Table S1: Bias (mean of the residuals between the reconstructed coastal pCO_2-product and SOCAT_a, in µatm), Root Mean Square Error (RMSE, µatm) and r^2 calculated for each year. The number of grid cells used for the comparison is also provided.

	bias (µatm)	RMSE (µatm)	r^2	cells
1982-12020	0	29	0.7	472134
1982	2	19	0.7	568
1983	4	16	0.7	209
1984	-1	14	0.6	341
1985	5	18	0.3	192
1986	-1	15	0.7	310
1987	-6	32	0.4	456
1988	-1	27	0.6	323
1989	-2	42	0.5	453
1990	2	26	0.2	181
1991	0	17	0.8	1094
1992	2	16	0.7	1176
1993	4	31	0.5	2067
1994	-1	25	0.5	2939
1995	0	25	0.8	6220
1996	1	29	0.7	5130
1997	3	33	0.8	4928
1998	2	29	0.7	5259
1999	0	32	0.7	5183
2000	-2	33	0.7	6289
2001	-1	34	0.7	7055
2002	3	27	0.6	8833
2003	-3	25	0.8	8772
2004	-1	27	0.8	12276
2005	-1	25	0.7	14980
2006	1	28	0.7	22512
2007	2	29	0.7	21724
2008	2	27	0.8	19784
2009	1	31	0.7	18313
2010	0	29	0.7	21149
2011	0	34	0.7	27382
2012	-2	31	0.7	24474
2013	-1	31	0.7	21674
2014	0	32	0.7	27817
2015	0	30	0.7	28386
2016	1	25	0.7	29319
2017	2	27	0.8	34210
2018	1	28	0.7	30488
2019	-1	31	0.7	29283
2020	-2	31	0.7	20367

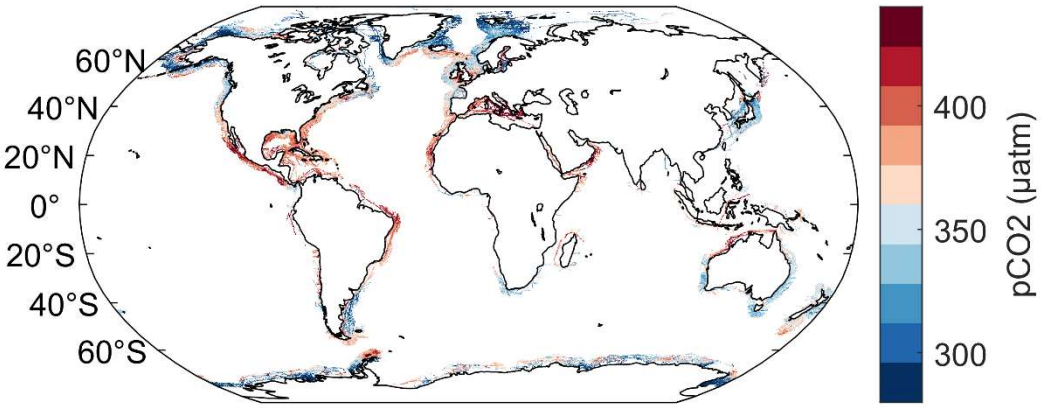

Figure S1. Global map of the climatological (1982-2020 period) averaged gridded sea surface coastal pCO_2 (µatm) from the SOCATv2022 database used as an independent dataset against for which the reconstructed coastal pCO_2-product is evaluated (SOCAT_b).

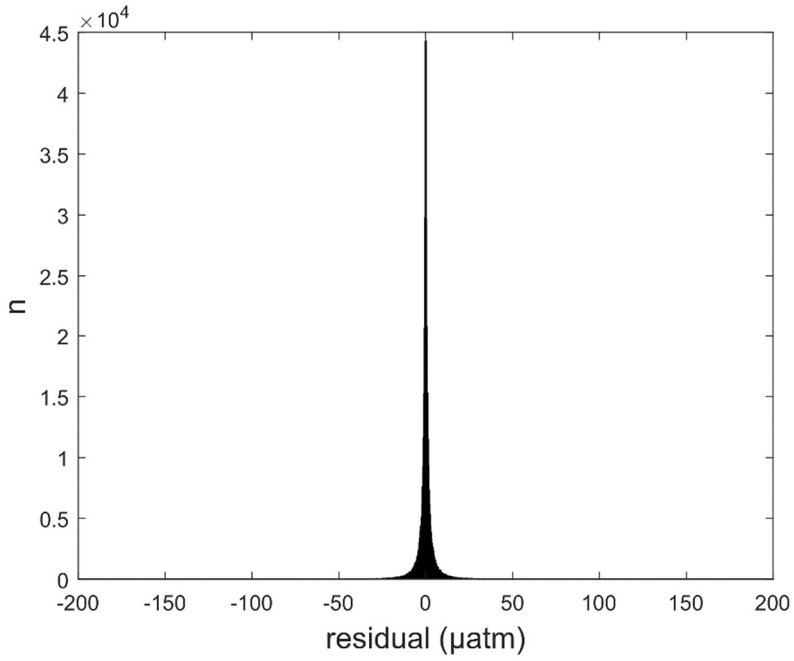

Figure S2. Histogram of the pCO_2 residuals (in µatm) betwen SOCAT_b and SOCAT_a.

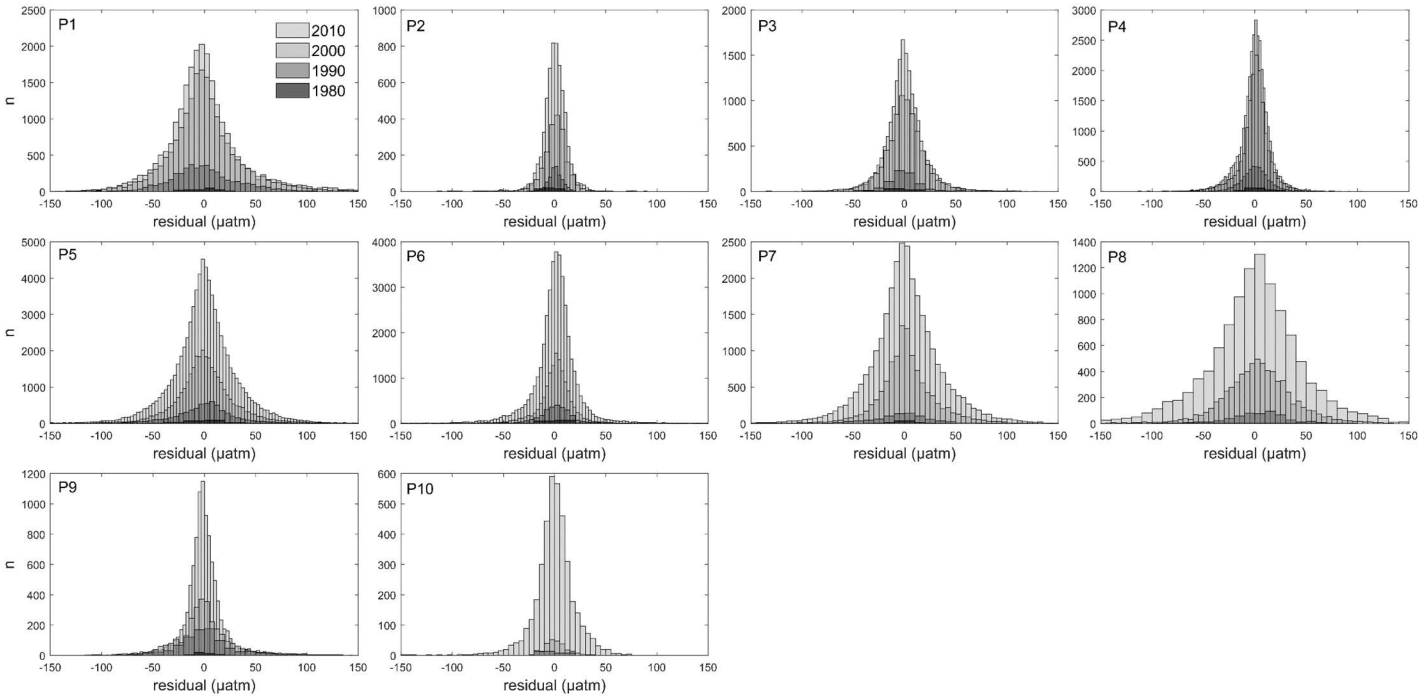

Figure S3: Histograms of the residuals (in µatm) between the reconstructed coastal pCO_2-product and SOCAT_b for each of the four decades in each biogeochemical province.