

Impact on planktic foraminiferal test (*G. bulloides*) calcification caused by sea-surface condition

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Discharged anthropogenic CO₂ gas has been accumulating in the oceans, lowering seawater pH (ocean acidification), and could reduce calcification rate of marine calcareous organism. In order to monitor and evaluate the impact on calcareous organisms by ocean acidification, several proxies of calcification intensity of planktic foraminifera based on test weight have been employed, whereas these proxies are controlled by several factors other than seawater carbonate chemistry. Here we employ 3-D physical measurement by X-ray micro CT scanner into living *Globigerina bulloides* (planktic foraminifera) test, evaluate test characteristics (wall thickness, density and calcification rate), and compared them with ambient seawater conditions for the first time. As a result, seawater carbonate saturation state (Ω_{Ca}) has the most significant correlation with test density, and seawater temperature has the most significant correlation with test wall thickness. Furthermore, traditional proxy of calcification intensity, based on the test weight measurement, is not controlled by test density but by calcification rate and wall thickness, indicating that these traditional proxies are not suitable to evaluate the impact on living *G. bulloides* calcification from ocean acidification, and 3-D physical measurement by X-ray micro CT must be a powerful tool replacing them.

Keywords: Planktic foraminifera, Ocean acidification, test density