

The origin of submarine groundwater discharge in the coastal zone of Hiji, Oita prefecture

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It is believed that groundwater discharges from the seabed of the coastal zone of Hiji, Oita prefecture. The marbled sole which lives around this submarine groundwater discharge (SGD) is called the "Shirosita Karei", and is held in high regard by the local community. From ancient times, local people have believed that this Shirosita Karei grows because of SGD. However, the ecological link between marbled sole and SGD has not been well established. Moreover, although it is clear that there is SGD in the area, there is almost no information about the origin and dissolved components of the SGD. In this study, we directly collected SGD and analyzed its chemical composition and water stable isotopes. Additionally, we analyzed the chemical composition and water stable isotopes of the inland cold spring water. We considered the origin of the SGD by comparing the result of the SGD analysis and the inland cold spring analysis. Since we expected that the temperature of SGD would be different than seawater, we used a thermometer for the identification of the discharge location. We inserted a stainless steel pipe in the identified location and collected SGD water. The sodium concentration from the collected SGD water was 12.1 mg/l, indicating fresh water. The isotopic composition of the SGD water resembled that of the inland cold spring water. The recharge area of the inland cold spring water is at an elevation of 200 m or more. These results suggest that the SGD water comes from an elevation of 200 m or more. It indicates that the origin of SGD is water recharged in the forest area of the mountain slope, and that the water moves under the plain and is discharged at the seabed.

Keywords: Submarine groundwater discharge, Stable isotope, recharge area, Hiji