

Case studies of the survey of induction method using GEM-2 -- along the sand beach and above the intrusive rock --

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GEM-2 is the electromagnetic instrument used in this study. Since it can simultaneously operate multiple frequencies in the broadband domain from 300 Hz to 96 kHz, we will be able to estimate the distribution of the conductivity to the depth direction. The purposes in this study are detection of the boundary of freshwater of the creek and seawater at Katsurahama coast in Akita city and examination on the anomaly of the electrical conductivity above the intrusive rock at the quarry site in Sugisawa, Daisen city, Akita prefecture.

On the exploration at Katsurahama coast, the freshwater of the creek has the characteristics of the low electrical conductivity of 0 to 40 mS/m. On the other hand, the high electrical conductivity is seen on a part of the western sea side. The change in the low conductivity to the depth beneath the creek cannot be observed, but on the part of the high conductivity on the sea side the change to the depth can be detected. The conductivity is higher at the shallower depth compared with deeper place at the part of the high conductive western sea side. I consider that the high electrical conductivity of the shallow sea side is more influenced by the invasion of the seawater.

At the quarry site in Sugisawa, the anomaly of the low electrical conductivity surrounded by the high conductivity is seen above the intrusive rock by the exploration. The distribution of the high electrical conductivity is considered to be due to alternation and mineralization in the contact part of intrusive rock and pre-existed rock. Examining the tendency of the depth change of the distribution of the low conductivity surrounded by the high conductivity above the intrusive rock, it is said that the structure change cannot be seen to the depth from 5 to 19 m.

I understand that the resolution by the exploration using GEM-2 is excellent at shallow depth, but that GEM-2 is easy to catch the noise when the exploration depth exceeds 10 m. In other words, GEM-2 is easy to catch the noise when we operate it with low frequencies. It is sometimes necessary to remove noises on low frequency operation. In this study, I successfully remove the noises and improve the data with taking the median values and using the running mean method on a finite length of data section.

Keywords: electromagnetic survey, induction method, GEM-2, freshwater/seawater interface