Variation of geochemical tracers in coral skeletons (*Acropora digitifera* vs *Porites australiensis*) based on the temperature controlled culture experiment

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While biogenic carbonates such as foraminifera and coccolithophorid are attractive tools to reconstruct the past environments, scleractinian corals also provide environmental data around tropical to subtropical region with much higher time resolution. For example, oxygen isotope ratio ($\delta^{18}O$) and strontium-calcium (Sr/Ca) ratio have been used for reconstructing sea surface temperature and salinity by generally using massive *Porites* sp. However, reconstructions of paleoenvironments using only *Porites* are sometime limited to Indo-Pacific region and specific time windows. Therefore in this study, we focus on *Acropora digitifera,* in addition to *Porites,* which dwell even in the Caribbean Sea in addition to Indo-Pacific ocean and are often found as fossil corals. We compare chemical components contained in *A. digitifera* and *P. australiensis* based on temperature controlled culture experiments in which three colonies of both corals were used. As a result, *A. digitifera* showed a strong negative correlation between the mean $\delta^{18}O$ and water temperature (R^2= 1.0), and the temperature dependency was comparable with that of *Porites* sp. Thus $\delta^{18}O$ of *A. digitifera* was suggested to be useful as a temperature proxy although they were also slightly influenced by skeletal growth rate. A negative strong correlation was also observed between mean Sr/Ca ratio and temperature in *A. digitifera* and *P. australiensis* (R^2= 1.0 and 0.93, respectively) without clear effects from skeletal growth rate. Therefore, it was suggested that skeletal Sr/Ca ratio in coral was predominantly controlled by water temperature although large deviations of Sr/Ca in *A. digitifera* even at same temperature settings were found. This deviation would be improved by subsampling along an appropriate skeletal structure composed of single polyp.

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