

The old river range and channels in the Hotta Stockade Site in Daisen-city and Senboku-Gun Misato town in Akita Prefecture

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Hotta Stockade Site is a wooden palisade site. Its location covers the Daisen city and Senboku-Gun Misato town in Akita Prefecture. The excavation clarified that the river flowed from east to west in this site in a zigzag form. This river trace has the depth of about 30cm near the surface, and the width is 4.5-6m. It has also been confirmed that this river trace is the channel of the last stage. In addition, the sandy soil is in the depth of about 2m from the surface, and the gravel layer exists below it. The width of the gravel layer is about 60-70m. This gravel layer recorded a large flood event. The purpose of this study is to clarify the old river trace and riverbed expected by the sandy soil and gravel layer by the technique of electrical exploration method.

The horizontal and vertical electrical prospecting is applied to the place where the underground structures are defined by the excavation, and features of the resistivity change are grasped. By this preliminary research, 30 Ohm-m layer obtained by vertical electrical prospecting corresponds to the clay layer or the blue gray silt layer. The part in which the upper surface in clay layer rapidly deepened from the 0.5-0.7 meter was regarded as a boundary in the riverbed. The position of the beginning of the sandy soil and the clay layer was illustrated by the horizontal electrical prospecting with the electrode spacing 3 to 5 meters. The similar examination was carried out in north-south and east-west direction, and estimated the distributional configurations of the riverbed.

The river of the last stage can be expected over the upper sandy soil in natural ground clay layer. Since the material of the clay is included, its resistivity shows lower value. In the horizontal electrical prospecting of electrical exploration, the river trace of the last stage could be probed, if electrode interval was set to about 1m. The candidate of the river of the last stage is the part which shows higher resistivity compared to the clay layer in the base rock, and shows lower resistivity than the circumference. The part in which the resistivity was lower than 60 Ohm-m in the range of 1m depth from the surface was determined to be a channel in the last stage. Southern and northern boundaries in estimated riverbed and channels in the last stage agreed well with the excavation. The result of the hand boring was also concordant with these results.