

Radiocarbon dating of Holocene carbonate concretions in Nagoya and Shimizu ports, central Japan

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Carbonate concretions are found in various geological formations worldwide, including in Nagoya and Shimizu ports located in central Japan. These concretion samples often contain biological remains and organic matter, such as organisms, which are believed to play a role in the concretion formation process [1, 2]. To better understand this process, it is important to conduct geochemical evaluations using concretions with known formation ages. In this study, we measured ¹⁴C ages and δ¹³C values of both the shell and concrete parts of concretion samples collected from the Nagoya and Shimizu ports. The ¹⁴C ages of the shells were found to be approximately 7850–7600 cal BP at Nagoya Port [3] and 7700–7500 cal BP at Shimizu port, while the ¹⁴C ages of the Shimizu concretion were approximately 7840–7620 cal BP. The ¹⁴C age of the concrete part of the concretion from Nagoya port was older than that of the encapsulated shell; however, after age correction, which involved estimating the contribution of soil organic carbon with an old age based on the δ¹³C value, the age was found to be close to that of the shell, ranging 8000–7800 cal BP. The age corresponds closely to the marine transgression to regression period occurring around 7800–7300 cal BP during the Jomon period in Japan. This suggests that the carbonate concretions in Nagoya and Shimizu ports formed rapidly after the death of organisms in an environment characterized by high sea levels and stagnant currents. Further research is expected to estimate sea level and paleoenvironmental changes during the Jomon period.

[1] Yoshida, Yamamoto, Minami, Katsuta, Shirono & Metcalfe (2018), *Sci. Rep.* 8, 6308.

[2] Yoshida, Ujihara, Minami, Asahara, Katsuta, Yamamoto, Sirino, Maruyama, Nishimoto & Metcalfe (2015), *Sci. Rep.* 5, 14123.

[3] Minami, Kuma, Asai, Takahashi & Yoshida (2022), *J. Geol. Soc. Japan* 128, 239-244.