



Supplement of

Evaluation of the particulate inorganic carbon export efficiency in the global ocean

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Table S1: Satellite products merged in the analyses. AV = Simple average method; AVW = Weighted average method; SWF = Sea-Viewing Wide Field of View Sensor (SeaWiFS); MOD = Moderate Resolution Imaging Spectrometer (MODIS); VIR = Visible Infrared Imaging Radiometer Suite (VIIRS); MER = Medium Resolution Imaging Spectrometer (MERIS); OLA = Ocean and Land Colour Instruments (Sentinel-3A); Vj1 = VIIRS aboard JPSS-1 (Joint Polar Satellite System); OLB = Ocean and Land Colour Instruments (Sentinel-3B).

Periods	Monthly PIC concentration	Monthly SST	Monthly PAR	Monthly K_d_{490nm}
	mol C m ⁻³	°C	mol photons m ⁻² d ⁻¹	m ⁻¹
Sept 1997- April 2002	AV-SWF	ESA SST CCI and C3S and C3S reprocessed SST	AV-SWF	AV-SWF
May 2002- June 2002	AV-SWF	ESA SST CCI and C3S reprocessed SST	AV-SWF	AVW-MERSWF
July - 2002 - Dec 2010	AVW-MODSWF	MODIS	AVW-MODSWF	AVW-MERMODSWF
Jan- 2011 - Jan 2012	AV-MOD	MODIS	AV-MOD	AVW-MERMOD
Febr - 2012 - Apr 2012	AVW-MODVIR	MODIS	AVW-MODVIR	AVW-MERMODVIR
May - 2012 - Apr 2016	AVW-MODVIR	MODIS	AVW-MODVIR	AVW-MODVIR
May 2016 - Nov 2017	AVW-MODVIR	MODIS	AVW-MODVIR	AVW-MODVIR
Dec 2017 - Mar 2019	AVW-MODVIR	MODIS	AVW-MODVIR	AVW-MODVIR
Apr 2019 - Oct 2023	AVW-MODVIR	MODIS	AVW-MODVIR	AVW-MODVIR

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Table S2: PIC flux dataset compilation.

Data sets	Reference
https://doi.org/10.1594/PANGAEA.855600	Mouw et al., 2016
https://doi.org/10.1594/PANGAEA.807946	Torres Valdés et al., 2014
Supplementary material: https://agupubs.onlinelibrary.wiley.com/doi/10.1002/2014GL061678	Le Moigne et al., 2014
https://doi.org/10.1594/PANGAEA.934361	Fischer et al., 2016
https://doi.org/10.1594/PANGAEA.867116	Romero et al., 2016
https://doi.org/10.1594/PANGAEA.863969	Rosengard et al., 2015
Table 2	Neukermans et al., 2023
Table 1	

Table S3: Number of observations per RECCAP2 biogeochemical regions and layer of depth used in the analysis.

Regions	Number of PIC observation	Number of stations	Depth layer	Number of PIC observation
Arctic (Ar)	83	4	0-100m	1
			100-500m	62
			1000-2000m	20
North Atlantic (NA)	1170	79	0-100m	39
			100-500m	172
			1000-2000m	202
			2000-3000m	444
			3000-4000m	78
			500-1000m	143

			> 4000m	92
North Pacific (NP)	963	17	0-100m	3
			100-500m	229
			1000-2000m	135
			2000-3000m	89
			3000-4000m	169
			500-1000m	104
			> 4000m	234
North Subtropics Atlantic (NSTA)	670	12	0-100m	7
			1000-2000m	173
			2000-3000m	240
			3000-4000m	22
			500-1000m	156
			> 4000m	72
North Subtropics Pacific (NSTP)	662	11	100-500m	342
			1000-2000m	103
			2000-3000m	102
			3000-4000m	36
			> 4000m	79
North Indian (NI)	939	16	1000-2000m	150
			2000-3000m	197
			3000-4000m	201
			500-1000m	391
Equatorial Atlantic (EA)	41	3	0-100m	2
			3000-4000m	19
			500-1000m	20
Equatorial Pacific (EP)	329	8	1000-2000m	63
			2000-3000m	125
			3000-4000m	78
			500-1000m	42
			> 4000m	21
	180	12	0-100m	4
South Subtropics Atlantic (SSTA)			1000-2000m	96
			2000-3000m	20
			500-1000m	60
South Subtropics Pacific (SSTP)	337	9	1000-2000m	106
			2000-3000m	132
			3000-4000m	78
			> 4000m	21
Subantarctic (SAZ)	21	21	0-100m	9
			100-500m	12
	608	62	0-100m	24
			100-500m	179
Antarctic (AAZ)			1000-2000m	106
			2000-3000m	56
			3000-4000m	49
			500-1000m	140

Table S4: Statistical parameter associated with the linear regression between EZ PIC production and log₁₀ transformed PIC flux for each layer of depth and per RECCAP2 biogeochemical regions.

Region	Depth	Slope	Slope σ	Intercept	Intercept σ	Pearson R coefficient	Pearson R coefficient σ	R ²	p-value	n
Arctic Ar	na	na	na	na	na	na	na	na	na	na
North Atlantic (NA)	0-100m	0.109	0.574	44.591	13.233	0.03	0.152	0.001	0.85	43
	100-500m	1.042	0.084	-0.838	0.492	0.785	0.039	0.616	<0.001	97
	500-1000m	0.412	0.065	0.295	0.618	0.591	0.075	0.35	<0.001	76
	1000-2000m	0.218	0.046	1.678	0.556	0.423	0.08	0.179	<0.001	105
	2000-3000m	0.237	0.026	1.857	0.332	0.448	0.044	0.201	<0.001	334
	3000-4000m	0.515	0.033	-1.01	0.428	0.874	0.027	0.763	<0.001	78
	>4000m	0.222	0.049	2.851	0.793	0.43	0.085	0.185	<0.001	92
North Pacific (NP)	0-100m	-0.501	1.481	1.222	0.356	-0.959	0.046	0.92	0.183	3
	100-500m	0.246	0.089	8.747	0.826	0.199	0.07	0.04	0.006	188
	500-1000m	0.007	0.029	2.133	0.332	0.029	0.115	0.001	0.803	76
	1000-2000m	0.068	0.036	3.696	0.513	0.219	0.112	0.048	0.064	72
	2000-3000m	-0.007	0.048	4.354	0.569	-0.02	0.136	0	0.887	54
	3000-4000m	-0.036	0.035	3.453	0.294	-0.102	0.099	0.011	0.313	99
	>4000m	0.004	0.014	3.342	0.202	0.023	0.07	0.001	0.744	206
North Subtropics Atlantic (NSTA)	0-100m	3.124	2.968	-33.919	51.986	0.466	0.32	0.217	0.352	6
	500-1000m	-0.452	0.088	12.683	1.521	-0.384	0.068	0.148	<0.001	155
	1000-2000m	-0.199	0.033	8.747	0.67	-0.431	0.065	0.186	<0.001	158
	2000-3000m	-0.257	0.047	10.387	0.895	-0.336	0.057	0.113	<0.001	240
	3000-4000m	-0.069	0.048	10.64	1.04	-0.304	0.194	0.092	0.169	22
	>4000m	-0.098	0.027	6.649	0.683	-0.399	0.099	0.159	0.001	72
North Subtropics Pacific (NSTP)	100-500m	-0.269	0.042	8.707	0.649	-0.338	0.049	0.114	<0.001	324
	1000-2000m	0.155	0.056	2.418	0.803	0.267	0.093	0.071	0.007	100
	2000-3000m	-0.052	0.045	3.206	0.715	-0.116	0.098	0.014	0.244	102
	3000-4000m	-0.175	0.08	5.611	1.318	-0.354	0.148	0.125	0.037	35
	>4000m	0.096	0.063	0.992	0.803	0.171	0.109	0.029	0.132	79
North Indian (NI)	500-1000m	0.543	0.061	4.623	0.58	0.417	0.043	0.174	<0.001	377
	1000-2000m	0.683	0.12	4.964	1.124	0.425	0.067	0.181	<0.001	150
	2000-3000m	0.395	0.087	5.895	0.678	0.31	0.065	0.096	<0.001	196
	3000-4000m	0.419	0.078	5.367	0.666	0.358	0.062	0.128	<0.001	200
Equatorial Atlantic (EA)	500-1000m	-0.127	0.197	5.808	1.813	-0.15	0.219	0.022	0.528	20
	3000-4000m	-0.269	0.225	8.937	2.111	-0.278	0.212	0.077	0.249	19
Equatorial Pacific (EP)	500-1000m	-0.227	0.354	9.358	3.872	-0.101	0.153	0.01	0.525	42
	1000-2000m	0.129	0.065	3.277	0.743	0.248	0.12	0.062	0.054	61
	2000-3000m	-0.195	0.106	8.882	1.301	-0.164	0.087	0.027	0.068	125
	3000-4000m	-0.178	0.17	8.657	1.885	-0.119	0.112	0.014	0.299	78
	>4000m	0.253	0.361	2.152	1.309	0.159	0.213	0.025	0.492	21
South Subtropics Atlantic (SSTA)	0-100m	0.14	0.344	4.308	7.683	0.276	0.462	0.076	0.724	4
	500-1000m	0.046	0.032	8.906	1.213	0.189	0.124	0.036	0.148	60

	1000-2000m	-0.004	0.03	7.724	0.829	-0.013	0.102	0	0.9	96
	2000-3000m	0.021	0.086	6.638	1.794	0.057	0.223	0.003	0.81	20
South Subtropics Pacific (SSTP)	1000-2000m	-0.187	0.043	5.587	0.501	-0.392	0.082	0.153	<0.001	106
	2000-3000m	0	0.042	4.918	0.545	0	0.087	0	0.998	132
	3000-4000m	-0.116	0.049	5.29	0.722	-0.266	0.107	0.071	0.02	76
	>4000m	0.71	1.146	1.457	4.037	0.141	0.214	0.02	0.543	21
South Indian Ocean (SI)	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	0
Subantarctic (SAZ)	0-100m	-0.272	0.775	41.71	23.086	-0.132	0.328	0.017	0.736	9
	100-500m	-0.229	0.474	21.056	15.639	-0.151	0.282	0.023	0.64	12
Antarctic (AAZ)	0-100m	2.689	6.401	78.012	46.542	0.101	0.227	0.01	0.68	19
	100-500m	1.456	0.585	4.13	5.71	0.54	0.172	0.292	0.025	17
	500-1000m	-0.085	0.09	4.607	0.948	-0.115	0.121	0.013	0.353	67
	1000-2000m	0.916	0.286	2.955	2.711	0.505	0.132	0.255	0.003	32
	3000-4000m	0.667	0.377	0.655	2.035	0.416	0.201	0.173	0.097	17
	>4000m	0.308	0.164	2.719	1.208	0.295	0.146	0.087	0.069	39

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