

## **New technology for elucidating archaeological sites (seabed edition)**

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Traces of the activities of people in the past can remain not only on land but also on seabeds, lakebeds, and riverbeds. Typical examples are harbor sites and ship moorings found on the beach and downstream of the river, and sunken ships on the seabed. The Kurakizaki underwater site (Uken village), where many Chinese ceramics dating from the 12<sup>th</sup> and 13<sup>th</sup> centuries were discovered, are famous on the Amami Islands. However, iron anchors and *Ikariishi* (weights for sinking wooden anchors) were also found in the sea at the ports in Omonawa and San ports. The three towns in Tokunoshima (Tokunoshima, Amagi, and Isen) that focused on these discoveries have engaged in efforts to investigate cultural properties that sank into the sea and have begun excavating the history of the area.

Underwater sites are often found because of information from divers and fishermen. Some examples of this are a bottom trawl net pulling up items on the seabed, or when part of the wrecked ship or an anchor when a diver finds an anchor accidentally during a recreational dive. The ocean is more expansive than the land, so random diving does nothing but consume time and energy to find archaeological sites. Therefore, it is important to narrow down the diving points by collecting historical information on the coastal waters by examining local historical materials and folklore with the cooperation of people who are involved with the sea every day. It is also important to walk along the beaches and reefs of the sea and collect materials that have washed ashore. Archaeologists sort out this information and select target areas where they should investigate.

Cultural properties found in the water are fragmentary materials of underwater sites, but let's examine how to reflect these places on a map. Tokunoshima is known as the location of the Tokunoshima Kamuiyaki pottery kiln site (11<sup>th</sup> to 14<sup>th</sup> centuries). The shipping port that was the starting point for transporting Kamuiyaki pottery to various areas has not yet been found. For these reasons, the three towns of Tokunoshima have decided to investigate the sea area around the island by cooperating beyond their respective towns and boldly taking on the challenge of elucidating the history of the sea in anticipation of the discovery of the Kamuiyaki shipping port.

What are the characteristics of the sea area that are likely to be related to the traffic of ships? To clarify this question, historical information obtained through interview surveys, coastal surveys, and a collection of local historical materials were recorded on a map, and seafloor topography surveys were conducted in areas where results were concentrated. The multi-beam sonar used for seabed surveying is a device that measures the distance (depth) to the seabed by calculating the time it takes for sound waves emitted from the ship to reflect off

the seabed and return, so that a seabed topographic map can be created under the navigation route of a GPS-equipped ship. Multiple iron anchors with four claws (Edo period) have been discovered around Omonawa port in Isen town. However, it became clear when the locations of those discoveries, recorded in the preliminary survey, were displayed on the completed topographic map of the seabed that the anchors used for the ships were distributed in the crevices of coral reefs. It is speculated that the sailors of that time were anchoring their ships in deep areas to avoid grounding on the rocks. We were surprised at their high level of knowledge about coastal topography in an era when it was difficult to grasp underwater conditions without diving equipment.

We do not know the location of the shipping port of Kamuiyaki, so these investigations will continue. However, it is certain that underwater exploration equipment will be effective in elucidating the history of island civilization. It may not be too long before the unknown sea area history is disclosed by combining traditional method (historical information gathering on land by interviewing people and visual inspection underwater) and new technology which enable us to explore the bottom of the water.



**Iron anchor with four claws found at Omonawa port (photographed on November 16, 2015). Photograph shows the process of attaching floats to acquire GPS data on the water's surface.**