

Occurrence and formation process of Holocene dolomite concretions found in Nagoya port

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Carbonate concretions are known to be widely distributed in the world, and mainly composed of calcite and dolomite as the main minerals. However, there are few studies focusing on the formation mechanism of dolomite concretions. In this study, we attempted to clarify the formation process of dolomite concretions collected from unconsolidated marine sediment near the Nagoya Port.

Concretions hold biological remains such as crabs, sea urchins, and shells, and the interiors of all the fossils were cemented. The size of the concretions are several centimeters in scale. Concretions were found at a maximum depth of 13 m in unconsolidated sediments. Fossilized crabs, in particular, have maintained their shell without disintegration, as they were rapidly concretized. For these concretions, we performed X-Ray Diffraction analysis, X-Ray Fluorescence analysis, microscopic observations, and radiocarbon isotope age dating.

Based on XRD analysis, dolomite is detected as a major mineral component, and based on XRF analysis, averaged 19.1% of MgO consist of concretions. In addition, microscopic observations suggested that the existence of numerous fecal pellets of about 1 mm in scale.

The results of age dating by ¹⁴C of inorganic carbon of concretions were calculated to 7800-8800 BP. It is remarkable that ¹⁴C ages of concretions have a few hundred years older than that of the fossil shell.

These lines of evidence indicate that the concretions have formed rapidly in anoxic environment such as where the dolomite could precipitate.

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