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Decoupling Carbon and Calcification in Tropical Scleractinian Corals

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Coral calcification is known to depend on ocean pH, saturation state (Ω_{Arag}) and carbonate ion concentration [CO_3^{2-}]. These factors are tightly coupled in the modern ocean, and are all changing in response to ocean acidification, which threatens coral's ability to calcify now and in the future. While the relationship between acidification and reduced calcification is evident, we have a poor understanding of the mechanisms driving these negative effects – is it a response to changes in pH, Ω_{Arag}, or [CO_3^{2-}]? Each factor has distinct implications for our understanding of coral calcification mechanisms and resilience to future ocean acidification.

Here, we present data from coral culturing experiments where pH, [CO_3^{2-}] and Ω_{Arag} were independently varied. These experiments reveal which component of seawater carbon chemistry is the determining factor for coral calcification. We will present growth rate and trace element data from three tropical Scleractinian species. Combined, this data can be used to explore calcification strategies and find the mechanistic links driving sensitivity to ocean carbon chemistry.