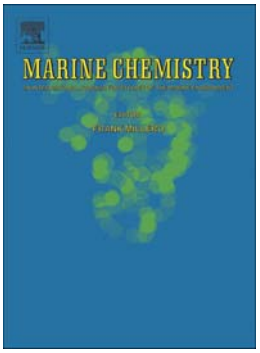

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Exploring the oxygen and carbon isotopic composition of the Mediterranean red coral (*Corallium rubrum)* for seawater temperature reconstruction

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Abstract

Here we provide first evidence that the stable oxygen and carbon isotopic composition ($\delta^{18}O$, $\delta^{13}C$) of the high-magnesium calcite skeleton red coral *Corallium rubrum* can be used as a reliable seawater temperature proxy. This is based upon the analyses of living colonies of *C. rubrum* from different depths and localities in the Western Mediterranean Sea. The assessment of the growth rates has been established through the analysis of growth band patterns. The $\delta^{18}O$ and $\delta^{13}C$ compositions show large variability with a significant difference between the branches and the bases of the colonies. In both coral portions, the $\delta^{18}O$ and $\delta^{13}C$ values are highly correlated and show well-defined linear trends. Following the "lines technique" approach developed by Smith et al. (2000) for scleractinian aragonitic deep-water corals, our data have been combined with published values for the deep-sea gorgonian corals Isididae and Coralliidae from Kimball et al. (2014) and Hill et al. (2011) resulting in the following $\delta^{18}O$ temperature equation: