

Relationship between the distribution of freshwater groundwater under the seabed at Obama Bay and the surrounding terrain of the land

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In Obama bay at north side of Obama City, Fukui Prefecture, research on submarine groundwater discharge (SGD) has been actively carried out so far, and it is clear that the SGD are discharging in Obama Bay. However, there are still many unclear points about the situation of SGD, that is, the distribution of freshwater groundwater under the seabed. Therefore, in this research, in order to clarify the distribution of freshwater groundwater under the seabed, we conducted the survey of resistivity distribution under the seabed by using a towing electric exploration system (SuperSting: Advanced Geosciences, Inc.). We discussed about relationship between the distribution of freshwater groundwater under the seabed and the surrounding terrain of the land from the results and the surrounding land topography.

The range indicated by the resistivity value under the seabed was approximately 0.1 to 6.2 Ohm-m. The place where the relatively high resistivity value of 1 Ohm-m or more was seen was mainly the place close to the land of the alluvial fan. At the north survey area, Observation towards the offshore direction revealed that the high resistivity area extended towards the offshore area. However, further offshore there was no place of high resistivity. These facts suggest that there is a possibility that freshwater groundwater is present in the high resistivity area extending about 500 m from the shoreline to the offshore.

At the estuary of the Kita-river in the south survey area, a high resistivity area was found at a distance of 1 km from the shoreline, suggesting the possibility that freshwater groundwater is present there. According to the bathymetric chart of Obama bay, the slope of the seabed at the offshore of Kita-river is gentle from estuary towards the ocean, which is considered to be covered with sediments derived from Kita-river. The place where high resistivity was observed corresponds to that part. In other words, it is considered that freshwater groundwater is present in the fan-shaped sediment. The above suggests that the groundwater flowing through the basement of the fan in land area may flow through the alluvial fan sediment under the seabed and supply freshwater groundwater under the seabed.

As a result, it was suggested that the distribution of freshwater groundwater under the seabed in Obama Bay was influenced by the spread of the alluvial sediment at the seabed and related to the shape of the alluvial fan in land area.

Keywords: Submarine Groundwater Discharge, Alluvial fan, Obama Bay