Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)
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BPO02-P01 会場:コンベンションホール 時間:5 月 25 日 17:15-18:30

高 pCO_2 海水における大型有孔虫殻の酸素炭素同位体比
The effect of high pCO_2 seawater on foraminiferal oxygen and carbon isotopes

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Ocean acidification in response to rising atmospheric pCO_2 is generally expected to reduce rates of calcification by reef calcifying organisms, with potentially severe implications for coral reef ecosystems. Various studies have revealed potentially dramatic responses in a variety of calcareous organisms to the range of pCO_2 values projected to occur over this century. In our previous culture experiment with two algal symbiont bearing, reef dwelling foraminifers, *Amphisorus kudakajimensis*, which hosts dinoflagellate symbionts, and *Calcarina gaudichaudii*, which host diatom symbionts, in seawater under five different pCO_2 conditions, net calcification of *A. kudakajimensis* was reduced under higher pCO_2 , whereas calcification of *C. gaudichaudii* generally increased with increased pCO_2 . These different responses among the two species are possibly due to differences in calcification mechanisms (in particular, the specific carbonate species used for calcification), and to links between calcification by the foraminiferal hosts and photosynthesis by the algal endosymbionts. However, knowledge about the factors of different calcification responses is poorly understood. To shed light on the factors leading to different calcification response to ocean acidification between perforate and imperforate, we analyzed the stable isotope composition of reef-dwelling foraminifers: *Amphosorus hemprichii*, belong to imperforate species, *Baculogypsina sphaerulata* and *C. gaudichaudii* belong to perforate species, subjected to five varied acid seawater for twelve weeks almost same as above-mentioned culture experiment. Oxygen isotope ratio value of cultured foraminiferal tests under five varied pCO_2 seawater, which temperature and intensity of light was adjusted constantly for experimental period, indicated no significant correlation to pCO_2 . The results show that oxygen isotope ratio stay constant within narrower range from CO_3^{2-} concentration (111 to 264 umol/ kg). On the other hand, carbon isotope ratio of foraminirferal tests indicated heavy trend with increasing pCO_2 . Alteration of carbonate chemistry result from ocean acidification may be effect strongly on carbon isotope composition relate to metabolic system (i.e. photosynthesis and respiration). In perforate species, both of oxygen isotope ratio and carbon isotope ratio was lighter than that in imperforate. For oxygen isotope ratio variation possibility among species would be caused by their Mg-content concentration in calcite shells. The distinct difference in the level of carbon isotope ratio values between imperforate and perforate foraminifera indicates different amounts of metabolic CO_2 used for shell construction. Therefore, oxygen and carbon isotopes ratio of foraminiferal test have the potential to reveal calcification mechanism of two species.

キーワード: 海洋酸性化, サンゴ礁棲有孔虫, 飼育実験, 酸素炭素同位体, 石灰化
Keywords: ocean acidification, reef-dwelling foraminifera, culture experiment, oxygen and carbon isotopes, calcification