Paleoceanography and Paleoclimatology

Supporting Information for

Deglacial ventilation changes in the deep Southwest Pacific

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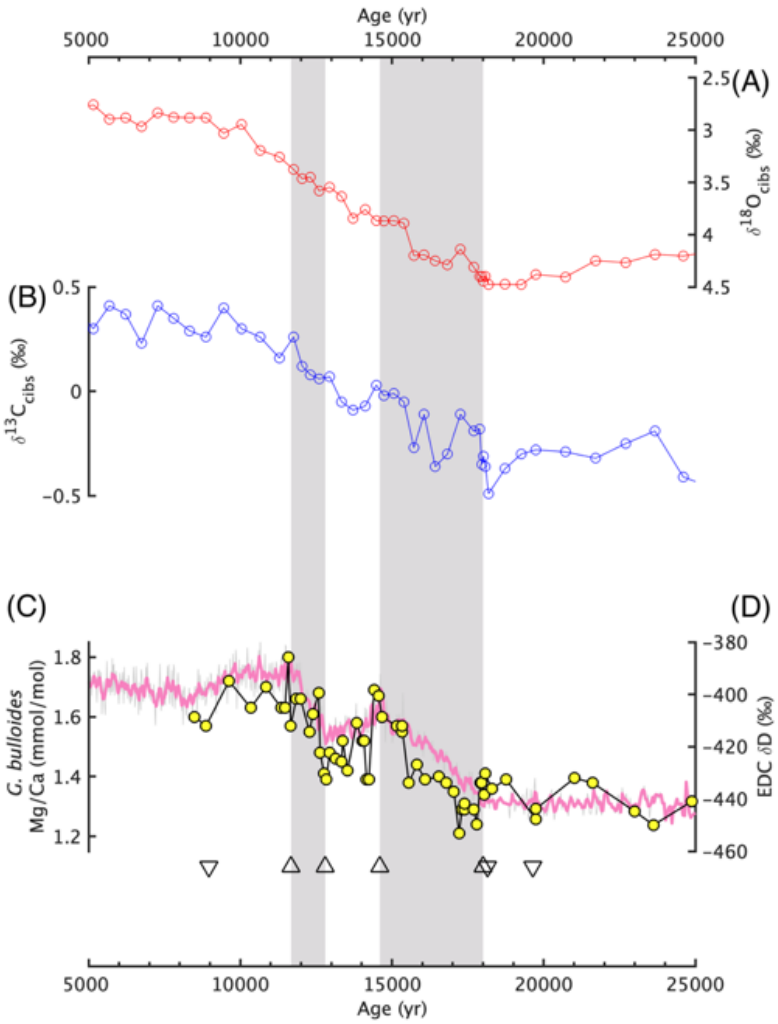

Figure S1. (A) and (B) are $\delta^{18}O$ and $\delta^{13}C$, respectively, of benthic foraminifera *Cibicidoides spp*. [*Moy et al.*, 2006] at MD97-2106 tuned to age model in this study. (C) Mg/Ca in *G. bulloides* at MD97-2106, (D) δD record at EDC [Members, 2013]. Upward triangles indicate age tie-points based on Mg/Ca-SST, downward triangles indicate age tie-points based on planktic radiocarbon.

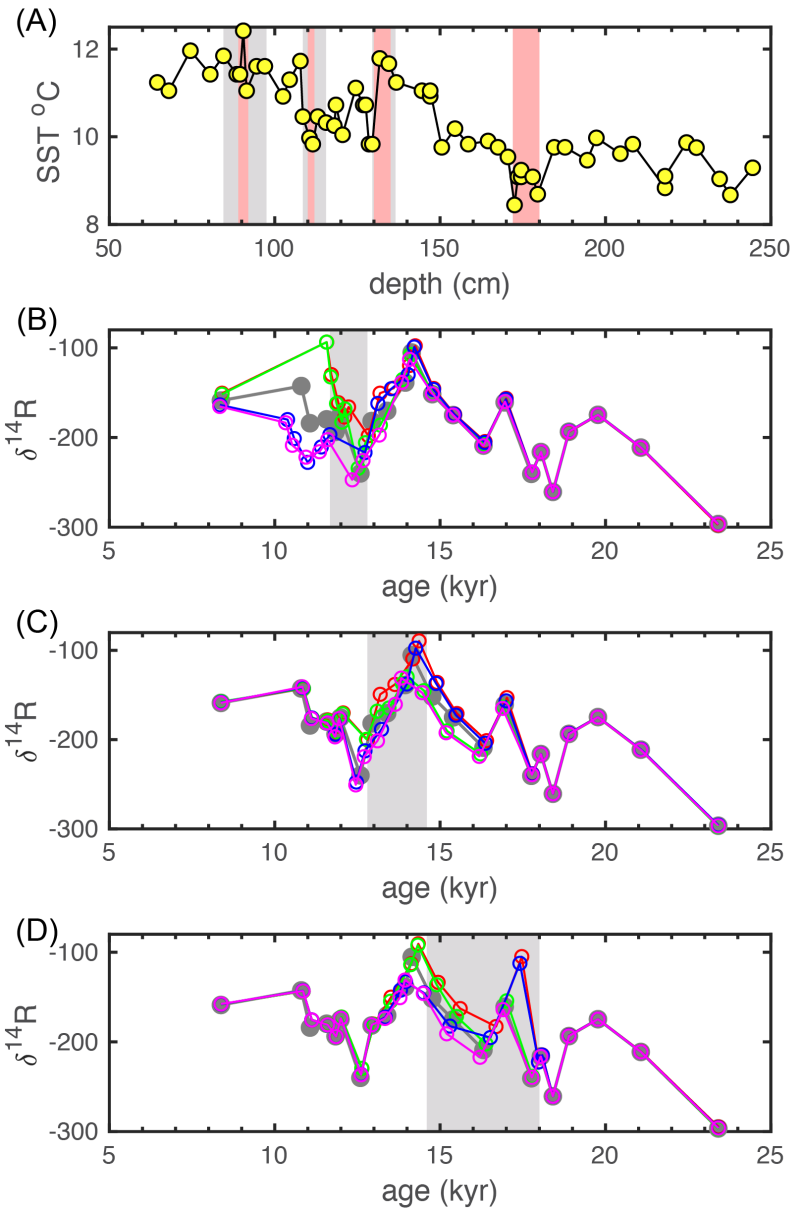

Figure S2. Sensitivity tests for the age model. (A) Mg/Ca-based SST record at MD97-2106 on the depth scale. Four red bars show the tie-points of the SST to the Antarctic δD record. The grey area associated with each red line indicates the range, within which each tie-point is shifted to generate alternative age models. (B) MD97-2106 δ^{14}R records with tie-points for beginning and ending points of the YD shifted. The filled gray circles are the δ^{14}R record presented in the main text. The empty circles represent δ^{14}R record with alternative age models. Red circles: both beginning and ending of the YD shifted to the shallowest depths within their respective ranges in the sediment. Green circles: ending of the YD shifted to the shallowest depth, and beginning of the YD shifted to the deepest depth. Blue circles: ending of the YD shifted to the deepest depth, and beginning of the YD shifted to the shallowest depth. Magenta circles: both beginning and ending of the YD shifted to the deepest depths. (C) and (D): the same as (B), but for the ACR and HS1, respectively.

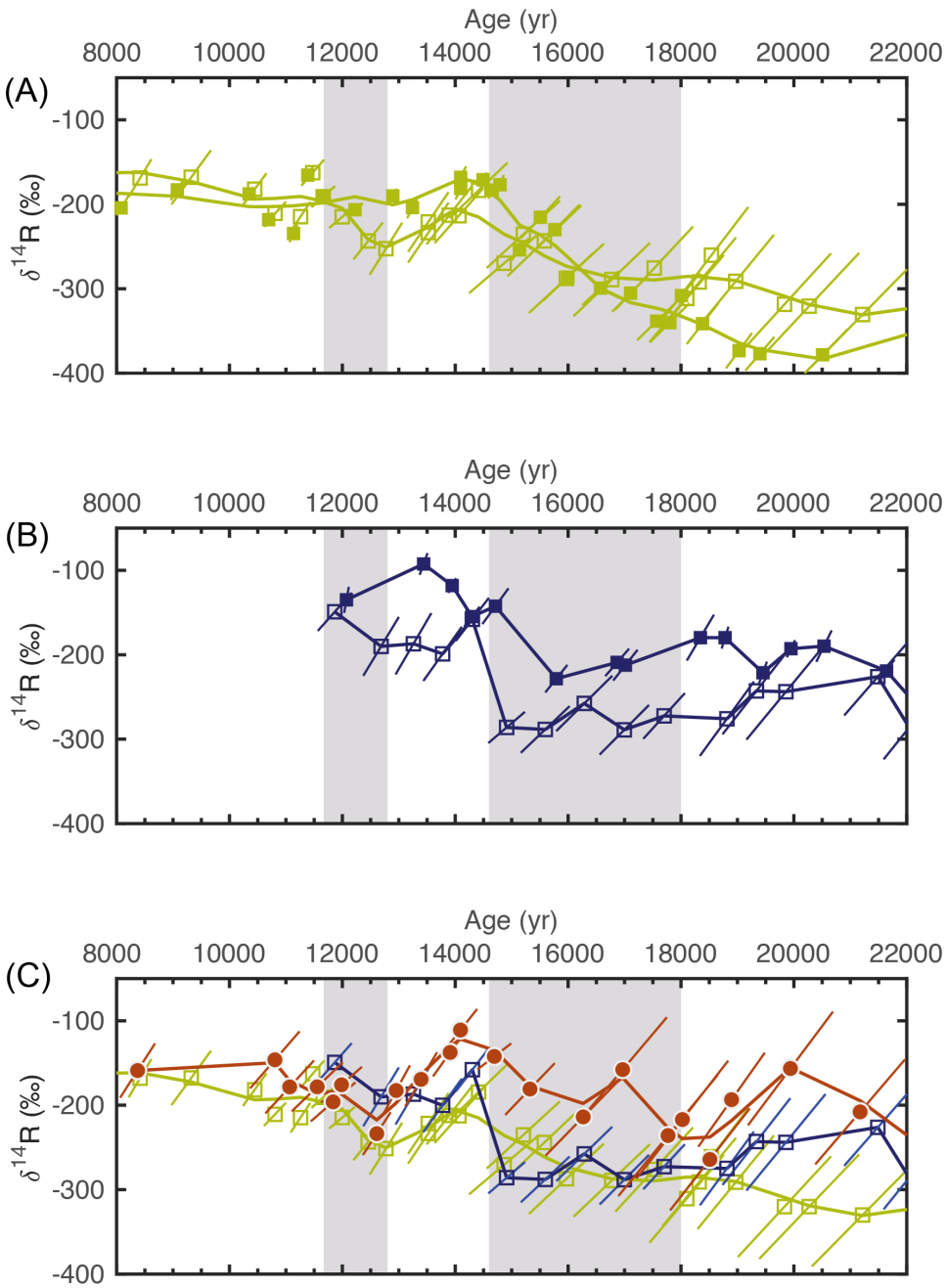

Figure S3. (A) Comparison between MD07-3076 δ^{14}R calculated using original age model [*Skinner et al.*, 2010] (solid squares, dashed line) and that calculated using the age model from *Waelbroeck et al.* [2019] (empty squares, solid line). (B) same as (A), but for TNO57-21 [*Barker et al.*, 2010]. (C) Comparison of MD97-2106 δ^{14}R record with two deep South Atlantic δ^{14}R records MD07-3076 and TNO57-21 based on age models from *Waelbroeck et al.* [2019].

Table S1. Age model of sediment core MD97-2016.

Depth top	*Depth bottom*	*Type*	*Radiocarbon age*	*1 sigma*	*Reservoir age*	*1 sigma*	*Tie point age*	*1 sigma*	*Reference*
cm	*cm*		*yr*	*yr*	*yr*	*yr*	*yr*	*yr*	
3	5	Radiocarbon	2497	65	500	100			Moy et al. (2006)
68	70	Radiocarbon	8486	45	500	100			Moy et al. (2006)
89	92	Tie-point					11670	200	This study
110	112	Tie-point					12800	200	This study
130	135	Tie-point					14600	200	This study
172	180	Tie-point					18030	200	This study
203	205	Radiocarbon	16079	70	1155	500			Moy et al. (2006)
217	219	Radiocarbon	17428	61	1155	500			This study
253	255	Radiocarbon	23530	140	1155	500			Moy et al. (2006)

Table S2. Trace element to calcium ratios in *G. bulloides*.

Depth top	*Depth middle*	*Calendar age*	*Mg/Ca*	*Al/Ca*	*Mn/Ca*
cm	*cm*	*kyr*	*mmol/mol*	*µmol/mol*	*µmol/mol*
64	64.5	8.4	1.60	4	20
67	68	8.8	1.57	0	14
74	74.5	9.5	1.72	11	23
80	80.5	10.3	1.63	0	18
84	84.5	10.8	1.70	11	16
88	88.5	11.3	1.63	0	17
89	89.5	11.5	1.63	0	17
90	90.5	11.6	1.80	12	13
91	91.5	11.6	1.57	0	18
94	94.5	11.8	1.66	10	17
96	97	12.0	1.66	3	20
102	102.5	12.3	1.55	2	21
104	104.5	12.4	1.61	17	19
107	107.75	12.6	1.68	-1	27
108	108.5	12.6	1.48	0	15
110	110.5	12.8	1.41	0	16
111	111.5	12.8	1.39	0	19
112	113	13.0	1.48	14	22
115	115.5	13.2	1.46	0	16
117	118	13.4	1.45	6	18
118	118.5	13.4	1.52	0	21
120	120.5	13.6	1.42	0	19
124	124.5	13.9	1.58	11	20
126	126.75	14.1	1.52	4	19
127	127.5	14.2	1.52	0	22
128	128.5	14.3	1.39	0	19
129	129.5	14.4	1.39	0	16
131	131.75	14.6	1.69	0	20
134	134.5	14.8	1.67	15	22
137	136.75	14.9	1.60	17	22
144	144.5	15.4	1.57	-2	21
146	147	15.5	1.55	9	22
146	147	15.5	1.57	18	21
150	150.5	15.8	1.38	0	19
154	154.5	16.0	1.44	-2	23
158	158.5	16.3	1.39	-2	24
164	164.5	16.7	1.40	-3	20

166.5	167.5	17.0	1.38	8	26
170	170.5	17.2	1.35	0	21
172	172.5	17.3	1.21	0	21
173	173.5	17.4	1.29	0	19
174	174.5	17.5	1.29	-1	25
174	174.5	17.5	1.31	0	21
177	178	17.8	1.29	0	22
179	179.5	17.9	1.24	0	22
184	184.5	18.0	1.38	6	21
187	187.75	18.0	1.38	20	23
194	194.5	18.1	1.34	5	27
196.5	197.25	18.2	1.41	33	20
204	204.5	18.4	1.36	9	24
207.5	208.25	18.9	1.39	4	25
217	218	19.8	1.26	1	24
217	218	19.8	1.29	0	17
224	224.5	21.1	1.39	0	17
226.5	227.5	21.7	1.38	0	19
234	234.5	23.1	1.28	0	19
237	237.75	23.7	1.24	0	17
244	244.5	24.9	1.32	0	13

Table S3. Benthic radiocarbon data.

Sample ID	*species*	*size fraction*	*depth top*	*depth mid*	*^{14}C age*	*1 sigma*	*Calendar age*	*1sigma*	*Lab ID*
		µm	*cm*	*cm*	*yr*	*yr*	*yr*	*yr*	
M64BEN	Benthics mixed	>212	64	64.5	8935	20	8489	288	UCI221416
M84BEN	Benthics mixed	>212	84	84.5	10815	25	10844	391	UCI221417
M86BEN	Benthics mixed	>212	86	86.5	11210	30	11096	367	UCI221418
M90BEN	Benthics mixed	>212	90	90.5	11620	30	11583	386	UCI221419
M94BEN	Benthics mixed	>212	94	94.5	11935	30	11843	337	UCI219908
MD96BEN	Benthics mixed	>212	96	97	11837	41	11986	312	ANU59826
M107BEN	Benthics mixed	>212	107	107.75	12700	39	12582	229	ANU59829
M112BEN	Benthics mixed	>212	112	112.5	12650	45	12906	229	UCI219909
M117BEN	Benthics mixed	>212	117	118	13015	30	13337	262	UCI221420
M124BEN	Benthics mixed	>212	124	124.5	13215	45	13836	299	UCI219910
M126BEN	Benthics mixed	>212	126	126.75	13149	43	14017	304	ANU59831
M134BEN	Benthics mixed	>212	134	134.5	13686	42	14560	324	ANU59833
M144BEN	Benthics mixed	>212	144	144.5	14450	60	15158	315	UCI219911
M158BEN	Benthics mixed	>212	158	158.75	15410	90	16109	512	UCI219912
M166BEN	Benthics mixed	>212	166.5	167.5	15309	50	16788	566	ANU59836
M177BEN	Benthics mixed	>212	177	178	16690	70	17691	657	UCI221421
M187BEN	Benthics mixed	>212	187	187.75	16660	45	17956	566	UCI221422
M204BEN	Benthics mixed	>212	204	204.5	17670	70	18289	451	UCI221423
M207BEN	Benthics mixed	>212	207.5	208.25	17375	50	18761	361	UCI221424
M217BEN	Benthics mixed	>212	217	218	17889	62	19740	438	ANU57621
M224BEN	Benthics mixed	>212	224	224.5	19420	50	21018	609	UCI221427
M235BEN	Benthics mixed	>212	235.5	236.25	22340	60	23335	915	UCI221428