

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

[B-PT04] Biomineralization and the Geochemistry of Proxies

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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-P03] Temporal size change of the planktonic foraminiferal species *Paragloborotalia siakensis* (LeRoy).

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This study aims to reconstruct the temporal size change pattern of the important planktonic foraminiferal index species *Paragloborotalia siakensis* (LeRoy) during Middle Miocene in the eastern equatorial Pacific and to discuss its implications to paleoceanographic and evolutionary factors.

Paragloborotalia siakensis was flourished in surface water of tropical to warm subtropical regions and its stratigraphic range is from Upper Oligocene to Middle Miocene. Its extinction horizon defines the upper boundary of the planktonic foraminiferal Zone N. 14. In the eastern equatorial Pacific, this species shows predominant abundance (20~80 % in total planktonic specimens). The morphologic feature of this species characterized by low trochospiral test is suitable for size measurement. Indeed, this species has a long stratigraphic range throughout 10 million years during drastic paleoceanographic changes, therefore the possibility should be considered that the species survived using several adaptation strategies related to the paleoceanographic conditions. On this viewpoint, it is highly noteworthy to reconstruct the adaptation strategies of this species.

The core samples we used in this study were drilled at the IODP Sites U1337 and U1338 during of the Pacific Equatorial Age Transect (PEAT) project, which was planned in order to obtain the Cenozoic successive geologic record. The stratigraphic interval of approximately four million years in Middle Miocene (15~11 Ma) was used for this study. This interval includes the transition from the relatively warm face (MCO: Miocene Climatic Optimum) to the colder mode with the expansion of the

Eastern Antarctica Ice Sheet (EAIE: 13.8 Ma). Total 102 samples from 15.14 to 11.18 Ma was used at Site U1338, and 71 samples between 15.36 and 11.38 Ma was used at Site 1337. Already the orbital age turning has been conducted on each core by previous workers. Fifty or more individuals were measured at each horizon to grasp the precise size distribution in the assemblage.

As a result of my study, 7073 individuals were measured from 75 of 102 samples at the Site U1338. And at U1337, 7196 individuals were analyzed from 58 of 71 samples. Significant size changes of this species were noted at both sites. For classification of the *P. siakensis*, the size changes should be explained as the intraspecific variation. Our result clearly indicates the relationship between the temporal size changes and paleoceanographic fluctuation through the comparison with previous stable isotope and alkenone data.

Especially, rapid size increases of this species generally correspond to isotopic events related to the EAIE. The size increase of this species should be regarded as an adaptation for the eutrophic condition related to the intensification of the E-W contract (La Nina-like ocean) in the equatorial Pacific.