

## Reconstitution of the environment of Submarine Groundwater Discharge (SGD) in the near past by using carbon and oxygen stable isotope ratio in the shell of bivalve

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We tried to reconstitute the environmental condition of Submarine Groundwater Discharge (SGD) in the near past by using carbon and oxygen stable isotope ratio in the shell of Manila clam (*Ruditapes philippinarum*). We conducted the rearing experiments of Manila clam collected at Mie Prefecture under field conditions. The field experiment was carried out at 5 sites under different SGD condition in Obama Bay, Japan from September 5th to October 24th 2019. A small piece of the shell was cut from the shell edge along the major growth axis. A cross section (1mm thick) was then cut. Calcium carbonates samples were drilled to a depth of 500  $\mu\text{m}$  in the middle of the prismatic layer using a high-precision micromill “GEOMILL326” fitted with a 300  $\mu\text{m}$  diameter drill bit. The contribution rates (FGRc and FGRo) of SGD were calculated by using the two end member mixing equation. In Obama Bay, The FGRc estimated from the shell were well consistent with that estimated from the  $\delta^{13}\text{C}$  of ambient water. However, FGRo (which was calculated by  $\delta^{18}\text{O}$ ) was not always consistent. Possible reason for the error as follows; the water temperature substituted in the equation which was used for estimating the  $\delta^{18}\text{O}$  in the ambient water in the near past was not suitable.

Keywords: Submarine groundwater discharge, Carbon stable isotope, Oxygen stable isotope, Shell