



Supplement of

A stalagmite test of North Atlantic SST and Iberian hydroclimate linkages over the last two glacial cycles

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Supplemental Material





Figure S1. COPRA-derived oxygen (top) and carbon (bottom) isotope ratios of BG/GCL stalagmites (each in a different color). Mean values are presented as solid lines surrounded by 2.5%-97.5% error window (shading).



Figure S2. U/Th ages and 2 s.d. errors of BG and GCL stalagmites. Each stalagmite denoted in different color. See Table 1 for isotope data.



Figure S3. Examples of hiatuses in BG66 (upper left) and BG6LR (other panels). Arrows denote locations of hiatuses.



Figure S4. Carbon (top) and oxygen (bottom) isotopic values in coeval stalagmites as a test of isotopic equilbrium. Similar trends and values are observed in most cases, when considering the combined error windows on both stalagmites and different temporal resolutions of the stalagmites. Exceptions are carbon isotopic offsets of 3‰ from 83-81 ka and 4‰ from 58-53 ka, and oxygen isotopic offsets of 1‰ from 111-104 ka.



Figure S5. Carbon isotopic (red lines) and δ^{234} U values from individual BG/GCL stalagmites.



Figure S6. Iberian margin UK'37-based SST reconstruction (Martrat et al., 2007) plotted against BG/GCL stalagmite carbon (top) and oxygen (bottom) isotope ratios. Data were binned into century-long intervals. Model ages for stalagmites BG66 and GLC6 increased by 4.0 kyr and 1.3 kyr, respectively, to improve correlation with the SST chronology.



Figure S7. Carbon (black) and oxygen (gray) isotopic time series of stalagmites BG66 and GCL6. Sampling was performed through each stalagmite's central growth axis, which was characterized in some areas by recrystallization. In order to test the impact of this alteration, stable isotope ratios were measured along parallel transects but margin to the zone of recrystallization (data shown in red and blue). Offsets between the two data sets are generally within the analytical uncertainties (\pm 0.20‰ for oxygen and carbon, 2.s.d. for black and gray data; \pm 0.12‰ for oxygen and \pm 0.04‰ for carbon, 2.s.d. for red data). Measurements of these secondary transects were conducted at two labs: the Iowa State University Stable Isotope Laboratory (215 ka in BG66) and the Union College isotope laboratory (GCL6 and 193 ka in BG66) using a Thermo Gas Bench II connected to a Thermo Delta Advantage mass spectrometer.

DRIPWATER				BEDROCK			SOIL & VEGETATION	
Date	Sample	Time Interval	δ ¹⁸ O (‰)	Sample	δ ¹³ C (‰)	δ ¹⁸ Ο (‰)	Sample	δ ¹³ C (‰)
Jun-14	PJ8	Single Day	-3.05	BG-A-1	3.35	-1.73	Soil-1	-28.7
Jun-14	PJ9	Single Day	-2.07	BG-A-2	2.95	-2.67	Soil-2	-29.3
Nov-14	PN24	Time Averaged	-3.29	BG-A-3	3.38	-2.88	Soil-3	-28.7
Nov-14	PN25	Time Averaged	-4.58	BG-A-4	3.15	-2.49	Soil avg	-28.9
Nov-14	PN26	Time Averaged	-4.50	BG-A-5	0.39	-8.29	Soil std dev	0.3
Oct-15	PO1	Time Averaged	-4.04	BG-B-1	3.30	-4.07	Plant-1	-26.8
Oct-15	PO2	Time Averaged	-4.31	BG-B-2	2.65	-7.16	Plant-2	-27.0
Oct-15	PO3	Time Averaged	-3.58	BG-B-3	3.74	-4.38	Plant-3	-26.7
Oct-15	PO4	Time Averaged	-4.03	BG-B-4	4.28	-3.84	Plant avg	-26.8
Oct-15	PO8	Single Day	-2.39	BG-B-5	3.57	-4.76	Plant std dev	0.2
Oct-15	PO9	Single Day	-2.35	BG avg	3.1	-4.2		
Mar-16	PM2	Single Day	-3.81	BG std dev	1.0	2.1		
Mar-16	PM3	Time Averaged	-4.03	GCL-1	1.75	-5.09		
Mar-16	PM4	Time Averaged	-3.86	GCL-2	2.34	-4.95		
Aug-16	PA1	Time Averaged	-4.62	GCL-3	2.14	-3.85		
Aug-16	PA2	Time Averaged	-4.51	GCL-4	1.63	-3.48		
Aug-16	PA3	Time Averaged	-4.52	GCL-5	1.89	-4.43		
Aug-16	PA4	Single Day	-4.52	GCL average	1.9	-4.4		
Aug-16	PA5	Single Day	-2.27	GCL std dev	0.3	0.7		
Jan-18	PJ2	Single Day	-2.59					
Jan-18	PJ3	Single Day	-4.32	PLATE CALCITE				
Jan-18	PJ8	Time Averaged	-4.11	Sample	δ ¹³ C (‰)	<u>δ¹⁸Ο (‰)</u>		
Jan-18	PJ9	Time Averaged	-3.99	LOFT-1a	-9.68	-2.82		
Jan-18	PJ10	Time Averaged	-3.97	LOFT-1b	-9.35	-2.84		
Jan-18	PJ11	Single Day	-4.23	LOFT-1c	-9.47	-3.37		
		Dripwater avg	-3.8	LOFT-2a	-7.38	-2.64		
		Dripwater std dev	0.8	LOFT-2b	-7.35	-4.03		
				LOFT-2c	-7.01	-2.46		
				Calcite avg	-8.4	-3.0		
				Calcite std dev	1.2	0.6		

Table S1. Rock, Water, and Plant Isotopic Measurements