

**Table S1**

Eagle et al., The influence of temperature and seawater carbonate saturation state on 13C-18O bond ordering in bivalve mollusks, Biogeosciences, 2012  
 Conversion of published data to absolute reference frame  
 Using transfer function proposed by Dennis et al. (2011) Geochim. Cosmochim. Acta. 75(22): 7117-7131  
 In most cases the transfer function is carried out using heated gas data and NBS-19 standard data, unless other standard data is available  
 In cases where carbonate standard data was not reported in publications we use accepted values from our laboratory based on long term (n>50) analysis

Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Ghosh et al., 2006	Synthetic calcite		0.550	0.011	50	2	9.576	0.598	NBS-19	Ghosh et al., 2006	0.352	0.392
Ghosh et al., 2006	Synthetic calcite		0.770	0.016	1	0.2	13.305	0.826	Heated gas	As described in Dennis et al, 2011	0	0.0266
Ghosh et al., 2006	Synthetic calcite		0.600	0.015	33	2	10.669	0.649				
Ghosh et al., 2006	Synthetic calcite		0.650	0.025	23	1	11.402	0.701				
Ghosh et al., 2006	Synthetic calcite		0.710	0.014	23	1	11.402	0.764				
Ghosh et al., 2006	Synthetic calcite		0.620	0.025	23	1	11.402	0.670				
Ghosh et al., 2006	Synthetic calcite		0.550	0.014	50	2	9.576	0.598				
Ghosh et al., 2006	Deep Sea Coral	<i>Desmophyllum dianthus</i>	0.740	0.019	5.5	1	12.879	0.795				
Ghosh et al., 2006	Deep Sea Coral	<i>Desmophyllum dianthus</i>	0.740	0.012	8	0.5	12.651	0.795				
Ghosh et al., 2006	Indonesian Surface Coral	<i>Porites</i> sp.	0.630	0.034	29.3	2	10.932	0.681				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.630	0.030				0.681				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.630	0.030				0.681				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.640	0.030				0.691				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.650	0.030				0.701				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.690	0.020				0.743				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.720	0.010				0.774				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.720	0.030				0.774				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.720	0.020				0.774				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.770	0.000				0.826				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.750	0.010				0.805				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.740	0.030				0.795				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.750	0.010				0.805				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.670	0.020				0.722				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.770	0.030				0.826				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.680	0.020				0.732				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.640	0.020				0.691				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.690	0.010				0.743				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.690	0.020				0.743				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.630	0.030				0.681				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.640	0.010				0.691				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.670	0.030				0.722				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.650	0.020				0.701				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.640	0.030				0.691				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.650	0.000				0.701				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.720	0.010				0.774				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.680	0.010				0.732				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.730	0.030				0.784				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.680	0.030				0.732				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.680	0.020				0.732				
Ghosh et al., 2006	Red Sea Porites Coral	<i>Porites</i> sp.	0.710	0.020				0.764				
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Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Ghosh et al., 2007	Fish otolith	<i>Patagonotothen ramsayi</i>	0.725	0.022	5	2	12.925	0.779	NBS-19	Accepted Caltech value	0.352	0.392
Ghosh et al., 2007	Fish otolith	<i>Lutjanus malabaricus</i>	0.642	0.013	25	3	11.249	0.693	Heated gas	As described in Dennis et al, 2011	0	0.0266
Ghosh et al., 2007	Fish otolith	<i>Reinhardtius hippoglossoides</i>	0.761	0.010	2	2	13.209	0.817				
Ghosh et al., 2007	Fish otolith	<i>Lutjanus analis</i>	0.647	0.029	20	2	11.636	0.698				
Ghosh et al., 2007	Fish otolith	<i>Gadus marhua</i>	0.704	0.009	7	2	12.741	0.757				
Ghosh et al., 2007	Fish otolith	<i>Pogonias cromis</i>	0.693	0.025	15	2	12.044	0.746				
Ghosh et al., 2007	Fish otolith	<i>Lutjanus synagris</i>	0.650	0.011	25	2	11.249	0.701				
Ghosh et al., 2007	Fish otolith	<i>Gadus marhua</i>	0.739	0.021	3	2	13.113	0.794				
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Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Came et al., 2007	Brachiopod	<i>Tichosina floridensis</i>	0.650	0.007	21.5	0.5	11.518	0.701	NBS-19	Accepted Caltech value	0.352	0.392
Came et al., 2007	Brachiopod	<i>Thecidellina blochmanni</i>	0.640	0.011	24.5	0.5	11.287	0.691	Heated gas	As described in Dennis et al, 2011	0	0.0266
Came et al., 2007	Brachiopod	<i>Terebratulina septentrionalis</i>	0.720	0.012	10	0.5	12.473	0.774				
Came et al., 2007	Mollusk	<i>Arctica islandica</i>	0.710	0.005	8.8	0.5	12.579	0.764				
Came et al., 2007	Mollusk	<i>Chlamys islandica</i>	0.740	0.008	3.6	0.5	13.056	0.795				

Came et al., 2007

Mollusk

*Paphia crassiscula*

0.640

0.012

28

0.5

11.026

0.691

Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Tripati et al., 2010	Planktic foraminifera	<i>Pulleniatina obliquiloculata</i>	0.655	0.034	23.0	3.0	11.402	0.707	NBS-19	Accepted Caltech value	0.352	0.392
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.658	0.038	24.5	1.5	11.287	0.710	Heated gas	As described in Dennis et al, 2011	0	0.0266
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.638	0.002	24.0	2.0	11.325	0.688				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.654	0.007	23.5	2.5	11.363	0.705				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.625	0.009	29.2	0.4	10.939	0.676				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.628	0.010	29.2	0.4	10.939	0.679				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides ruber</i>	0.627	0.010	29.2	0.4	10.939	0.677				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.637	0.003	29.2	0.4	10.939	0.688				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.634	0.047	27.0	1.0	11.100	0.684				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.643	0.021	28.0	1.0	11.026	0.694				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.658	0.009	23.5	0.5	11.363	0.710				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.668	0.009	22.0	3.0	11.479	0.720				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (without sac)	0.644	0.002	26.8	2.0	11.115	0.695				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerinoides sacculifer</i> (with sac)	0.657	0.009	21.0	3.0	11.557	0.708				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerina bulloides</i>	0.697	0.009	14.7	1.0	12.069	0.750				
Tripati et al., 2010	Planktic foraminifera	<i>Globigerina bulloides</i>	0.723	0.019	9.1	1.0	12.553	0.777				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia menardii</i>	0.658	0.006	22.5	2.5	11.440	0.710				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia menardii</i>	0.692	0.008	21.0	3.0	11.557	0.744				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia hirsuta</i>	0.702	0.014	13.5	0.5	12.170	0.756				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia tumida</i>	0.641	0.007	17.0	5.0	11.878	0.692				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia tumida</i>	0.660	0.009	17.0	5.0	11.878	0.711				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia tumida</i>	0.661	0.005	17.0	5.0	11.878	0.713				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia tumida</i>	0.669	0.012	17.0	5.0	11.878	0.721				
Tripati et al., 2010	Planktic foraminifera	<i>Globorotalia truncatulinoides</i>	0.665	0.010	14.9	3.0	12.052	0.716				
Tripati et al., 2010	Benthic foraminifera	<i>Uvigerina semiornata</i>	0.703	0.010	13.0	0.2	12.213	0.756				
Tripati et al., 2010	Benthic foraminifera	<i>Uvigerina semiornata</i>	0.685	0.005	16.1	0.2	11.956	0.738				
Tripati et al., 2010	Benthic foraminifera	<i>Uvigerina semiornata</i>	0.683	0.003	19.9	0.2	11.643	0.736				
Tripati et al., 2010	Benthic foraminifera	<i>Hoeglundina elegans</i>	0.660	0.007	19.9	0.2	11.643	0.712				
Tripati et al., 2010	Benthic foraminifera	<i>Hoeglundina elegans</i>	0.755	0.013	2.8	0.2	13.129	0.810				
Tripati et al., 2010	Benthic foraminifera	<i>Bicoidoides mundulus</i>	0.752	0.003	2.4	0.2	13.174	0.807				
Tripati et al., 2010	Benthic foraminifera	<i>Planulina wuellerstorfi</i>	0.754	0.011	2.4	0.2	13.174	0.810				
Tripati et al., 2010	Benthic foraminifera	<i>Oridorsalis umbonatus</i>	0.740	0.005	2.4	0.2	13.174	0.795				
Tripati et al., 2010	Benthic foraminifera	<i>Planulina wuellerstorfi</i>	0.732	0.007	-0.8	0.2	13.482	0.786				
Tripati et al., 2010	Benthic foraminifera	<i>Oridorsalis umbonatus</i>	0.751	0.009	-0.8	0.2	13.482	0.806				
Tripati et al., 2010	Benthic foraminifera	Mixed species	0.758	0.014	1.4	0.2	13.267	0.813				
Tripati et al., 2010	Cultured coccolith	<i>Emiliani huxleyi</i>	0.685	0.007	15.0	0.1	12.044	0.737				
Tripati et al., 2010	Cultured coccolith	<i>Coccolithicus pelagicus</i>	0.713	0.007	10.0	0.1	12.473	0.767				
Tripati et al., 2010	Bulk carbonate	Mixed species	0.723	0.008	9.5	1.0	12.517	0.777				
Tripati et al., 2010	Bulk carbonate	Mixed species	0.698	0.011	14.0	1.0	12.128	0.752				
Tripati et al., 2010	Bulk carbonate	Mixed species	0.746	0.016	9.1	1.0	12.553	0.801				
Tripati et al., 2010	Bulk carbonate	Mixed species	0.633	0.001	29.2	0.4	10.939	0.684				
Tripati et al., 2010	Benthic foraminifera	<i>Planulina wuellerstorfi</i>	0.739	0.008	3.3	2.0	13.084	0.794				
Tripati et al., 2010	Benthic foraminifera	<i>Melonis pompilioides</i>	0.735	0.007	3.3	2.0	13.084	0.789				
Tripati et al., 2010	Benthic foraminifera	<i>Gyroidina sp.</i>	0.729	0.011	4.3	2.0	12.991	0.783				

Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Eagle et al., 2010	Rhino tooth	<i>Ceratotherium simum</i>	0.597	0.006	37	0.5	10.396	0.654	NBS-19	Eagle et al., 2010	0.361	0.392
Eagle et al., 2010	Elephant tooth	<i>Elephas maximus</i>	0.596	0.008	37	0.5	10.396	0.653	Heated gas	As described in Dennis et al, 2011	0	0.0266
Eagle et al., 2010	Crocodile tooth	<i>Crocodylus niloticus</i>	0.638	0.006	28	3	11.026	0.698	102-GC-AZ01	Eagle et al., 2010	0.646	0.713
Eagle et al., 2010	Alligator tooth	<i>Alligator mississippiensis</i>	0.639	0.011	28	3	11.026	0.699				
Eagle et al., 2010	Tiger shark teeth	<i>Carcharias taurus</i>	0.641	0.013	25.3	0.5	11.227	0.701				
Eagle et al., 2010	Tiger shark teeth	<i>Carcharias taurus</i>	0.654	0.010	23.6	0.5	11.356	0.715				

Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^6/T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Dennis and Schrag, 2010	Synthetic calcite		0.656	0.007	7.5		12.696	0.718	Harvard Carrara Marble	Dennis et al., 2011	0.334	0.385
Dennis and Schrag, 2010	Synthetic calcite		0.677	0.006	10		12.473	0.740	Heated gas	As described in Dennis et al, 2011	0	0.0266
Dennis and Schrag, 2010	Synthetic calcite		0.649	0.024	15		12.044	0.710				
Dennis and Schrag, 2010	Synthetic calcite		0.620	0.015	15		12.044	0.680				
Dennis and Schrag, 2010	Synthetic calcite		0.629	0.019	20		11.636	0.689				
Dennis and Schrag, 2010	Synthetic calcite		0.691	0.028	20		11.636	0.755				
Dennis and Schrag, 2010	Synthetic calcite		0.640	0.004	25		11.249	0.701				
Dennis and Schrag, 2010	Synthetic calcite		0.608	0.014	30		10.881	0.667				

Dennis and Schrag, 2010 Synthetic calcite  
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0.612 0.002 30 10.881 0.671  
 0.586 0.014 40 10.198 0.644  
 0.549 0.014 50 9.576 0.605  
 0.562 0.015 60 9.010 0.619  
 0.530 0.008 70 8.492 0.585  
 0.555 0.019 70 8.492 0.611  
 0.526 0.015 77 8.156 0.581

Publication	Material	Taxa (where given)	$\Delta_{17}$ (‰) (SD)	1 s.e.	Growth T (°C)	T (°C) error (where given)	$10^7 T^2$ (T in Kelvin)	Calculated Sample $\Delta_{17}$ (ARF)	Parameter Used For Transfer Function	Source of standard $\Delta_{17}$ (SD) data	Measured or assumed $\Delta_{17}$ (SD)	Accepted $\Delta_{17}$ (ARF) (Dennis et al., 2011)
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.733	0.007	7.9		12.660	0.788	NBS-19 heated gas	Accepted Caltech value As described in Dennis et al, 2011	0.352	0.392
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.736	0.006	7.9		12.660	0.791				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.732	0.009	7.9		12.660	0.786			0	0.0266
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.736	0.008	7.9		12.660	0.791				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.722	0.005	7.9		12.660	0.776				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.726	0.007	7.9		12.660	0.780				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.697	0.006	7.9		12.660	0.750				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.707	0.009	13.1		12.204	0.761				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.695	0.008	13.1		12.204	0.748				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.717	0.010	13.1		12.204	0.771				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.749	0.006	4.2		13.000	0.804				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.762	0.010	9.8		12.491	0.818				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.715	0.005	9.8		12.491	0.769				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.727	0.008	9.8		12.491	0.781				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.772	0.008	2.3		13.180	0.828				
Thiagarajan et al., 2011	Coral	<i>Desmophyllum</i>	0.744	0.010	3.7		13.047	0.799				
Thiagarajan et al., 2011	Coral	<i>Ennalopsammia</i>	0.675	0.004	14.3		12.103	0.727				
Thiagarajan et al., 2011	Coral	<i>Ennalopsammia</i>	0.738	0.009	7.5		12.696	0.793				
Thiagarajan et al., 2011	Coral	<i>Caryophyllia</i>	0.688	0.011	17.4		11.846	0.741				
Thiagarajan et al., 2011	Coral	<i>Caryophyllia</i>	0.744	0.008	4.6		12.963	0.799				
Thiagarajan et al., 2011	Coral	<i>Caryophyllia</i>	0.744	0.008	6.1		12.824	0.799				
Thiagarajan et al., 2011	Coral	<i>Porites</i>	0.650	0.006	25.2		11.234	0.701				
Thiagarajan et al., 2011	Coral	<i>Porites</i>	0.639	0.006	25.2		11.234	0.690				
Thiagarajan et al., 2011	Coral	<i>Porites</i>	0.648	0.005	25.2		11.234	0.699				
Thiagarajan et al., 2011	Coral	<i>Porites</i>	0.615	0.007	25.2		11.234	0.665				

SD = Relative to the stochastic distribution. Also referred to as data in the Caltech Intralaboratory reference frame. Includes the acid digestion correction of 0.08. ± Values are one standard error  
 ARF = Values given on the absolute reference frame