Data Repository Appendix 1. Oxygen isotopic compositions of mollusks and isotopic temperatures for each formation.

Formation name	Age (Ma)	Number of shells	δ_w (‰)	Mollusk $\delta^{18}O$ (‰)		Temperature (°C)				Paleodepth
				Min ± 1σ	Max ± 1σ	Summer	MAT*	Winter	MART*	
Alligator Point, FL (present)	0	3	1.04	-1.2 ± 0.63	1.2 ± 0.49	29.5 (30)	24.1 (22)	18.8 (14)	10.6 (16)	shallow
Chipola fm., FL	17	3	0.09	-2.3 ± 0.74	0.3 ± 0.23	30.2	24.4	18.7	11.5	shallow
Byram fm., MS	30	5	0.54	-1.2 ± 0.16	1.1 ± 0.38	27.1	22.1	17.1	10.0	shallow
Mint Spring fm., MS	32	6	0.44	-1.0 ± 0.33	0.5 ± 0.51	26.1	22.8	19.4	6.7	shallow
Red Bluff fm., MS	33	6	0.84	0.2 ± 0.33	1.4 ± 0.51	22.6	20.0	17.4	5.2	deeper
Yazoo fm., MS	36	5	0.04	-0.5 ± 0.24	0.2 ± 0.09	21.8	20.3	18.8	3.0	deeper
Moodys Branch fm., MS	38	7	0.24	-1.7 ± 0.78	0.1 ± 0.37	28.0	24.2	20.4	7.6	shallow
Gosport Sand, AL	39	6	0.14	-1.8 ± 0.61	-0.4 ± 0.73	28.2	25.2	22.1	6.1	shallow
Cook Mountain fm., MS	40.5	6	0.04	-1.0 ± 0.29	0.2 ± 0.30	24.1	21.5	18.9	5.1	shallow
Dobys Bluff fm., MS	42	4	-0.06	-2.1 ± 0.63	-0.8 ± 0.66	28.6	25.7	22.9	5.7	shallow
Hatchetigbee fm., MS	53	2	-0.36	-2.6 ± 0.27	-0.8 ± 0.41	29.6	25.6	21.6	8.0	shallow
Bashi fm., MS	54	4	-0.36	-2.6 ± 0.32	-1.4 ± 0.39	29.4	26.9	24.3	5.2	shallow

*MAT = mean annual temperature, MART = mean annual range in temperature

Data Repository Appendix 2. Oxygen isotopic compositions of mollusk shells, isotopic temperatures, and sample locations.

Sample number*	Species	Number of analyses	$\delta^{18}O$ (‰)				Temperature (°C)				Formation, Location
			Min	Mid	Max	Amplitude	Max	MAT	Min	Range	
MOC2	*Conus spurious atlanticus*	101	-0.7	0.3	1.3	2.0	27.2	23.0	18.7	8.5	Alligator Pt., FL (29°54'N, 84°31'N)
MOC3	*Conus floridanos*	44	-1.3	0.2	1.7	3.0	29.9	23.4	16.9	12.9	Alligator Pt., FL (29°54'N, 84°31'N)
MOC5	*Conus floridanos*	58	-1.6	-0.4	0.8	2.4	31.3	26.1	20.9	10.4	Alligator Pt., FL (29°54'N, 84°31'N)
CFC1	*Conus sulculus*	83	-2.0	-0.9	0.2	2.2	28.8	24.1	19.4	9.4	Chipola Fm., Ten Mile Creek, Calhoun Co., FL
CFC2	*Conus sulculus*	64	-1.8	-0.8	0.2	2.2	28.0	23.5	19.1	8.9	Chipola Fm., Ten Mile Creek, Calhoun Co., FL
CFC3	*Conus sulculus*	39	-3.2	-1.3	0.6	3.8	33.8	25.7	17.6	16.3	Chipola Fm., Ten Mile Creek, Calhoun Co., FL
BFC1	*Conus alveatus*	53	-1.3	0.2	1.6	3.0	27.7	21.4	15.1	12.6	Byram fm., Redwood (loc. 114), MS
BFC2	*Conus alveatus*	49	-0.9	-0.0	0.9	1.8	26.0	22.1	18.2	7.7	Byram fm., Keyes Scrap Metal, Vicksburg, Warren Co., MS
BFC3	*Conus alveatus*	56	-1.2	-0.0	1.1	2.3	27.2	22.2	17.2	10.1	Byram fm., Keyes Scrap Metal, Vicksburg, Warren Co., MS
BFC4	*Conus alveatus*	49	-1.2	0.1	1.4	2.5	27.3	21.6	16.0	11.3	Byram fm., Keyes Scrap Metal, Vicksburg, Warren Co., MS
BFC5	*Conus alveatus*	103	-1.3	-0.3	0.7	1.9	27.5	23.3	19.2	8.3	Byram fm., Keyes Scrap Metal, Vicksburg, Warren Co., MS
MSC1	*Conus alveatus*	52	-0.7	0.2	1.1	1.9	24.7	20.8	16.8	7.9	Mint Spring fm., (loc. 99), MS
MSC2	*Conus alveatus*	77	-0.7	0.0	0.7	1.4	24.7	21.6	18.4	6.3	Mint Spring fm. (loc. 110), Warren County, MS
MST1	*Turritella caelatura*	31	-0.8	-0.3	0.2	0.9	25.0	23.0	20.9	4.1	Mint Spring fm. (loc. 110), Warren County, MS
MST2	*Turritella caelatura*	67	-1.4	-0.4	0.7	2.1	27.9	23.2	18.6	9.3	Mint Spring fm. (loc. 110), Warren County, MS
MST3	*Turritella caelatura*	33	-1.3	-0.8	-0.3	1.0	27.3	25.2	23.0	4.3	Mint Spring fm. (loc. 110), Warren County, MS
MST4	*Turritella caelatura*	30	-1.3	-0.3	0.6	1.9	27.0	23.0	18.9	8.2	Mint Spring fm. (loc. 110), Warren County, MS
RBC1	*Conus alveatus*	49	-0.2	0.5	1.2	1.4	24.0	21.2	18.3	5.8	Red Bluff fm., Hiwannee, Wayne County, MS
RBC2	*Conus alveatus*	102	-0.1	0.7	1.4	1.5	23.8	20.5	17.1	6.7	Red Bluff fm., Hiwannee, Wayne County, MS
RBC3	*Conus alveatus*	98	-0.2	0.6	1.4	1.6	24.1	20.8	17.4	6.7	Red Bluff fm., Hiwannee, Wayne County, MS
RBT1	*Turritella rubricollis*	31	0.6	1.1	1.5	0.9	20.7	18.8	16.8	3.9	Red Bluff fm., Hiwannee, Wayne County, MS
RBT2	*Turritella rubricollis*	24	0.7	1.0	1.4	0.7	20.4	18.9	17.3	3.1	Red Bluff fm., Hiwannee, Wayne County, MS
RBT3	*Turritella rubricollis*	66	0.2	0.8	1.4	1.2	22.6	20.0	17.5	5.1	Red Bluff fm., Hiwannee, Wayne County, MS
YCC1	*Conus spp*	50	-0.4	-0.1	0.2	0.5	21.4	20.2	18.9	2.5	Yazoo Clay, Miss Lite Clay Pit, Cynthia, Hinds Co., MS
YCT2	*Turritella arenlcola*	31	-0.5	-0.2	0.1	0.6	22.0	20.7	19.4	2.7	Yazoo Clay, Miss Lite Clay Pit, Cynthia, Hinds Co., MS
YCT4	*Turritella arenicola danvillensis*	40	-0.8	-0.2	0.4	1.2	23.5	20.9	18.4	5.2	Yazoo Clay, Miss Lite Clay Pit, Cynthia, Hinds Co., MS
YCT5	*Turritella arenicola danvillensis*	32	-0.3	-0.1	0.2	0.5	21.4	20.1	18.9	2.5	Yazoo Clay, Miss Lite Clay Pit, Cynthia, Hinds Co., MS
YCT6	*Turritella arenicola danvillensis*	33	-0.2	0.1	0.3	0.5	20.8	19.6	18.5	2.3	Yazoo Clay, Miss Lite Clay Pit, Cynthia, Hinds Co., MS
MBC1	*Conus tortilis*	155	-1.1	-0.5	0.0	1.1	25.4	23.0	20.6	4.8	Moodys Branch fm., Town Creek (loc. 1), Jackson, MS
MBC2	*Conus tortilis*	297	-1.1	-0.6	-0.1	1.0	25.5	23.3	21.2	4.2	Moodys Branch fm., Town Creek (loc. 1), Jackson, MS
MBT1	*Turritella perdita*	45	-1.3	-0.7	-0.1	1.2	26.3	23.8	21.2	5.1	Moodys Branch fm., Garland Creek (Loc. 9), MS
MBT2	*Turritella arenlcola*	42	-1.7	-0.7	0.3	2.1	28.3	23.8	19.4	8.9	Moodys Branch fm., Garland Creek (Loc. 9), MS
MBT4	*Turritella spp*	29	-1.4	-0.4	0.6	2.0	26.7	22.4	18.1	8.6	Moodys Branch fm., MS
MBT5	*Turritella spp*	25	-3.3	-1.9	-0.5	2.8	35.1	29.0	22.9	12.2	Moodys Branch fm., MS
MBV1	*Venericardia apodensata*		-1.8	-0.7	0.4	2.2	28.6	23.9	19.2	9.4	Moodys Branch fm., MS
GSC1	*Conus sauridens*	35	-1.5	-1.1	-0.7	0.8	26.8	25.0	23.3	3.5	Gosport Sand, Claiborne Bluff, AL
GSM1	*Mesalia vetusta*	39	-2.0	-1.4	-0.9	1.1	29.0	26.6	24.1	4.8	Gosport Sand, Little Slave Creek, AL
GSM2	*Mesalia vetusta*	27	-0.9	-0.6	-0.3	0.7	24.1	22.9	21.8	2.3	Gosport Sand, Little Slave Creek, AL
GSM3	*Mesalia vetusta*	34	-2.2	-1.8	-1.3	0.9	29.9	28.0	26.1	3.7	Gosport Sand, Little Slave Creek, AL
GSM4	*Mesalia vetusta*	29	-2.6	-1.3	0.1	2.7	31.7	25.8	20.0	11.7	Gosport Sand, Little Slave Creek, AL
GST1	*Turritella nasula*	52	-1.8	-0.5	0.7	2.5	28.1	22.6	17.2	10.9	Gosport Sand, Little Slave Creek, AL
CMT1	*Turritella rina*	24	-1.0	-0.5	-0.1	0.8	24.0	22.2	20.4	3.6	Cook Mountain fm., Newton exit, I-20, MS
CMT2	*Turritella rina*	21	-0.4	0.0	0.5	0.9	21.6	19.7	17.8	3.8	Cook Mountain fm., Newton exit, I-20, MS
CMT3	*Turritella spp*	27	-1.1	-0.6	-0.1	1.0	24.6	22.4	20.1	4.5	Cook Mountain fm., Newton exit, I-20, MS
CMT4	*Turritella spp*	31	-1.1	-0.5	0.1	1.2	24.8	22.1	19.4	5.4	Cook Mountain fm., Newton exit, I-20, MS
CMT5	*Turritella spp*	29	-1.0	-0.4	0.3	1.3	24.2	21.4	18.7	5.5	Cook Mountain fm., Newton exit, I-20, MS
CMT7	*Turritella spp*	24	-1.2	-0.3	0.6	1.8	25.1	21.1	17.1	8.0	Cook Mountain fm., Newton exit, I-20, MS
DBC1	*Conus sauridens*	35	-2.7	-2.1	-1.5	1.2	31.1	28.4	25.7	5.4	Dobys Bluff member, Kosciusko fm., Chickasawhay River, MS

DBC4	*Conus sauridens*	49	-2.1	-1.2	-0.4	1.7	28.3	24.8	21.2	7.1	Dobys Bluff member, Kosciusko fm., Chickasawhay River, MS
DBT2	*Turritella spp*	35	-1.3	-0.7	-0.1	1.2	24.9	22.3	19.8	5.1	Dobys Bluff member, Kosciusko fm., Chickasawhay River, MS
DBV1	*Venericardia spp*	68	-2.4	-1.8	-1.3	1.2	29.9	27.4	24.9	5.0	Dobys Bluff member, Kosciusko fm.,
HFV1	*Venericardia spp*	30	-2.8	-1.7	-0.5	2.3	30.5	25.4	20.4	10.1	Hatchetigbee fm., Hatchetigbee Bluff, Tombigbee River, Washington Co., AL
HFV2	*Venericardia spp*	52	-2.5	-1.8	-1.1	1.4	28.8	25.8	22.9	5.9	Hatchetigbee fm., Hatchetigbee Bluff, Tombigbee River, Washington Co., AL
BSV1	*Venericardia spp*	50	-2.8	-2.2	-1.6	1.2	30.3	27.8	25.3	5.0	Bashi fm., Red Hot Truck Stop locality, Meridian, Lauderdale Co., MS
BSV2	*Venericardia spp*	30	-2.2	-1.9	-1.5	0.7	27.8	26.3	24.8	3.0	Bashi fm., Red Hot Truck Stop locality, Meridian, Lauderdale Co., MS
BSV3	*Venericardia spp*	32	-2.9	-2.3	-1.6	1.2	30.9	28.0	25.2	5.7	Bashi fm., Red Hot Truck Stop locality, Meridian, Lauderdale Co., MS
BSV4	*Venericardia spp*	29	-2.5	-1.6	-0.8	1.5	28.8	25.3	21.8	7.0	Bashi fm., Red Hot Truck Stop locality, Meridian, Lauderdale Co., MS

*Sample name abbreviations: MO = modern ocean, CF = Chipola fmn, BF = Byram Formation, MS = Mint Spring formation, RB = Red Bluff formation, YC = Yazoo Clay, MB = Moodys Branch formation, GS = Gosport Sand, CM = Cook Mountain formation, DB = Dobys Bluff Tongue of the Kosciusko formation, HF = Hatchetigbee formation, and BS = Bashi formation; C = *Conus*, T = *Turritella*, and V = *Venericardia*.