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Reconstruction of anthropogenic environmental changes from a Cuban coral over the last 175 years

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Ocean warming and ocean acidification (OA) are increasingly influencing marine life. Parts of the increasing amount of CO_2 in the atmosphere will eventually get absorbed by the ocean, which changes the oceans carbonate chemistry and threatens the ecological competitiveness of calcareous marine organisms. Currently, the global coverage of studies on the development of pH since preindustrial times is sparse. An important region to study environmental and climate variations is the northwestern coastal part of Cuba where the Loop Current (LC) joins the Florida Current and contributes to the Gulf Stream. The tropical Atlantic is a primary region for the formation of warm surface water of the thermohaline ocean circulation and the Caribbean in particular as a habitat for coral reefs in the Atlantic making them susceptible to changes in water temperatures and carbonate chemistry. This provides a unique chance to study multiple aspects of the implications of anthropogenic activities such as changes in SST, ocean pH, and carbonate chemistry using the coral skeletal geochemistry as an archive of climate and environmental changes. Here we present results from a multi-proxy approach for the reconstruction of environmental change and natural climate variability from a North Cuban Siderastrea siderea coral. The sub-seasonally resolved records indicate interannual to decadal changes in SST and seawater carbonate chemistry since 1830 CE. The comparison with pH will provide clues on whether the regional climate variability has been directly affected by atmospheric CO_2 forcing.