Preliminary Results of Wideband-MT surveys in Dewa Hills, Akita Prefecture, Japan

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Wideband-MT soundings were carried out across the Dewa Hills, Akita prefecture, Japan. The survey line is across the focal area of 1914 Akita Senboku earthquake and its vicinity area. The characteristics of the observed apparent resistivity are summarized as follows : (1)Apparent resistivity show very low values(<10 Ohm-m) for periods shorter than 1 sec. (2)Apparent resistivity values have a tendency to become higher toward the long period band longer than 1sec. The former is interpreted as the Tertiary sediment. The latter is implies that a resistive layer is situated in the middle to lower part of the upper crust.

Electromagnetic observations were conducted across the Dewa Hills, Akita prefecture, Japan. Seismic surveys were also carried out in this area, and revealed the P-wave velocity crustal structure beneath the Dewa Hills. The electrical resistivity is another independent but important physical parameter to image the crustal structure, because it is very sensitive to the existence of fluids in the crust.

In november 1999, wideband(0.01 to 1000 sec) magnetotelluric soundings were carried out by Research Group for Crustal Resistivity Structure at 13 sites along the survey line with 45 km. The survey line is across the focal area of 1914 Akita Senboku earthquake and its vicinity area, and many other thrust faults(e.g., Toridame fault, Kitayuri thrust fault). The main purpose of this survey is to investigate the relationship between electrical resistivity structure and the hypocentral distribution of the microearthquakes. We acquired the electric and magnetic fields data using 11 sets of the MTU5 and MTU2-E systems, owned by GSJ and TIT. All of these instruments were synchronized using GPS. Quality of the data was fair.

The characteristics of the observed apparent resistivity are summarized as follows : (1)Apparent resistivity show very low values(<10 Ohm-m) for periods shorter than 1 sec except two sites. (2)Apparent resistivity values have a tendency to become higher toward the long period band longer than 1sec. The former is interpreted as the Tertiary sediments, which is thought to the basement in this area. The latter is implies that a resistive layer is situated in the middle to lower part of the upper crust, contrary to a conductive layer is distributed widely and thickly in the upper part of one. The microearthquakes occurred in and around the Senya fault are concentrated in the middle to lower part of the upper crust, where resistivity is high(RGCRS, 2000). Therefore, the microearthquakes, occurred in the deeper part than 5 km in depth(Asano, personal communication), in 1914 Akita Senboku earthquake, may be concentrated in the high resistivity layer according to above mentioned features. We will present the preliminary analysis derived from MT impedance and discuss two-dimensional resistivity model.