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Stable Strontium (delta-88/86 Sr) Isotope Fractionation in Scleractinian Corals

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Isotope fractionation taking place during biological calcification harbors important information about adjacent environmental parameters and the biomineralization process itself. We present stable strontium ($\delta^{88/86}$Sr) isotope data of fossil (*Porites* sp. 15 ka B.P. from Tahiti, IODP Expedition 310) and cultured (*Acropora* sp.) warm water corals. Samples were analyzed with the Sr double spike technique (KRABBENHÖFT et al., 2009) and an external reproducibility of 0.025‰ (2SD, n=26, Carbonate standard JCp-1). For cultured Acropora sp. we determined a non-linear u-shaped $\delta^{88/86}$Sr-temperature relationship of -0.005‰°C (r^2=0.92) in the temperature range from 21 to 25°C and of 0.003‰°C (r^2=0.53) for 25°C to 29°C. This trend is in sharp contrast to earlier reports for *Pavona clavus* in the temperature range from 23°C to 27°C (FIETZKE and EISENHAUER, 2006) where a strong positive correlation has been observed. For the fossil Porites sp. coral Sr/Ca elemental and δ^{18}O isotope ratios show a temperature variation like expected and in accordance with earlier observations. However, in support of the measurements on the cultured Acropora sp. the fossil $\delta^{88/86}$Sr-record for the Porites sp. coral again show an inverse relationship to temperature when compared to other temperature proxies Sr/Ca (FELIS et al., 2010) and δ^{18}O, respectively. In addition, our measurements on the 15 ka old coral show a mean $\delta^{88/86}$Sr value of 0.205(17) ‰ which is in agreement with modern corals (KRABBENHÖFT et al., 2010). This indicates that the extra supply of Sr from exposed shelves at low sea levels (about 130 m below present sea level) has no measurable effect on the $\delta^{88/86}$Sr of seawater on these timescales.

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