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Subseasonal resolution on climate conditions and metabolic activity in *Porites* corals: What does their dual clumped isotope composition teach us?

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The isotopic composition and relative proportions of trace elements archived in marine biogenic carbonates provide pivotal information on the environmental and climatic conditions prevailing during their formation. These inter-relationships have been extensively studied and constitute the foundations of existing knowledge on past climate and ocean currents changes and how these shifts correlate with distinct climate stages. However, to enable these insights into the distant past, the various organisms must have formed their carbonate tests in equilibrium with the prevailing water. Recent studies showed that dual clumped isotope (D_{47}, D_{48}) analyses not only detect isotopic disequilibrium, but also add information on the underlying process and eventually can be used for correcting the corresponding isotope disequilibrium effect to obtain accurate paleotemperatures.

To evaluate if the two independent D_{47} and D_{48} thermometers can be applied on relatively limited sample material (< 5 mg) at high resolution, the dual clumped isotopes, as well as the accompanying carbon and oxygen isotope composition were measured on a subseasonally sampled *Porites* coral from the northern Red Sea. We subsampled the aragonitic corallite at roughly one mm steps for the recent warmer years of 1991-1993 and the years of 1838-1841 that are part of the Little Ice Age with presumably drier conditions for the northern Red Sea region. Based on seasonal dual clumped isotope signature, we evaluate eventual seasonal variations in isotope disequilibrium due to slight differences in the metabolic activity of the *Porites* coral and if different climate conditions during the LIA modified this effect.