Future perspective on the response of marine calcifiers to “evil twins” of climate change due to increased PCO2

"Hodaka Kawahata"¹

1. Atmosphere Ocean Research Institute, the University of Tokyo


Our planet will experience global warming and ocean acidification due to increased partial pressure of CO2 in the atmosphere. They are often referred to as the “evil twins” of climate change, potentially inducing severe threats in the near future.

Generally, majority of marine calcifying organisms show decreases in calcification rates in response to acidified seawater by increased pCO2. However, the response often differs depending on situations, species, and life-cycle stage. Calcification of Calcarina gaudichaudii, generally increased with increased pCO2. As one possible cause of these different sensitivities, Calcarina hosts diatoms as its symbiotic algae. High-CO2 seawater is favorable to diatom growth.

X-ray micro-computed tomography will provide valuable information regarding biomineralization including calcification of planktic and benthic foraminifera in response to ocean acidification as well as regarding carbonate dissolution.

Based upon the analysis of the biogeochemical cycle (today, at P/E boundary and in Cretaceous), “high speed” and “high level” pCO2 are the primary and secondary factors, respectively, leading to acidification in the Earth surface’s system. Over the long-term, it is well known that alkalinity has fluctuated largely in the Earth’s surface environment. Therefore, it is important to quantitatively reconstruct alkalinity, which is another key factor determining the saturation state of carbonate minerals.

キーワード：地球温暖化、海洋酸性化、石灰化生物、炭酸塩、アルカリ度
Keywords: global warming, ocean acidification, calcifiers, carbonate, alkalinity