

Marine electrical exploration at the Kujukuri coastal area

Daijiro Uehara[1]; Akira Kikuchi[2]; Atsushi Tanaka[1]; Yuji Mitsuhata[3]

[1] Sumicon; [2] SUMICON; [3] AIST

High-density electrical exploration was carried out at the Kujukuri coastal area to investigate the geological structure and the freshwater/saline-water interface.

We laid down bundled cables, whose length is 520m on the sea floor (marine survey line) and 360m on land (land survey line). Basic electrode separation is 20m and pole-pole array was adopted to acquire potential data. Resistivity of the survey area are very low, so electrical potential are low as well. The maximum electrical separation with which to acquire reliable electrical potential data is 200m on the land survey line and 100m on the marine survey line. From the two-dimensional inversion analysis, the resistivity structure at the depth up to nearly 40m was obtained.

Resistivity structure of under the coastal plain are horizontally stratified. Shallow parts are resistive and deep parts are conductive. This character suggests that fresh water infiltrate from the surface and mingle with the saline-water in the deeper part.

Resistivity structure of under the sea floor is slightly dipped toward the offshore. Shallow parts are very conductive and deep parts are relatively resistive. This character suggests that the porosity decreases in proportion with the depth from the sea floor. We recognized a relative resistive body in conductive layer is in accordance with the seabed groundwater discharge estimated by Marui et al. (1999). This indicates that fresh ground water make the sea floor resistive.

As above, high-density electrical exploration have high ability to investigate the geological structure and the ground water structure. Denser data acquisition leads to images with higher resolution, which make it possible to explore the seabed groundwater discharge with a high degree of accuracy.