

Supplementary Material

The time series at the Strait of Gibraltar as a baseline for long-term assessment of vulnerability of calcifiers to ocean acidification

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1 Supplementary Figures

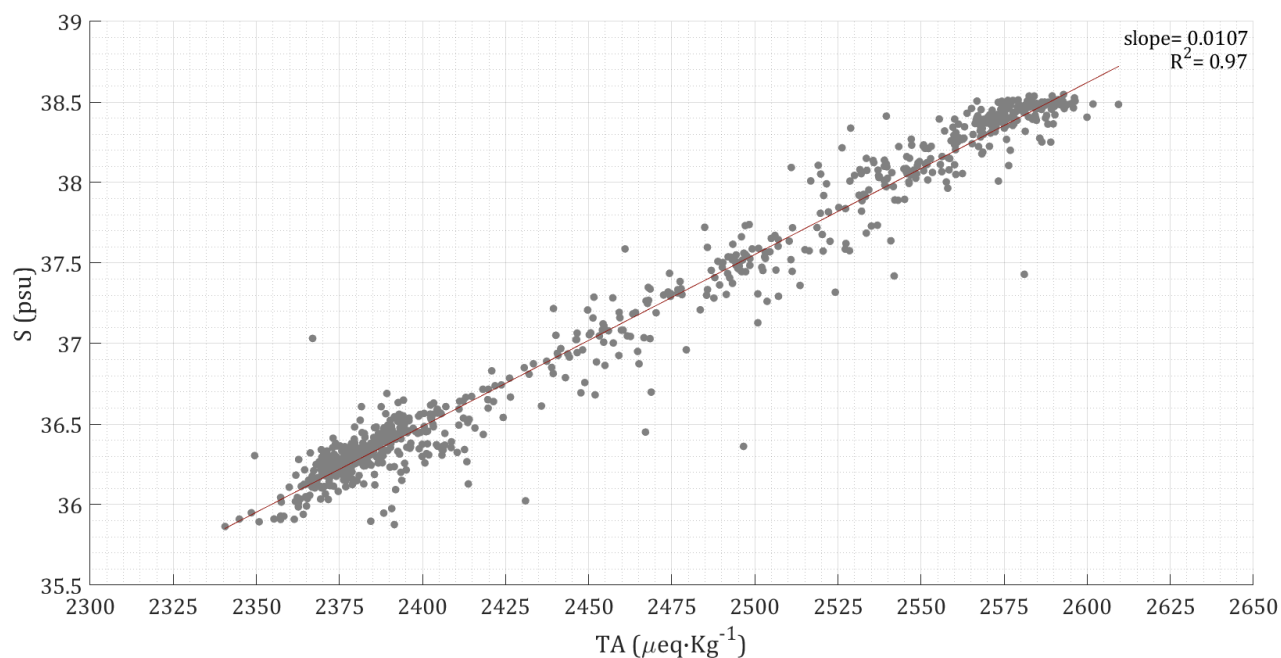


Figure 1S. Relationship of Alkalinity to Salinity in our study area.

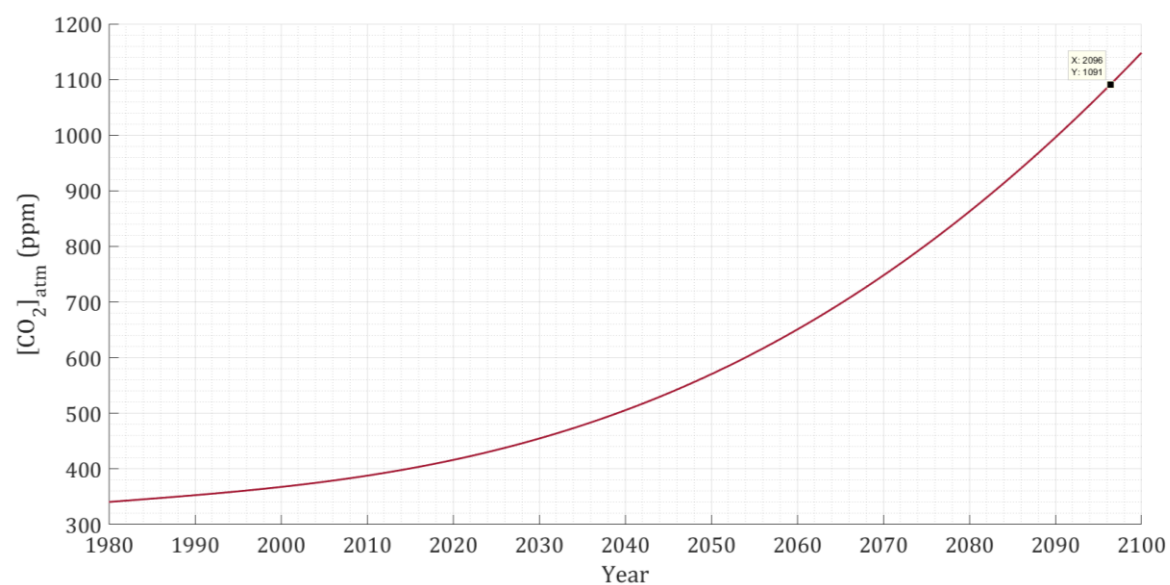


Figure 2S. Estimation of the years under the IPCC AR6 Shared Socio-economic Pathway "fossil-fuel-rich development" (SSP5-8.5).

2 Supplementary Tables

Table 1S. Oceanographic campaigns carried out from 2005 to 2021 have provided data for this study. Total measurements/data used in the assessment are also indicated.

Campaign ID	Date	Vessel	Number of depths	Measurements
CARBOGIB1	3-4 May, 2005.	RV Al Amir Moulay Abdellah	40	272
GIFT0605	10 June, 2005.	BO García del Cid	14	98
CARBOGIB3	12-13 December, 2005.	RV Al Amir MoulayAbdellah	37	259
CARBOGIB4	20-21 March, 2006.	RV Al Amir MoulayAbdellah	40	280
CARBOGIB5	22-23 May, 2006.	RV Al Amir MoulayAbdellah	40	275
GIFT1106	23 November, 2006.	BO García del Cid	15	104
CARBOGIB6	14 December, 2006.	RV Al Amir MoulayAbdellah	37	252
CARBOGIB7	7-8 May, 2007.	RV Al Amir MoulayAbdellah	37	221
CARBOGIB8	4-5 July, 2007.	RV Al Amir MoulayAbdellah	37	250
CARBOGIB9	6-7 November, 2007.	RV Al Amir MoulayAbdellah	34	224
SESAME1	13 April, 2008.	BO Regina Maris	23	155
SESAME2	27 July, 2008.	BO Regina Maris	27	173
SESAME3	26 September, 2008.	BO García del Cid	25	173
P3A2_1 ST _LEG	12 October, 2008.	RV Hespérides	21	147
P3A2_2 ST _LEG	21 October, 2008.	RV Hespérides	21	145
GIFT0409	24 April, 2009.	BO Sarmiento de Gamboa	15	105
GIFT0609	1 July, 2009.	BO Sarmiento de Gamboa	15	104
GIFT0909	25 September, 2009.	BO Sarmiento de Gamboa	26	181

GIFT1109	24 November, 2009.	BO Sarmiento de Gamboa	25	175
GIFT0711	26 July, 2011.	BO García del Cid	26	161
GIFT0811	4-5 August, 2011.	BO Cornide de Saavedra	21	138
GIFT1111	10 November, 2011.	BO García del Cid	18	125
GIFT0212	27-28 February, 2012.	BO García del Cid	22	154
GIFT0513	19-20 May, 2013.	RV Hespérides	18	126
GIFT1114	3 November, 2014.	BO Socib	18	126
GIFT0615	10 June, 2015.	BO Socib	18	126
GIFT1215	4 December, 2015.	BO Socib	16	112
GIFT0919	23 September, 2019.	UCADIZ	21	137
GIFT1219	11 December, 2019.	BO Ángeles Alvariño	22	152
GIFT0220	21 February, 2020.	BO Ramón Margalef	6	42
GIFT0820	20 August, 2020.	BO Ángeles Alvariño	18	126
GIFT1120	6 November, 2020.	BO Ramón Margalef	18	126
GIFT0521	25 May, 2021.	BO Ángeles Alvariño	12	84
GIFT1221	20 December, 2021.	BO Ángeles Alvariño	6	42

Table 2S. Range of years obtained by considering the errors of the estimate for $\Omega = 1.5$ for the three water masses present in the water column, under the SSP5-8.5 scenario.

Ω Critical	Water Masses	Year (SSP5-8.5) $Y2 = (m - SE) \cdot X + n2$	Year (SSP5-8.5) $Y = m \cdot X + n$	Year (SSP5-8.5) $Y1 = (m + SE) \cdot X + n1$
$\Omega_{\text{Aragonite}}$	NACW	2066	2074	2084
	WMDW	2071	2079	2090
	LIW	2087	2096	>2100
Ω_{Calcite}	NACW	2097	>2100	>2100
	WMDW	>2100	>2100	>2100
	LIW	>2100	>2100	>2100

Table 3S. Range of years obtained by considering the errors of the estimate for $\Omega = 1$ for the three water masses present in the water column, under the SSP5-8.5 scenario.

Ω Undersaturation	Water Masses	Year (SSP5-8.5) $Y2 = (m - SE) \cdot X + n2$	Year (SSP5-8.5) $Y = m \cdot X + n$	Year (SSP5-8.5) $Y1 = (m + SE) \cdot X + n1$
$\Omega_{\text{Aragonite}}$	NACW	2094	>2100	>2100
	WMDW	>2100	>2100	>2100
	LIW	>2100	>2100	>2100
Ω_{Calcite}	NACW	>2100	>2100	>2100
	WMDW	>2100	>2100	>2100
	LIW	>2100	>2100	>2100

Table 4S. Rates of change in aragonite and calcite saturation state (in yr^{-1}).

Parameter	Water Masses or Region	Slope	Reference
$\Omega_{\text{Aragonite}}$ (yr^{-1})	SoG	-0.0107	This study
	MOW	-0.0091	This study
	NACW	-0.0139	This study
	WMDW	-0.0102	This study
	LIW	-0.0080	This study
	GoC	-0.0552	Jiménez-López et al. (2021)
	Mediterranean Levantine basin	-0.07	Hassoun et al. (2019)
	South Atlantic Central Water (SACW)	-0.010	Fontela et al. (2021)
	BATS	-0.010	Bates et al. (2012)
	BATS	-0.011	Takahashi et al. (2014)
	ESTOC	-0.010	Takahashi et al. (2014)
	ESTOC Surface	-0.0140	González-Dávila et al. (2010)
Ω_{Calcite} (yr^{-1})	SoG	-0.0168	This study
	MOW	-0.0145	This study
	NACW	-0.0215	This study
	WMDW	-0.0161	This study
	LIW	-0.0129	This study
	Mediterranean Levantine basin	-0.1	Hassoun et al. (2019)
	BATS	-0.014	Bates and Johnson (2020)
	Subtropical North Atlantic Ocean	-0.010	Bates and Peter (2007)
	BATS	-0.0152	Bates et al. (2012)
	BATS	-0.016	Takahashi et al. (2014)
	ESTOC	-0.015	Takahashi et al. (2014)
	ESTOC Surface	-0.0209	González-Dávila et al. (2010)