Chemical composition of deep-sea precious corals (Corallium spp.) from the northwestern Pacific

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Recently, deep-sea precious corals attract much attention because climatic information and the history of deep-ocean circulation changes could be obtained from those corals with huge geographic and depth ranges in the ocean. Oxygen and carbon isotopic ratios as well as elemental compositions incorporated in the calcite skeleton of these corals have been proposed as a method for obtaining information from intermediate and deep-water environments. In the northwestern Pacific, there are several species of deep-sea octocorals including Corallium japonicum (red coral), Corallium konojoi (white coral) and so on. These corals have been called 'precious corals' because of their use in the jewelry industry.

In the present study, we analyzed stable isotope ratios and elemental composition, together with radiocarbon (14C) dating, of three specimens of deep-sea precious corals from NW Pacific. We examined the spatial variability of oxygen and carbon isotope ratios, Mg/Ca, Sr/Ca and Ba/Ca ratios along the growth axis of the basal part of stem of corals. Relatively large variations in oxygen isotope ratios along the growth axes of corals were found (˜2-3 per mil). The large variation may not be attributed to temperature and salinity changes of intermediate or deep water in the region, but the variation is probably influenced by a growth-rate-related kinetic isotope effects.