Temperature reconstruction using (Sr, Mg, Li)/Ca, Li/Mg, Sr/Li, $\delta^{44/40}$Ca, and δ^{18}O measurements of seasonal bands in *Porities sp.* coral from Lakshadweep, India

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Multi-element/Ca ratios, $\delta^{44/40}$Ca, and δ^{18}O in marine carbonates covary with temperature of the ambient water and are used as proxies for reconstructing sea surface temperature (SST). However, these geochemcial and isotopic proxies can be affected by vital effects, variations in growth rates, pH, etc. We have applied a multi-proxy approach to test the efficacy of these proxies in estimating SST from the same sample. Live samples of *Porites sp*. were collected from Kavarati, Lakshadweep in the Arabian Sea in 2010. After initial H_2O_2 treatment, we collected powdered samples (n=14) along the growth axis of the coral using a dental microdrill of 0.3 mm diameter. For each sample, we measured Sr/Ca, Mg/Ca, Li/Ca, Li/Mg using a cold-plasma technique on a Thermo X-Series II ICPMS , $\delta^{44/40}$Ca using a ^{43}Ca-^{48}Ca double spike technique using a Thermo Triton Plus TIMS and δ^{18}O using a Gas bench II connected to a Thermo MAT 253 IRMS.

Variations in SST around Lakshadweep is controlled by the Indian Summer Monsoon [c.f., 1] as well as El Nino events. We acquired monthly average satellite-SST data from 2000-2010. Temperature calculated from δ^{18}O of the corals using the relationship from [1] matched the satellite-SST data (T = 28-31 ^{0}C) for the period 2010-2008 which we consider as the growth period of our sample. SST estimated from Sr/Ca using the relationship from [2] also correlates well with satellite-SST data. Sr/Li shows a positive correlation with satellite-SST data while the Li/Mg data overlap with the global trend [3] which includes forams and bivalves thereby suggesting that these ratios can be effectively used to reconstruct longterm SST from corals. Temperature estimates from $\delta^{44/40}$ Ca using the relationship based on lab-cultured corals [4] over-estimates the seasonal SST of this region.

[1] S. Chakraborty and R. Ramesh, 1997, Quat. Int. 37, 55-56 [2] DeLong et al., 2013, Paleo3, 373, 6-24 [3] Montagna et al., 2014, Geochim. Cosmochim Acta, 132, 288-310[4] Böhm et al., 2006, Geochim. Cosmochim Acta, 70, 4452-4462.