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Sr isotope fractionation in benthic foraminifers reflects seawater carbonate saturation

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Seawater carbonate chemistry regulates ocean-atmosphere carbon exchange and stabilizes Earth's climate, yet its evolution remains challenging to reconstruct. In this talk, we present the stable strontium isotope compositions ($\delta^{88/86}Sr$) of multiple benthic foraminiferal taxa from core-top samples across multiple ocean basins with diverse bottom-water carbonate chemistries. The $\delta^{88/86}Sr$ values for two of these taxa, the epifaunal *Cibicidoides wuellerstorfi* and surficial *Cibicidoides pachyderma*, robustly correlate with the degree of seawater carbonate saturation ($\Delta[CO_3^{2-}]$). Given that $\Delta[CO_3^{2-}]$ exerts a first-order control on calcification rate, these results are consistent with a precipitation rate-dependent kinetic isotope fractionation. Building from these $\delta^{88/86}Sr$ observations, we reconstructed bottom-water $[CO_3^{2-}]$ over the past 20,000 years by applying the *C. pachyderma* calibration to a tropical Atlantic core. The record closely matches a complementary B/Ca-based reconstruction. We propose that benthic foraminiferal $\delta^{88/86}Sr$ values provide a robust, independent proxy for reconstructing past seawater carbonate chemistry.