[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-P05]Ultra-microstructures of foraminiferal calcification observed using focused ion beam microscopy

*Yukiko Nagai[1], Takashi Toyofuku[2] (1.Graduate School of Environment and Information Sciences, Yokohama National University, 2.JAMSTEC)
Keywords:foraminifer, mineralization, calcification

Foraminifera is unicellular organism with calcareous shells in ocean. The elemental composition of foraminiferal calcite is of great usage in paleoceanographic reconstructions. Even though, little is known regarding the governing biological processes of elemental uptake during calcification. The role of the organic templates are still unclear. This organic template separating the different layers of calcite that form the foraminiferal chamber wall. Further, although the function of this template is considered as crystal nucleation for chamber wall by previous studies, it is not well understood. In this study, we applied a focused ion beam (FIB) to the site of calcification of an *Ammonia “beccarii”*’s (benthic foraminifer) newly growing chamber to observe ultra-microscopic distribution of crystals on the organic template. Exposed cross sections of both soft and hard tissues allowing detailed time series observation of the site of calcification throughout process. We show numerous micro gaps of calcareous layers and internal appearance of organic structures are present within the site of calcification during calcification process. The series of SEM observations suggest that organic layers are actively involved in calcite precipitation. We provide the evidence that the site of calcification is enclosed from surrounding seawater during calcification. Our findings improve the understanding of foraminiferal biomineralization and characterize the conditions under which element partitioning and isotope fractionation occur.