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SST Variability in the Southeastern Caribbean Sea over the Past 1800 Years

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Sea surface temperature (SST) of the Caribbean Sea exerts a strong control on the amount of precipitation on the adjacent land. However, a clear understanding of the regional climate development on centennial timescales is missing due to scarcity of SST records. To fill this gap, we generated a new high-resolution proxy dataset of the last 1800 years from the Tobago Basin, a region that is presently affected by both Atlantic and Pacific climate variability on one hand, and by the South Atlantic circulation on the other hand. Our dataset is comprised of Mg/Ca and alkenone-derived SSTs, stable isotopes, element composition of bulk sediment and planktic foraminiferal assemblages. Our Mg/Ca-based reconstruction suggests significant SST variability over the past 1800 years CE, particularly during the Medieval Climate Anomaly (MCA) and the Little Ice Age (LIA). The MCA encompasses an abrupt 2 °C SST reduction between 1050-1100 years CE, which coincided with a distinct episode of precipitation minima in the region and was followed by a century of warm and wet MCA conditions. A 1 °C cooling also characterized the onset of the LIA between 1400-1550 years CE, which was associated with a reduction in water column stratification inferred from stable isotopes and foraminiferal assemblage data. The initial LIA cooling was followed by a robust 1 °C SST rise between 1550-1750 years CE. This warming trend is also supported by alkenone-derived SSTs. Our reconstructed SST variability across the LIA may help to explain the occurrence of alternating dry and wet conditions on the Caribbean islands.