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# Tracking interannual to multidecadal-scale climate variability in the Atlantic Warm Pool using central Caribbean coral data

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Atlantic Warm Pool (AWP) climate variability is subject to multiple influences ranging from internal tropical Atlantic variability to modes of external forcing. However, before the mid-20th century observational data are sparse and the lack of long-term SST and climate records has hampered the detection and investigation of decadal- and longer-scale variability and relationships between climate parameters in the North Atlantic.

We present a new seasonnally resolved 125-year record of coral $\delta^{18}$O and Sr/Ca variations in the Central Caribbean Sea (Little Cayman, Cayman Islands; *Diploria strigosa*). Both geochemical proxies show a decreasing long-term trend, indicating long-term warming. Sr/Ca indicates a much stronger regional warming than large-scale grid-SST data, while coral $\delta^{18}$O tracks large-scale sea surface temperature (SST) changes in the AWP. By removing the Sr/Ca derived temperature component from coral $\delta^{18}$O, sea water $\delta^{18}$O variations are reconstructed reflecting past changes in the hydrological cycle, indicating a drying trend over the past century while temperature increases.

High spatial correlation between coral $\delta^{18}$O and SST in the region of the Loop Current and Gulf Stream system suggests that Little Cayman is a sensitive location for the detection of past large-scale temperature variability beyond the central Caribbean region. More specifically, our $\delta^{18}$O data tracks changes in North Atlantic Oscillation (NAO) variability on both decadal and multidecadal time scales providing new insights into the temporal and spatial nonstationarity of the NAO.A combination of our coral $\delta^{18}$O record with two other coral records from different Caribbean sites reveals high spatial correspondence between coral $\delta^{18}$O and SST variability in the North Atlantic subtropical gyre, where few instrumental measurements and proxies are available prior to the 20th century. Our results clearly demonstrate the potential of combining proxy data to provide information from these sparsely-sampled areas, helping to reduce uncertainty in model based projections.