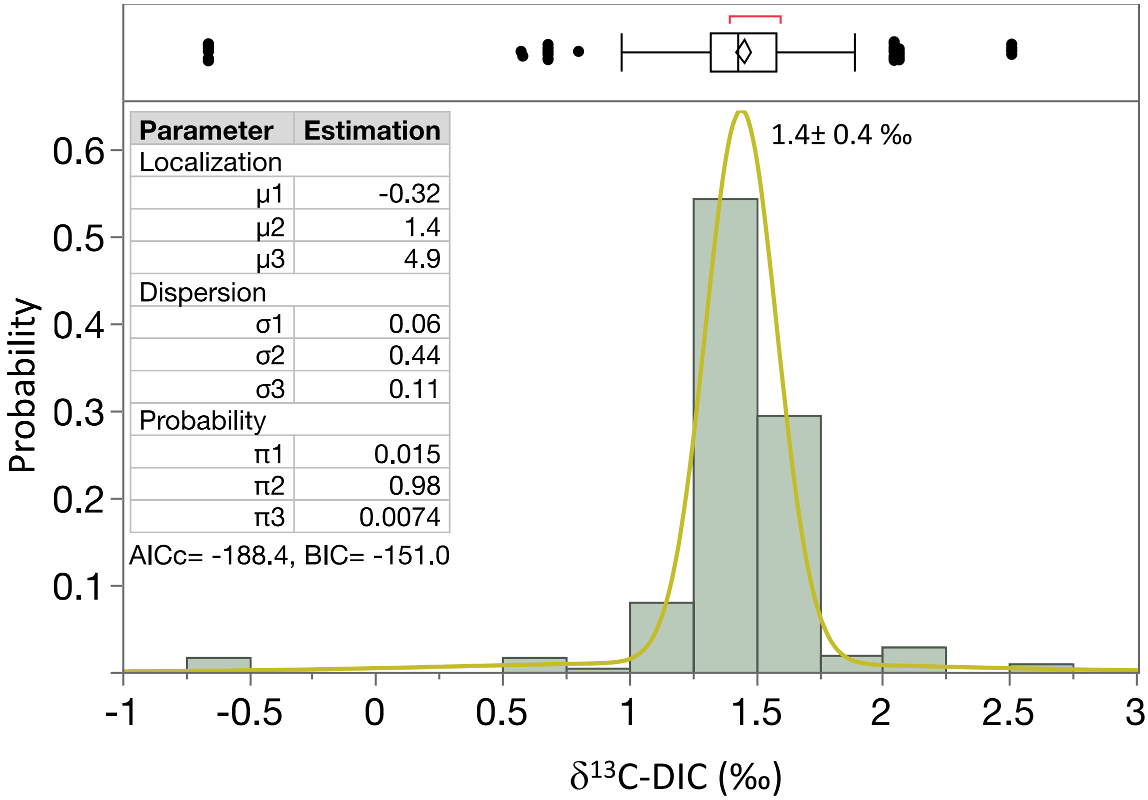
Table S5. Temperature mean by regions and seasons in the Gulf of California based on time series data (1981 to 2016) by Escalante et al. (2013) and Robles-Tamayo (2018).

Region	South	Central	Midriff Islands	North	GC	Source
Annual mean of both GC coast	25.6±0.2ºC	24.5±0.4ºC	23.2±0.4ºC		24.5±0.7ºC	Escalante et al., (2013)
Annual mean of eastern GC coast	25.8±4.3ºC	24.8±4.8 ºC	23.7±5.7ºC	23.5±5.0ºC	24.4±1.1ºC	Robles-Tamayo (2018)
Annual TºC range of eastern GC coast	32.4 to 16.7ºC	32.4 to 15.7ºC	36.3 to 11.9ºC	31.98 to 15.5ºC		Robles-Tamayo (2018)
Winter (GC)	24.1±0.2ºC	19.3±0.3ºC	17.7±0.4ºC		20.4±1.9ºC	Escalante et al., (2013)
Spring (GC)	24.3±0.2ºC	21.6±0.3ºC	19.5±0.3ºC		21.8±1.4ºC	Escalante et al., (2013)
Summer (GC)	28.7±0.2ºC	29.3±0.3ºC	28.6±0.3ºC		28.9±0.2ºC	Escalante et al., (2013)
Autumm (GC)	29.1±0.2ºC	28.2±0.3ºC	27.0±0.3ºC		28.1±0.6ºC	Escalante et al., (2013)
Cold period time. (eastern coast GC)	5 months	6 months	7 months	8 months		Robles-Tamayo (2018)
Cold period TºC mean. (eastern coast GC)	22.1±2.7ºC	21.1±3.0ºC	20.1±4.0ºC	20.7±3.5ºC		Robles-Tamayo (2018)
Cold period TºC range. (eastern coast GC)	28.0 to 16.7ºC	30.8 to 15.7ºC	34.8 to 11.9ºC	29.5 to 15.5ºC		Robles-Tamayo (2018)
TºC mean during season transitions	25ºC	25ºC	25ºC	25ºC	25ºC	Robles-Tamayo (2018)
Warm period time (eastern coast GC)	7 months	6 months	5 months	4 months		Robles-Tamayo (2018)
Warm period TºC mean (eastern coast GC)	28.5±3.0ºC	28.5±2.9ºC	28.7±3.3ºC	29.0±2.2ºC		Robles-Tamayo (2018)
Warm period TºC range (eastern coast GC)	32.4 to 19.5ºC	32.4 to 18.9ºC	36.3 to 13.9ºC	31.8 to 24ºC		Robles-Tamayo (2018)

Figure List

Fig. S1. Histogram representing the distribution of δ^{13}C-DIC values in surface seawater in the Gulf of California.

Fig. S2. Histograms representing the distribution of Δ^{13}C-macroalgal in macroalgae collected in the Gulf of California for Phyla a) Chlorophyta, Rhodophyta, and Ochrophyta.



Parameter	Estimation
Localization	
μ1	-0.32
μ2	1.4
μ3	4.9
Dispersion	
σ1	0.06
σ2	0.44
σ3	0.11
Probability	
π1	0.015
π2	0.98
π3	0.0074

AICc= -188.4, BIC= -151.0

Fig. S1. Histogram representing the distribution of δ^{13}C-DIC values in surface seawater in the Gulf of California.

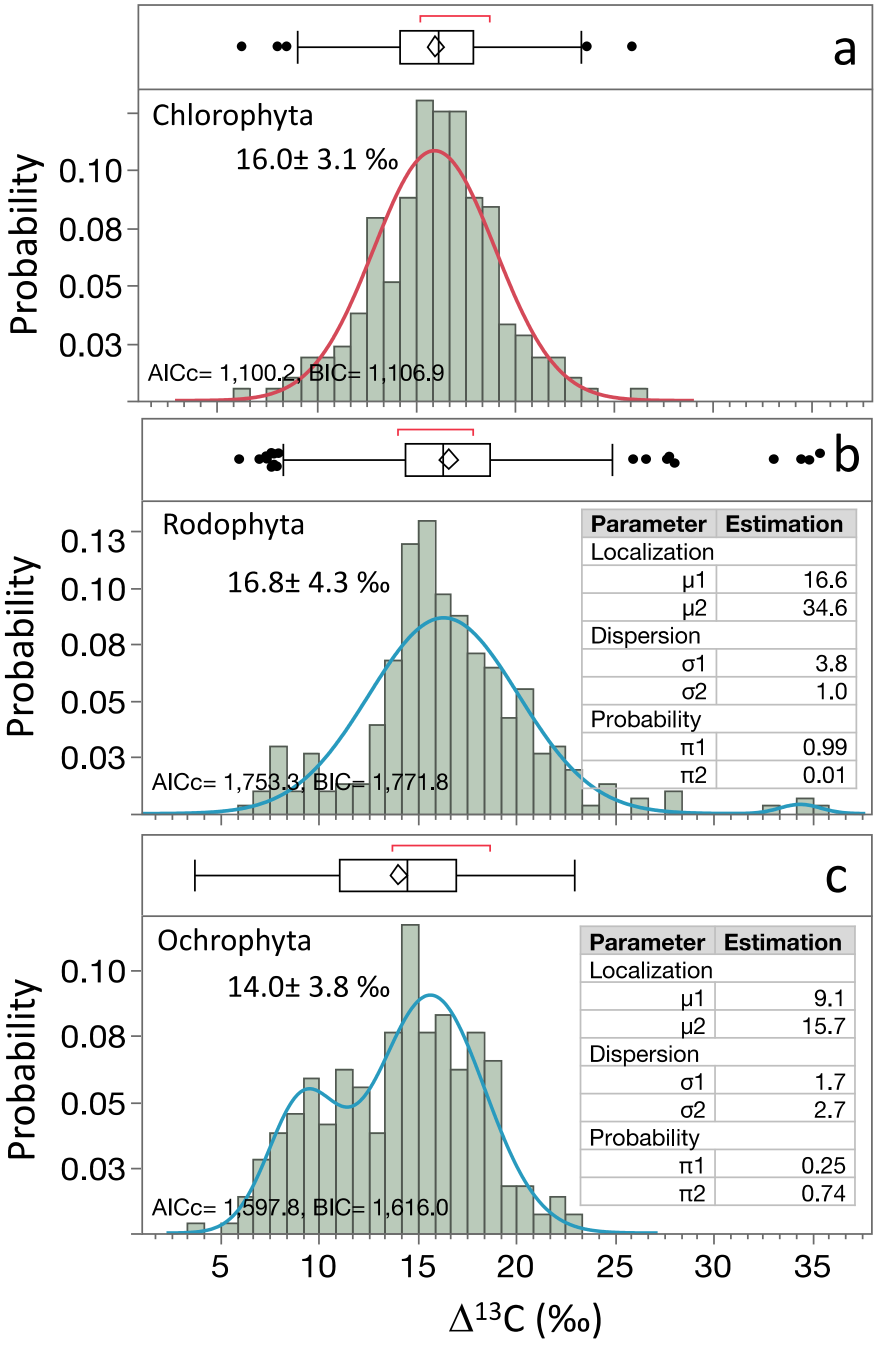


Fig. SI-2. Histograms representing the distribution of Δ^{13}C-macroalgal in macroalgae collected in the Gulf of California for Phyla a) Chlorophyta, Rhodophyta, and Ochrophyta.

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