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Reconstructing variability of past sea surface conditions using coral records from three sites in the Caribbean Sea

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This study presents several coral-based high resolution records of elemental ratio (Sr/Ca) and oxygen isotope variations from the Caribbean Sea. Our multi-proxy approach is based on common reef-building corals of the genus *Diploria strigosa* which form massive colonies on western Atlantic and Caribbean reefs and build highly feasible archives for paleoclimatic reconstructions due to their massive growth and pronounced annual density bands. Our data set includes timeseries derived from coral colonies from three sites located in the eastern Caribbean Sea (Guadeloupe, Lesser Antilles; Archipelago Los Roques and Chichiriviche de la Costa, Venezuela), where surface waters from the Atlantic Ocean enter the Caribbean.

Both geochemical proxies were measured at separate aliquots from samples of coral aragonite and analyzed in monthly resolution for growth periods between 1898 and 2004. The length of our reconstructed timeseries ranges from 64 years up to 102 years of coral growth. In order to assess the robustness of our proxies, we have correlated each proxy with local records of SST when available and with the appropriate grid boxes of global gridded SST data sets for a corresponding time period to derive a proxy-temperature calibration. By subtracting the temperature contribution inferred from coral Sr/Ca, we deconvolved the effects of sea surface temperature (SST) and seawater oxygen isotopic composition ($\delta^{18}O_{SW}$) in the coral $\delta^{18}O$ timeseries. Our preliminary results indicate that monthly resolved sampling, which is limited to a specific skeletal element in the *Diploria strigosa* corals, facilitates us to capture the full amplitude of the seasonal SST/SSS cycle, in contrast to other massive growing coral species sampled in the tropical Atlantic which require more tedious sampling tech-

niques. Hence, rapidly growing corals of the genus *Diploria strigosa* (growth rates of 1-1.5 cm/year) represent an excellent oceanic archive of tropical Atlantic climate variability, and promise a high potential for future paleoenvironmental reconstructions. Reconstructions of past sea surface conditions from single coral records often contain site-specific error. To enhance this we are developing a century-long master chronology, which includes several coral-based proxy timeseries from different coral colonies and sites in the Caribbean. This will improve the signal to noise ratio compared to the single core reconstructions.