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Coral reconstructed Mid-Holocene seasonality in the southwestern Caribbean

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Seasonality is a dominant factor in the Earth's climate system, but proxy reconstructions on this time scale are sparse. Corals provide an excellent archive to reconstruct environmental conditions on seasonal time scale using geochemical proxies. Here, we use subfossil (~6.2-7.1 ka BP) *Siderastrea siderea* and *Pseudodiploria labyrinthiformis* corals from a pristine Mid-Holocene reef, located in Panamá, southwestern Caribbean. Mid-Holocene insolation seasonality in the Northern Hemisphere was stronger than at present. We investigate the resulting changes in SST and hydrological seasonality using coral Sr/Ca, $\delta^{18}O$ and $\delta^{13}C$. To evaluate, if the coral heads can be utilised for geochemical analyses, they have been screened for diagenetic alteration (2D-XRD, thin section analysis). Obtained modern coral Sr/Ca-SST based annual cycle corresponds well with *in situ* measured SST. Fossil coral Sr/Ca-SST based cycles exceed the modern one by up to 50%. Fossil coral $\delta^{18}O$ seasonal amplitudes are higher than the modern one by up to 30% and show a reduction in the mean gradient between wet and dry period, attributable to the northward shift of the Intertropical Convergence Zone. Increased SST and $\delta^{18}O$ seasonality are consistent with model simulated SSTs (Kiel Climate Model) and model-based calculated pseudocoral $\delta^{18}O$, but the model underestimates the seasonality increase in the Mid-Holocene.