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Temperature reconstructions on carbonate mounds (IODP Site 1317) using elemental ratios (Mg/Ca, Mg/Li, Sr/Ca) as well as non-traditional isotope techniques

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In paleoceanographic terms cold-water coral mounds have the unique property to provide geochemical and climate information of the past from two different archives (cold-water corals and foraminifera). This study shows a direct comparison of well developed paleo-temperature proxies on benthic foraminifera *P. ariminensis* (δ^{18}O-Mg/Ca) as well as potential temperature proxies in the scleractinian cold-water coral *L. pertusa* from Challenger Mound (IODP Site 1317) initiated at $\sim$ 2.6 Ma (Kano et al., 2007). Potential paleo-temperature proxies (Sr/Ca, Mg/Li and $\delta^{88/86}$Sr ratios) were all calibrated on live-*in situ* sampled *L. Pertusa* along the European continental margin. For $\delta^{88/86}$Sr determinations we used the new developed Doubel-Spike-TIMS technique and found a negative $\delta^{88/86}$Sr relationship to tempretaure (6-10°C), signficantly different to that have been published earlier (Fietzke and Eisenhauer 2006; Rüggeberg et al., 2008). Coral Sr/Ca ratios show the excpected negative linear relationship and Mg/Li ratios show a positive linear relationship. Our results show that downcore Sr/Ca$_{Lophelia}$ratios give unrealistic low values. Whereas downcore Mg/Li$_{Lophelia}$ and $\delta^{88/86}$Sr$_{Lophelia}$ ratios result in reasonable temperature values in the order of $\sim$6°C and $\sim$12°C for the mound record investigated. In support of this foraminiferal Mg/Ca$_{ariminensis}$ temperatures show values from about 9.5°C to 12.5°C for the upper mound interval.

Our reconstructed paleo-temperatures from cold water coral *L. pertusa* are interpreted as a warming of intermediate water masses since the onset of the Challenger mound formation. We suggest that this trend reflect vertical movements of the Mediterranean Outflow Water (MOW) generating mound waxing and wanning.