O222-P012 **Room: Poster Session Hall** **Time: May 21**

Ground water imaging using ground penetrating radar at Aramata Coast in Kurobe alluvial fan

Toshiyuki Yokota[1]; Kyosuke Onishi[2]

[1] Institute for Geo-Resources and Environment, AIST; [2] Civil & Earth Res. Eng., Kyoto Univ.

1. Introduction

Recently, ground water resources came to be paid attention. Delineation of ground water distribution is an important issue in various fields such as: security of subsurface water resources for drinking water and irrigation to cereals, environmental safeguard about water pollution or diffusion of a pollutant, or disaster prevention in civil engineering fields such as detection of water leaks from underground buildings.

In the present research, we considered about ground water in Aramata Coast, Kurobe City, Toyama. Aramata Coast is located in the end of the Kurobe River alluvial fan that developed in the river mouth of the Kurobe River which is known as one of the most rapid rivers in Japan. In the end of Kurobe River alluvial fan, it is known that free water level is high, and free water inflows are observed at many spots in a wide area (Toyama University science research organization, 1966). Submarine groundwater discharge is also observed at many spots. It is important to grasp its actual state for considering the problems like evaluation of its influence to coastal ecosystem and inflows of land origin pollutants to the sea area. For better understandings of free and submarine ground water discharges, it is desirable to know the ground water in the alluvial fan as broadly and high density as possible.

For ground water surveys, we have been using boreholes. Reliability of the borehole surveys are quite high; however, may not always provide the data with sufficient spatial density because the number of the boreholes are limited. In such cases, spatial interpolation of data obtained at the borehole positions using geophysical survey is widely performed. For ground water survey purposes, electric of electromagnetic survey methods are frequently used because they are sensitive for ground water. Among the electric of electromagnetic methods, ground penetrating radar (GPR) has highest resolution and fastest survey ability.

This research describes the results of ground water survey using GPR at a beach. At the data acquisition, high accuracy and highly efficient survey was carried out using real-time kinetic GPS. Date quality of deeper portion was enhanced by CMP stacking using wide angle GPR reflection data sets. As a result, ground water distribution about 2 m below ground surface is imaged precisely. Adding to that many reflectors below the ground water are also imaged, and finally, we could image subsurface geological structures down to 6 m deep from ground surface

2. Experiment summary and results

Pulse radar antennas with central frequency of 200 MHz are used for data acquisition. A highly efficient common receiver GPR data acquisition was performed with real-time antenna positioning using real-time kinetic GPS aimed at data acquisition of high quality in high efficiency.

The data processing with prestack migration was performed for getting highly reliable depth section and electromagnetic velocity distribution. A migrated depth section was shown in Fig. 1. A reflector with high horizontal continuity is seen in the direction at the depth about 2m. The reflectors with various slants were seen by about 6m depth and, electromagnetic velocity could be determined with such reflection events from deeper portions. As a result, because the electromagnetic velocity of depth 2m - 6m section showed wet sand velocity, we could interpret that a reflector at the depth about 2m corresponds to the water table.

3. Conclusion

For the purpose of ground water and shallow geological structure surveys at Aramata Coast of Kurobe City, Toyama, GPR surveys were carried out.

As a result, a clear reflector with strong horizontal continuity was caught at the depth about 2m. Clear reflection wave events were caught to about around 6m depth. It was understood the shallower reflector was equivalent to a water table, and this result was conformal with observation of neighboring wells.

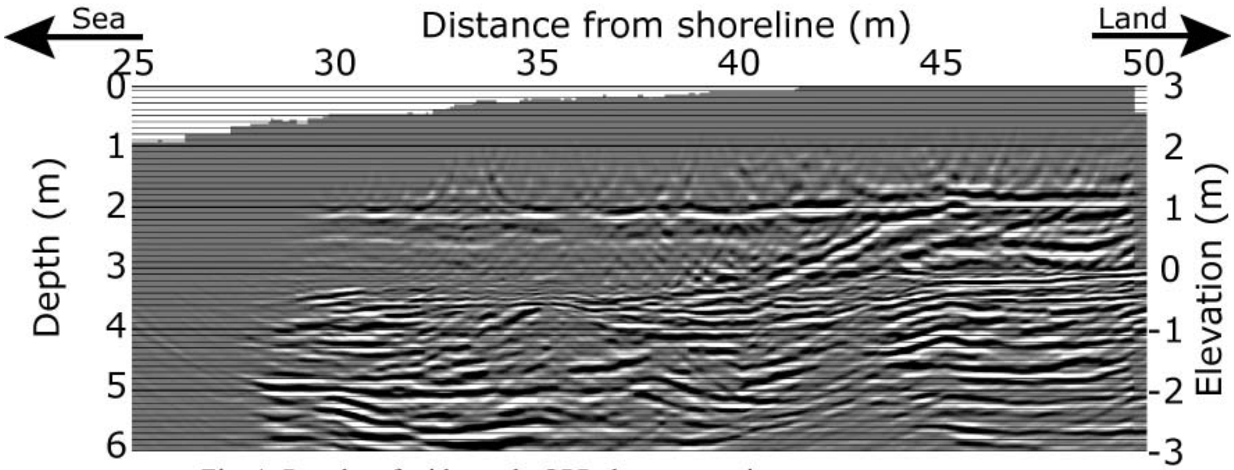

Fig. 1. Results of wide angle GPR data processing.