

Growth history of abalones collected from off Shima Peninsula, central Japan, based on stable oxygen isotope analysis

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Abalone is a molluscan group which has been familiar to Japanese people for a long time. It has been cultivated as food and decoration for many years. Abalone shell is mainly composed of biomineralized calcium carbonate (CaCO_3). Calcium carbonate is made by calcification to happen within an organism. It is known that the formation of such biomineral is influenced by environment and a life history of organism. In this study, we clarify that environmental factors and a life history have influenced on the biomineralization of abalones based on oxygen stable isotope analysis and shell morphology.

We examined two species of abalone shell of *Haliotis madaka* and *Haliotis discus discus*, which were collected from off Shima Peninsula, central Japan. Shells of these species are composed of the outer layer of prismatic aragonite including minor calcite, middle layer of nacreous aragonite and inner layer of nacreous aragonite. Powder samples for isotopic analysis were drilled from the outer layer of the shell along the shell growth. As a result of the isotope measurement, the oxygen profiles of two shells show about 6 cycles indicating seasonal variations of water temperature. Calculated water temperatures from oxygen isotope values during first to third cycle almost correspond to the temperature of water depth where the abalones inhabited. After third cycles of both specimens, calculated temperature variations decreased gradually. Summer water temperatures of *H. madaka* and summer to autumn temperatures of *H. discus* were not recorded in these shells. Generally the sexual maturation of abalones may happen at around third cycle. Therefore, these changes around third cycle in the two species may be caused by preparation or starting to spawn during autumn to winter. Thus, it is considered that these species changed their energy priority from shell formation to gamete formation after third cycle. *Haliotis madaka* and *H. discus discus* probably recorded an environmental change and change of metabolic activity in stable oxygen isotope ratio of the shells and shell morphology.