

New technology for elucidating archaeological sites (land edition)

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There has been dramatic progress in recent years on the investigation of the archaeological sites in the Amami Islands. This progress has been because each local government in the Amami Islands has a curator (or curators) specializing in archaeology. Furthermore, academic researches and excavations accompanying land development have dramatically increased. Not only have the number of excavations increased, but also the introduction of new technologies has enabled further investigation of the discovered sites than in the past. Let's introduce practical examples from the field and the results obtained from them.

Archaeological excavations primarily involve recordkeeping, using photographs and drawings. This is to broadly convey the situations at the sites by showing the locations and shapes of the remains (buildings, tombs, etc.) excavated from the sites in a drawing. The past events confirmed in the excavation area are represented in a drawing, and the history of the land is examined from its characteristics. In that sense, archaeological excavation can be rephrased as the one way to make a historical map.

On-site mapping work has mainly been conducted by handwriting until recent, but nowadays a range-finding device called a "total station" has been used, enabling the measurement of a wide area with a high level of accuracy. The use of digital cameras and GPS is quite commonplace. Drone-generated aerial photographs and ortho-images (photographs that correct distortion of shot image and have accurate positional information and scale data) are also being adopted.

These devices are used to create a plan view of large villages spanning tens of thousands of square meters at the Gusuku site group in Kikaijima. The devices have also been used to record, in detail, the internal shapes of cave sites and ancient tombs in steep cliffs on Okinoerabujima and Tokunoshima.

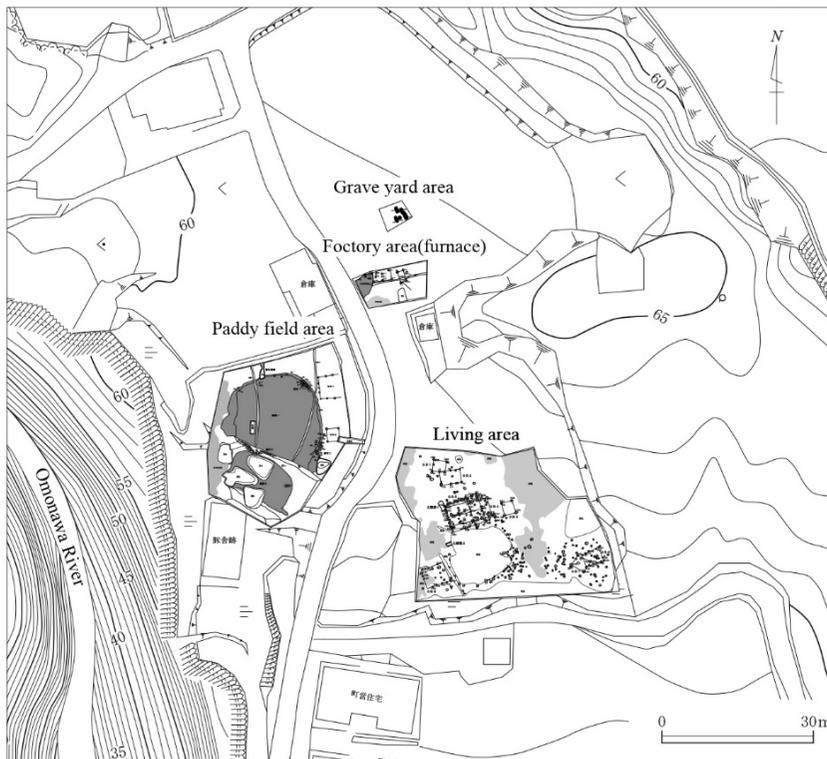
A village operated in the flatland area on a limestone plateau in the Maeatari site (Gusuku period: 11th to 12th centuries) in Omonawa, Isen town, which I have conducted an excavation, and paddy fields were confirmed in the adjacent valley. These new types of technological devices make it possible to reflect a floor plan of the survey area in the surrounding topographic map and represent the land use in the Gusuku period as a map. The coordinates of the world geodetic system are the standard, so the new technology also makes it possible to place information on archaeological sites on a world map.

Remot-sensing methods have also been developed that can investigate underground objects and structures without excavating sites. The Tokunoshima Kamuiyaki pottery kiln site

(11th to 14th centuries) comprised a group of kiln sites buried in a forest of over 100 hectares. A magnetic probe-based survey was conducted to identify the places where the kilns were buried. Soil contains a large amount of iron, so heating this to high temperatures using a fire, results in the material developing stronger magnetic properties than its surroundings. A magnetic probe can detect this magnetic anomaly.

Explorations of areas where many Kamuyaki pottery pieces were found in the forest revealed several magnetic anomalies, increasing the likelihood that many kilns were buried in the ground. Combining these results with high-precision topographic maps created at the same time as the exploration allowed for the mapping of the remaining kiln sites, making this a successful example of a survey that clarified the current state of the sites without excavation.

Archaeology is known as a discipline in the humanities, but it is indispensable to collaborate with various disciplines to unravel the history of an area from the traces that people in the past carved into the earth. How did the people of the past face nature; how did they use it? Further understanding the history of island civilizations and depicting them even more vividly requires the selection of the best methods according to the characteristics of the archaeological site while keeping an eye out for new technical development, and a challenging spirit to gain new knowledge. Curators should play a large role in this process.



Plan view of the excavated area of the Maeatari site in Omonawa, Isen town. Paddy fields were found in the valley on the west side facing the Omonawa River, and traces of buildings and tombs were found on the flat land at the foot of the hill on the east side.