[EE] Evening Poster | B (Biogeosciences) | B-PT Paleontology

[B-PT04]Biomineralization and the Geochemistry of Proxies

convener:Takashi Toyofuku(Japan Agency for Marine-Earth Science and Technology (JAMSTEC)), Hiroshi Kitazato(Tokyo University of Marine Science and Technology (TUMSAT)), Jelle Bijma(アルフレッドウェゲナー極域海洋研究所, 共同), Kotaro Hirose(Faculty of Science & Engineering, Waseda University) Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe) Biomineralization and the Geochemistry of Proxies - Biology, laboratory culture-experiments and their applications to the paleo-research -

In order to reconstruct the Earth climate system, marine paleoclimatologists resort to transfer functions or geochemical proxies, which are produced or affected by organisms. The relationships used for reconstructions are generally based on field calibrations or derived from laboratory experiments. The danger of these so-called empirical relationships is that they may be valid only within the restricted parameter space of their calibration. Application of proxy relationships to very different environmental settings (e.g. high vs. low latitude or glacial vs. interglacial) requires a mechanistic understanding of these relationships. Much progress can be expected by a better understanding of the biomineralization mechanisms and the incorporation of proxy signals.

In this session we facilitate contributions related to the biomineralization, calibration and validation of marine proxies from field study, laboratory culture experiment and paleo-environmental reconstruction.

[BPT04-P04] 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 (δ 18O) 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 δ ¹⁸O and water temperature (R²= 1.0), and the temperature dependency was comparable with that of *Porites* sp. Thus δ ¹⁸O 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.