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Paleoceanography and Paleoclimatology

Supporting Information for

Mid Holocene, Coral-based Sea Surface Temperatures in the Western Tropical Atlantic

Luis G. Rodriguez[1,2], Anne L. Cohen[1], Wilson Ramirez[2], Delia W. Oppo[1], R. Lawrence Edwards[3], Alice E. Alpert[1] and Nathaniel Mollica[4].

[1] Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA.

[2] Department of Geology, University of Puerto Rico-Mayagüez, Mayagüez, Puerto Rico.

[3] Department of Earth Sciences, University of Minnesota, Minneapolis, Minnesota, USA.

[4] Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography/Applied Ocean Science and Engineering, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA

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Sample Name	CH-232	CH-202
Age CORRECTED	5199	6427
± (95% CI = (Q97.5- Q2.5)/2 from MC var.)	26	81
Activity ratio 234U/238U initial	1.157	1.147
± (95% CI = (Q97.5- Q2.5)/2 from MC var.)	0.003	0.018
Initial δ234U	133.592	122.888
233/238U	0.000159899	0.000204546
[234U] sample from MC	0.174302773	0.127550269
[238U] sample from MC	2797.255847	2066.535066
[230Th] sample from MC	0.002462889	0.002232765
[232Th] sample from MC	0.239234566	4.44649851
Ratio 234/238U from MC	6.23121E-05	6.17237E-05

Table S1

U-Series dating results from the two Holocene Enriquillo Valley corals. Additional data are provided in the supplementary spreadsheet. Dating was performed by Dr. Ali Pourmand following methods described in Pourmand et al. (2014). U decay constants: 238 = 1.55125x10-10 (Jaffey et al., 1971) and 234 = 2.82206x10-6 (Cheng et al., 2013).

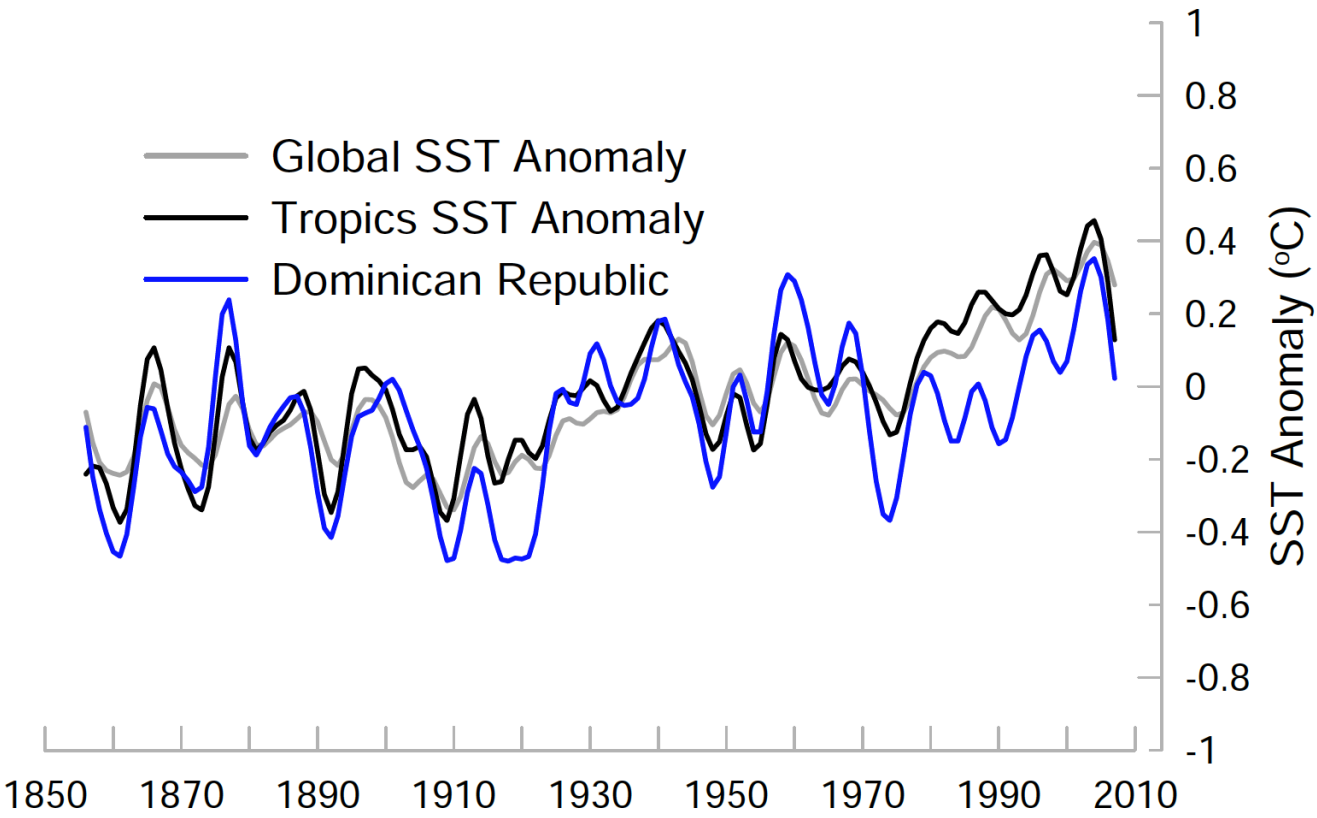

Figure S1

Instrumental sea surface temperature anomalies from 1850-2008 from the Kaplan Sea Surface Temperature data product (https://climatedataguide.ucar.edu/climate-data/kaplan-sea-surface-temperature-anomalies) for the global ocean (87.5S-87.5N) (black line), global tropics (22.5S-22.5N) (red line) and western tropical Atlantic excluding Gulf of Mexico (dashed blue), processed with a 6-yr low pass Butterworth filter.

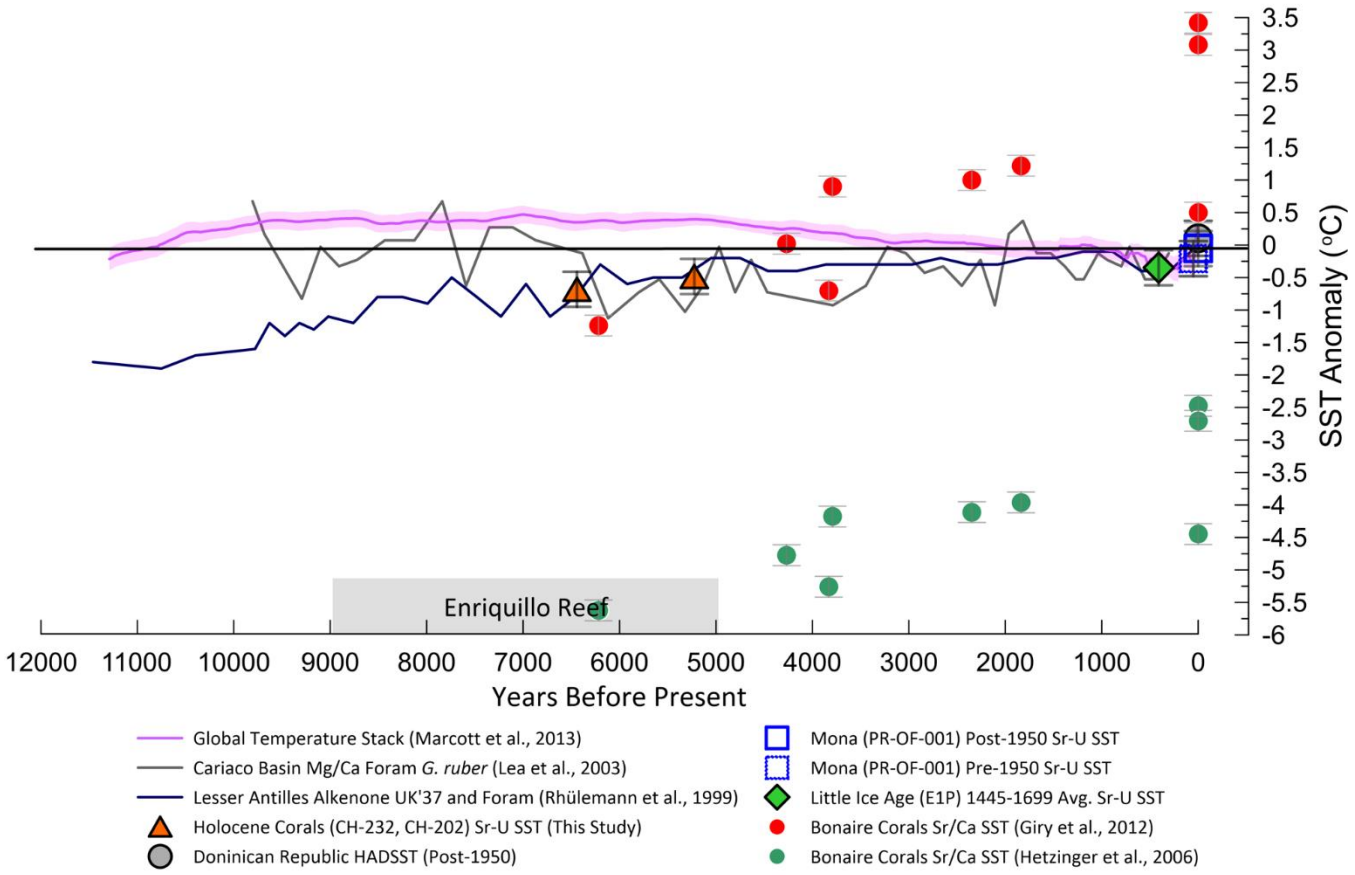

Figure S2

Sr-U SST anomalies relative to modern SSTs at eachderived from the mid-Holocene Enriquillo Valley, Little Ice Age Pinnacles Reef and 20th century Mona Island corals compared with sediment core (alkenone and foraminifera Mg/Ca) reconstructions from the Lesser Antilles (orange) and Cariaco Basin (grey), and the global temperature stack of Marcott et al., (2013) (pink). Holocene Sr/Ca-based SSTs from Bonaire coral (solid circles) infer a Holocene warming trend but derived SSTs depend on the Sr/Ca-SST calibration used (orange = Giry et al., 2012 equation; green = Hertzinger et al., 2006 annual equation), and 5 out of 6 modern coral Sr/Ca-SSTs do not capture instrumental temperatures, independent of the equation used. All SST anomalies are calculated relative to the site-specific HADISST climatology from 1961 to 1990. Note: We used the

Sr/Ca ratios of corals from Bonaire, published by Giry et al., (2012) to calculate the Sr/Ca SSTs using the Giry et al., (2012) calibration (orange) and the Hetzinger et al., (2006) calibration (green). The Sr/Ca SST anomalies were then calculated relative to the 1961-1990 HADISST climatology for Bonaire.

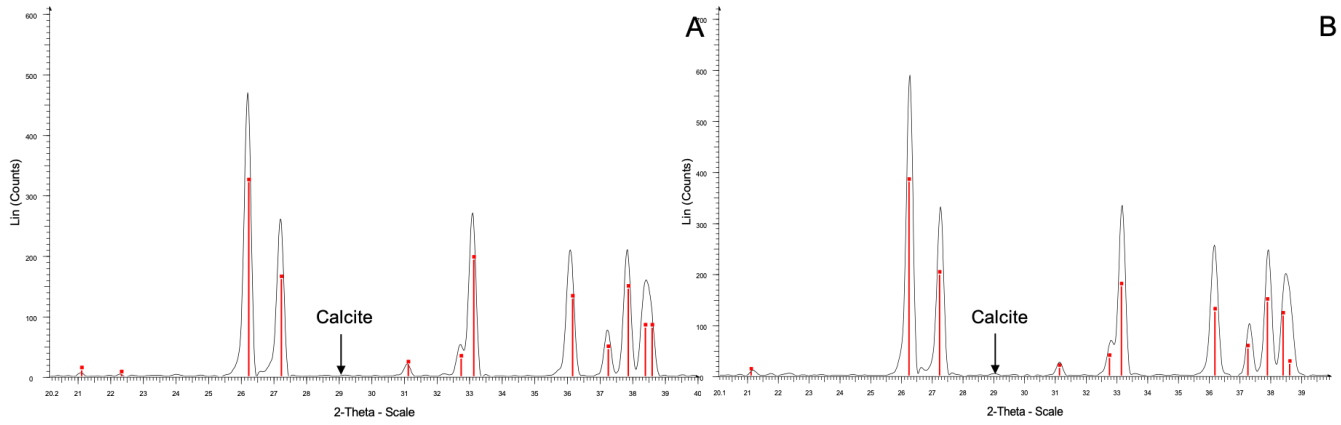

Figure S3

X-Ray Diffraction spectra from the mid-Holocene (Enriquillo Valley) corals analyzed in this study. Red bars indicate the aragonite spectral peaks. Note the absence of a calcite peak in both corals (black arrow).

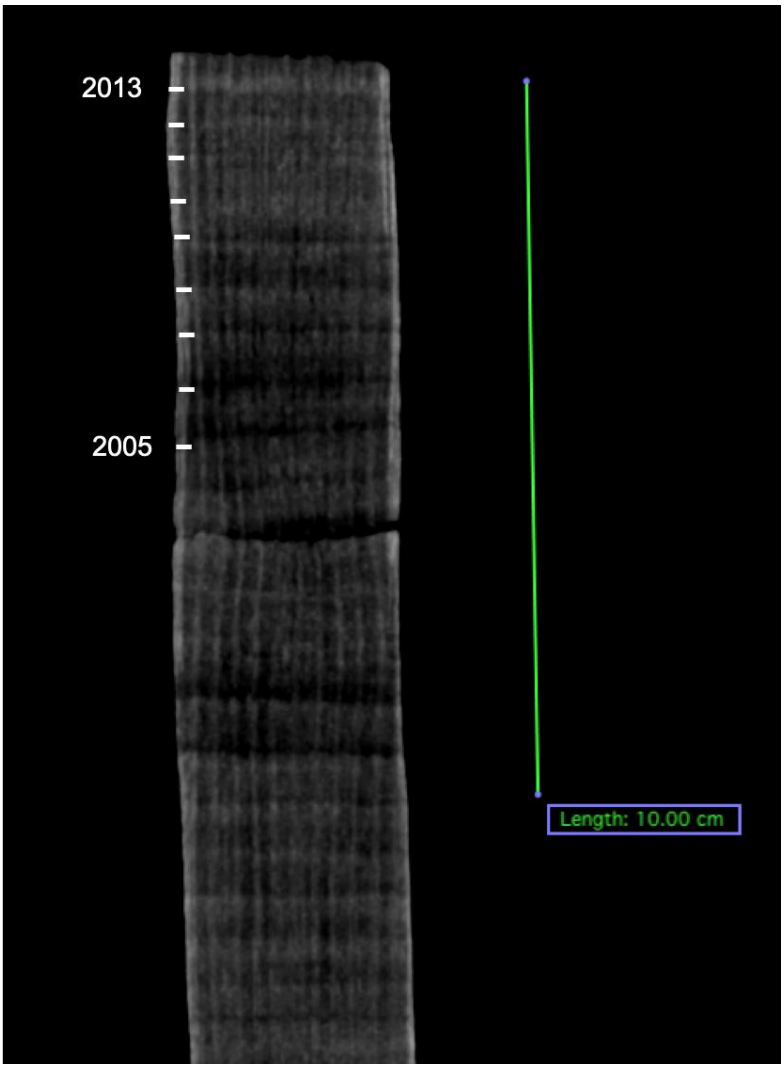

Figure S4.

A 2-D slice cut from the top section of the 3-D CT scan of the modern Martinique Coral (core ID 719). Annual bands are visible and identified with white ticks. Also notable are anomalously low density (dark) bands, which become frequent after the 2005 annual band. Anomalous Sr-U values are associated with this group of low density bands and are not used in the study. Green bar represents a 10 cm scale. Interpreted years are shown in the figure.

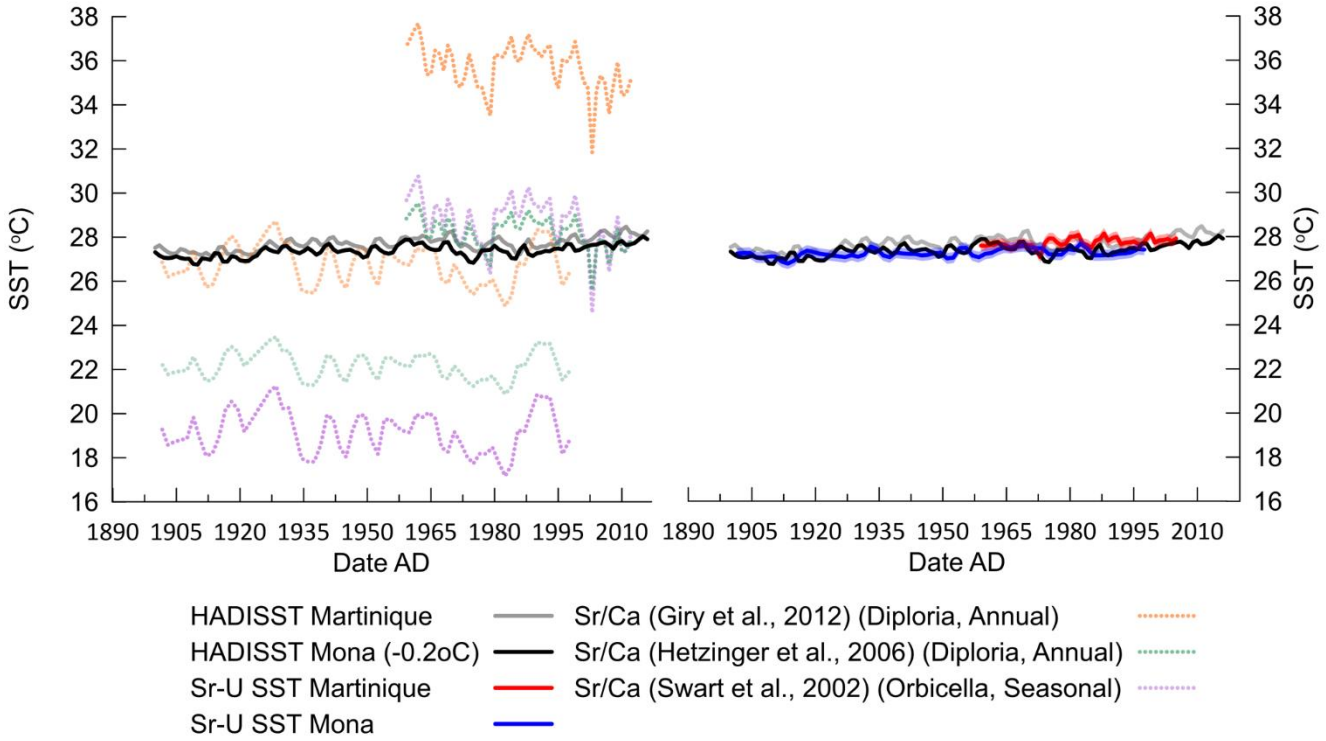

Figure S5.

Sr/Ca derived SST time-series shown vs HADISST (left) vs Sr-U SST time-series shown vs HADISST (right) generated from the modern corals analyzed in this study.

Calibrations used for converting Sr/Ca to SST are given in parentheses.