

Supplementary Material

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Table S1 Normality p-values for the PIRATA databases. In white: Normally distributed data; in grey: data with non-normal distribution. TSW – Surface Tropical Water; SACW – South Atlantic Central Water; AAIW – Antarctic Intermediate Water; NADW – North Atlantic Deep Water; AABW – Antarctic Bottom Water.

	PIRATA XVII						PIRATA XVIII					
	TSW	SACW	NACW	AAIW	NADW	AABW	TSW	SACW	NACW	AAIW	NADW	AABW
Nitrate	< 0.01	0.04	0.88	0.09	0.40	0.67	0.04	-	0.36	0.20	0.93	0.66
Phosphate	< 0.01	< 0.01	0.78	0.04	0.37	0.42	< 0.01	0.07	0.46	0.40	0.08	0.85
Silicate	< 0.01	< 0.01	0.30	0.33	< 0.01	0.06	< 0.01	0.27	0.11	0.22	0.41	0.50

Table S2 p-values for Dunn’s comparative statistical test (pairwise), after Kruskal-Wallis analysis, for TSW, SACW, AAIW, NADW and AABW water masses. Also p-values for Wilcoxon-Mann-Whitney test for NACW and for the nitrate parameter only in SACW (marked with *). In white: datasets do not differ significantly; in grey: datasets differ significantly. TSW – Surface Tropical Water; SACW – South Atlantic Central Water; AAIW – Antarctic Intermediate Water; NADW – North Atlantic Deep Water; AABW – Antarctic Bottom Water.

		TSW			SACW			NACW*		AAIW			NADW			AABW		
		XVII	XVIII	GLODAP	XVII	XVIII	GLODAP	XVII	XVIII	XVII	XVIII	GLODAP	XVII	XVIII	GLODAP	XVII	XVIII	GLODAP
Nitrate	XVII		0.26	< 0.01		-	0.18*		< 0.01		0.10	0.02		< 0.01	0.03		0.18	0.04
	XVIII	0.26		< 0.01		-		< 0.01		0.10		< 0.01	< 0.01		< 0.01		0.18	< 0.01
	GLODAP	< 0.01	< 0.01		0.18*	-		-	-	0.02	< 0.01		0.03	< 0.01		0.04	< 0.01	
Phosphate	XVII		0.70	< 0.01		0.41	0.03		0.73		0.01	< 0.01		0.78	0.60		0.79	0.51
	XVIII	0.70		< 0.01		0.41	0.61	0.73		0.01		0.67	0.78		0.34	0.79		0.22
	GLODAP	< 0.01	< 0.01		0.03	0.61		-	-	< 0.01	0.67		0.60	0.34		0.51	0.22	
Silicate	XVII		< 0.01	< 0.01		< 0.01	< 0.01		0.01		0.06	0.02		< 0.01	0.54		0.63	< 0.01
	XVIII	< 0.01		0.01	< 0.01		0.14	0.01		0.06		< 0.01	< 0.01		< 0.01		0.63	< 0.01
	GLODAP	< 0.01	0.01		< 0.01	0.14		-	-	0.02	< 0.01		0.54	< 0.01		< 0.01	< 0.01	

Table S3 Mean, minimum, maximum and standard deviation values of the main physical-chemical parameters related to this work. In the PIRATA dataset, potential temperature, salinity and potential density data were acquired through the CTD-O₂ system, while nitrate, nitrite, phosphate, silicate and O₂ data were obtained in the laboratory through the analysis of discrete samples collected with Niskin bottles. TSW – Surface Tropical Water; SACW – South Atlantic Central Water; AAIW – Antarctic Intermediate Water; NADW – North Atlantic Deep Water; AABW – Antarctic Bottom Water.

		PIRATA XVII						PIRATA XVIII						GLODAP				
		TSW	SACW	NACW	AAIW	NADW	AABW	TSW	SACW	NACW	AAIW	NADW	AABW	TSW	SACW	AAIW	NADW	AABW
Potential Temperature (°C)	n	1214	1680	497	17752	56989	3399	1056	1805	562	15617	52421	3227	180	105	447	1347	76
	Mean	27.26	15.68	17.94	6.99	2.86	1.32	27.58	15.24	19.17	7.15	2.87	1.37	27.50	15.73	6.67	3.12	1.06
	standard deviation	0.84	4.07	3.16	2.15	0.87	0.25	1.00	3.81	3.46	2.24	0.89	0.21	0.80	3.79	2.29	0.88	0.35
	Minimum	24.01	11.41	12.38	4.42	1.67	0.74	23.91	11.66	12.97	4.34	1.73	0.73	25.10	11.60	4.18	1.71	0.60
	Maximum	28.23	25.49	25.70	14.38	5.32	1.69	29.14	25.79	25.61	14.52	5.38	1.77	28.98	24.82	12.03	4.85	1.76
Salinity	n	1214	1680	497	17752	56989	3399	1056	1795	562	15617	52421	3227	180	105	447	1347	76
	Mean	36.05	35.62	36.27	34.77	34.92	34.81	36.09	35.56	36.45	34.81	34.93	34.83	35.84	35.60	34.70	34.94	34.79
	standard deviation	0.37	0.47	0.37	0.20	0.04	0.03	0.37	0.43	0.40	0.22	0.04	0.03	0.46	0.43	0.18	0.04	0.04
	Minimum	34.71	35.05	35.30	34.48	34.78	34.86	34.54	35.11	35.45	34.50	34.79	34.75	32.97	35.07	34.45	34.79	34.74
	Maximum	36.74	36.89	36.88	35.85	34.99	34.75	36.79	36.94	37.01	35.89	35.00	34.87	36.56	36.81	35.23	35.00	34.87
Potential Density (kg m³)	n	1214	1680	497	17752	56989	3399	1056	1795	562	15617	52421	3227	180	105	447	1347	76
	Mean	23.42	26.23	26.22	27.23	27.83	27.88	23.35	26.30	26.04	27.22	27.84	27.89	23.19	26.21	27.20	27.82	27.88
	standard deviation	0.47	0.65	0.58	0.21	0.07	0.00	0.52	0.61	0.64	0.21	0.07	0.00	0.53	0.62	0.22	0.08	0.01
	Minimum	22.19	24.45	24.45	26.75	27.57	27.87	21.72	24.45	24.47	26.75	27.57	27.88	20.63	24.50	26.75	27.57	27.87
	Maximum	24.45	26.75	26.76	27.59	27.89	27.89	24.45	26.75	26.76	27.59	27.90	27.90	24.27	26.75	27.56	27.91	27.90
Nitrate (μmol kg⁻¹)	n	27	29	11	41	33	8	9	1	4	9	21	6	128	73	331	1032	50
	Mean	7.15	12.24	16.01	28.83	21.58	23.56	2.55	0.70	2.11	22.53	15.98	19.33	0.23	14.50	31.65	20.55	26.71
	standard deviation	9.55	9.41	7.52	8.08	3.51	6.05	2.22	-	2.07	10.72	5.26	5.04	0.55	6.95	3.50	1.98	2.63
	Minimum	0.10	0.37	3.94	14.52	15.29	16.11	0.02	0.70	0.31	1.42	5.93	12.16	0.00	0.00	20.91	17.90	21.00
	Maximum	27.93	29.90	28.11	42.00	29.81	33.07	7.46	0.70	4.61	33.77	27.65	25.26	3.65	27.40	36.35	29.46	30.40
Nitrite (μmol kg⁻¹)	n	27	28	11	39	36	9	20	9	5	16	23	10	96	54	255	748	30
	Mean	0.19	0.25	0.25	0.13	0.14	0.23	0.37	0.34	0.21	0.13	0.12	0.13	0.02	0.06	0.01	0.01	0.00
	standard deviation	0.12	0.15	0.15	0.08	0.07	0.14	0.20	0.27	0.10	0.09	0.08	0.14	0.05	0.08	0.04	0.02	0.01
	Minimum	0.02	0.07	0.09	0.02	0.02	0.02	0.04	0.00	0.08	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	Maximum	0.46	0.86	0.62	0.35	0.29	0.50	0.70	0.65	0.34	0.28	0.26	0.50	0.27	0.28	0.55	0.28	0.03

Table S3 Cont.

		PIRATA XVII						PIRATA XVIII						GLODAP				
		TSW	SACW	NACW	AAIW	NADW	AABW	TSW	SACW	NACW	AAIW	NADW	AABW	TSW	SACW	AAIW	NADW	AABW
Phosphate ($\mu\text{mol kg}^{-1}$)	n	26	29	11	36	29	6	20	9	5	25	31	10	113	61	280	840	32
	Mean	0.27	0.67	0.42	1.57	1.38	1.76	0.36	0.82	0.34	2.04	1.44	1.60	0.04	0.87	2.08	1.35	1.79
	standard deviation	0.27	0.57	0.26	0.63	0.22	0.56	0.53	0.69	0.19	0.38	0.34	0.40	0.06	0.44	0.27	0.14	0.20
	Minimum	0.05	0.03	0.07	0.28	1.01	1.14	0.02	0.14	0.10	1.10	0.86	1.03	0.00	0.03	1.39	1.19	1.43
	Maximum	1.03	2.37	0.89	2.54	1.76	2.75	1.10	1.93	0.52	2.67	2.07	2.36	0.42	1.66	2.52	1.94	2.10
Silicate ($\mu\text{mol kg}^{-1}$)	n	27	28	11	38	40	7	19	9	5	23	32	10	107	59	258	787	41
	Mean	11.91	13.74	8.99	20.07	25.98	53.22	3.42	4.32	1.14	15.82	18.67	62.40	1.35	6.54	22.82	26.30	82.88
	standard deviation	9.04	7.22	6.02	6.66	10.50	21.46	3.73	3.56	0.77	6.13	7.64	18.99	1.11	2.62	7.41	8.38	18.11
	Minimum	1.65	4.57	0.87	6.94	14.22	9.43	0.40	0.01	0.54	5.39	3.65	21.85	0.23	1.56	9.44	15.57	45.26
	Maximum	33.67	33.44	21.03	32.66	61.24	76.56	12.55	12.27	0.54	26.89	32.69	84.80	7.47	11.80	33.83	50.80	104.79
O₂ ($\mu\text{mol kg}^{-1}$)	n	16	8	3	22	18	10	21	10	5	30	36	14	168	94	406	1.278	69
	Mean	178.67	129.74	120.26	86.53	233.15	223.22	194.61	142.46	190.29	116.41	245.52	245.00	200.70	147.30	136.40	247.50	238.40
	standard deviation	3.96	34.80	49.89	29.40	15.84	17.93	16.06	32.87	32.04	26.99	15.20	7.07	5.30	25.60	22.50	19.00	8.60
	Minimum	171.67	90.19	70.59	37.91	203.92	181.26	143.79	84.21	139.31	55.70	186.88	231.23	172.50	87.40	61.80	168.10	227.20
	Maximum	185.18	184.74	170.37	147.27	248.36	247.92	214.78	198.24	212.07	161.09	267.06	255.01	210.80	210.80	189.10	266.20	258.60