Supplementary material for Brewer & Peltzer, 2017, Depth Perception: The Need to Report Ocean Biogeochemical Rates as Functions of Temperature, not Depth, *Phil. Trans. R. Soc. A.* doi: 10.1098/rsta.2017.xxxx

Depth Perception: The Need to Report Ocean Biogeochemical Rates as Functions of Temperature, not Depth

All data for this paper comes from previously published reports except as noted in the text. The data for each figure are listed here for the convenience of the reader

Depth	Temp	1/T	AOU	AOUR	ln(AOUR)
m	°C	1/K	umol/kg	umol/kg-yr	mol/kg-s
140	19.330	0.003419	13.51	8.91	-28.896
200	18.825	0.003425	20.31	10.04	-28.776
250	18.528	0.003428	24.49	8.74	-28.915
300	18.262	0.003432	26.60	8.22	-28.976
400	17.665	0.003439	36.75	7.70	-29.042
500	16.401	0.003454	54.22	6.54	-29.205
600	14.936	0.003471	66.25	5.48	-29.382
700	12.741	0.003498	94.84	4.31	-29.622
800	10.156	0.003530	120.02	3.08	-29.958
900	8.197	0.003554	122.53	2.15	-30.317
1000	6.641	0.003574	102.32	2.04	-30.370

Supplementary Table 1: Data for Figure 1: Sargasso Sea Arrhenius activation energy and Eyring / Gibbs Free Energy of activation equation plots. Original data from Stanley et al. [2].

SigTh	Depth	Temp	Temp	OUR(grad)	AOUR	ln(AOUR)
g/L	m	degC	K	umol/kg-yr	mol/kg-sec	
25.0-25.5	164 ± 42	18.50	291.65	10.8	3.4224E-13	-28.703
25.5-26.0	214 ± 56	14.60	287.75	8.3	2.6302E-13	-28.967
26.0-26.2	281 ± 54	12.00	285.15	3.6	1.1408E-13	-29.802
26.2-26.4	353 ± 43	9.96	283.11	4.3	1.3626E-13	-29.624
26.4-26.6	435 ± 34	8.13	281.28	3.3	1.0457E-13	-29.889
26.6-26.8	507 ± 53	6.68	279.83	3.1	9.8235E-14	-29.951
26.8-27.0	598 ± 61	5.98	279.13	0.12	3.8027E-15	-33.203

Supplementary Table 2: Data for Figure 2A: Northeast Pacific along 152W Arrhenius activation energy Eyring / Gibbs Free Energy of activation equation plots. Data is from Table 2 in Sonnerup et al [22].

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			Gradient calculations			Path calculations		
Depth	Temp	Temp	OUR(grad)	AOUR	ln(AOUR)	OUR(path)	AOUR	ln(AOUR)
m	degC	K	umol/kg-yr	mol/kg-sec		umol/kg-yr	mol/kg-sec	
150	19.41	292.56	11.5	3.6442E-13	-28.640	13.8	4.3730E-13	-28.458
200	16.54	289.69	6.5	2.0598E-13	-29.211	23.0	7.2884E-13	-27.947
250	14.06	287.21				17.0	5.3871E-13	-28.250
300	10.71	283.86				13.0	4.1195E-13	-28.518
350	9.17	282.32	4.5	1.4260E-13	-29.579	8.0	2.5351E-13	-29.003
400	7.90	281.05	6.5	2.0598E-13	-29.211	6.5	2.0598E-13	-29.211
450	6.88	280.03	3.5	1.1091E-13	-29.830	4.0	1.2676E-13	-29.697
500	6.57	279.72	3.0	9.5066E-14	-29.984	3.0	9.5066E-14	-29.984
600	5.84	278.99	0.2	6.3378E-15	-32.692	0.2	6.3378E-15	-32.692

Supplementary Table 3: Data for Figures 2B and 2C: Northeast Pacific 20N 152W Arrhenius activation energy and Eyring / Gibbs Free Energy of activation equation plots. Data is from Figure 9 (gradient calculation, for Figure 2B; path calculation, for Figure 2C) in Sonnerup et al. [22]

SigTh	Latitude	WOCE	Depth	Temp	Temp	OUR(grad)	AOUR	ln(AOUR)
g/L	Band	Mid-pt Stn	m	degC	K	umol/kg-yr	mol/kg-sec	
25.5-26.0	30-37S	72	175	14.80	287.95	6.4	2.0281E-13	-29.227
26.0-26.5	30-40S	69	220	10.96	284.11	3.1	9.8235E-14	-29.951
26.5-26.8	30-42S	67	275	7.74	280.89	2.7	8.5560E-14	-30.090
26.8-26.9	30-42S	67	340	7.20	280.35	2.3	7.2884E-14	-30.250
26.9-27.0	30-42S	67	440	6.44	279.59	1.7	5.3871E-14	-30.552
27.0-27.1	30-42S	67	690	5.45	278.60	1.3	4.1195E-14	-30.820
27.1-27.2	30-42S	67	895	4.65	277.80	0.8	2.5351E-14	-31.306

Supplementary Table 4: Data for Figure 3A: Southeast Pacific 32° to 42° S Arrhenius activation energy and Eyring / Gibbs Free Energy of activation equation plots. Data from Sonnerup et al. [24].

SigTh	Latitude	WOCE	Depth	Temp	Temp	OUR(grad)	AOUR	ln(AOUR)
g/L	Band	Mid-pt Stn	m	degC	K	umol/kg-yr	mol/kg-sec	
26.5-26.8	43-47S	49	155	8.42	281.57	16.6	5.2603E-13	-28.273
26.8-26.9	43-50S	46	210	6.85	280.00	4.3	1.3626E-13	-29.624
26.9-27.0	43-50S	46	410	6.36	279.51	1.0	3.1689E-14	-31.083
27.0-27.1	43-54S	42	665	5.53	278.68	0.8	2.5351E-14	-31.306
27.1-27.2	43-54S	42	850	4.74	277.89	0.01	3.1689E-16	-35.688

Supplementary Table 5: Data for Figure 3B: Southeast Pacific 43° to 54° S Arrhenius activation energy and Eyring / Gibbs Free Energy of activation equation plots. Data from Sonnerup et al. [24].

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		Temperature °C						Temp		
Depth	Lat	36.500			37.500			°C		OUR
m	Lon	16.500	17.500	18.500	16.500	17.500	18.500	Mean	Stdev	µmol/kg-yr
125		15.087	15.158	15.235	14.727	14.876	15.001	**15.014**	0.188	**14.39**
150		14.889	14.961	15.039	14.582	14.717	14.834	**14.837**	0.166	**10.09**
200		14.604	14.692	14.762	14.309	14.516	14.607	**14.582**	0.158	**5.81**
250		14.520	14.608	14.681	14.272	14.470	14.558	**14.518**	0.141	**3.83**
300		14.404	14.487	14.556	14.193	14.376	14.455	**14.412**	0.125	**2.75**
400		14.253	14.301	14.350	14.065	14.221	14.287	**14.246**	0.099	**1.69**
500		14.134	14.151	14.168	13.931	14.067	14.106	**14.093**	0.087	**1.19**
600		13.981	13.978	13.969	13.820	13.921	13.937	**13.934**	0.061	**0.92**
700		13.854	13.869	13.873	13.876	13.863	13.859	**13.866**	0.008	**0.76**
800		13.676	13.712	13.728	13.662	13.702	13.719	**13.700**	0.026	**0.65**
900		13.621	13.656	13.671	13.648	13.660	13.671	**13.655**	0.019	**0.58**
1000		13.558	13.590	13.602	13.575	13.595	13.605	**13.588**	0.018	**0.53**

Supplementary Table 6: Data for Figure 4: Eastern Mediterranean Sea Arrhenius activation energy and Eyring / Gibbs Free Energy of activation equation plots. Data from Roether & Well [25].

Station	Depth	OUR	OUR	Temp	Temp
	m	mm	µmol/kg-yr	mm	Deg C
3	100	36.9	10.92	12.0	20.99
3	150	27.8	8.22	32.2	22.66
3	300	26.9	7.96	18.0	21.49
67	100	61.5	18.20	55.1	24.55
67	200	31.6	9.35	24.4	22.01
67	300	31.0	9.17	19.4	21.60
157	100	73.8	21.83	42.8	23.53
157	200	26.5	7.84	24.9	22.05
157	300	26.9	7.96	19.6	21.62
192	100	97.4	28.82	44.9	23.71
192	200	41.9	12.40	27.8	22.29
192	300	27.0	7.99	20.4	21.68
205	100	104.2	30.83	51.0	24.21
205	200	105.0	31.07	24.0	21.98
205	300	31.4	9.29	19.0	21.57

Supplementary Table 7: Red Sea data for Figure 5: All qualified data sets as indicated in the text plotted as an Arrhenius function. For Figure 5 we included all data from all of the previous tables plus this data set from the Red Sea which was not plotted previously. This data is from Zhai et al. [26]. Please note, this data was interpolated from various plots "by hand" from figures for stations 3, 67, 157, 192 & 205. After measuring the offset distances from the axes for each point the distances were converted to the proper units by dividing by the full length of each axis times the data range.

References

Please see the text of the manuscript for the complete citations for the references.