[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

Shoko Sakata[1], *Mayuri Inoue[1], Yasuaki Tanaka[5], Takashi Nakamura[3], Kazuhiko Sakai[2], Minoru Ikehara[4], Atsushi Suzuki[6] (1.Department of Earth Sciences, Okayama University, 2.Tropical Biosphere Research Center, University of the Ryukyus, 3.Faculty of Science, University of the Ryukyus, 4.Center for Advanced Marine Core Research, Kochi University, 5.Faculty of Science, Universiti Brunei Darussalam, 6.Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology (AIST))
Keywords:geochemical proxies, coral skeleton, temperature

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^{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 δ^{18}O and water temperature (R^2= 1.0), and the temperature dependency was comparable with that of *Porites* sp. Thus δ^{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.