

Bathymetric mapping and seafloor imaging for finding historical records of Nankai earthquakes at Nomi bay in Susaki city, Kochi Prefecture, Japan

*Wataru Tanikawa¹, Masafumi MURAYAMA², Hidekazu Tokuyama³, Kouki Tanaka⁴, Akira Ijiri¹, Tatsuhiko Hoshino¹, Takehiro Hirose¹, Kazuya Kitada⁵, Toshiya Fujiwara⁵

1. Japan Agency for Marine-Earth Science and Technology, Kochi Institute for Core Sample Research, 2. Kochi University, Faculty of Agriculture and Marine Science, 3. Kochi University, Center for Advanced Marine Core Research, 4. Kochi University, 5. Japan Agency for Marine-Earth Science and Technology

In a coastal area of Nomi bay (Susaki city, Kochi Prefecture, Japan), a traditional tale about a village named Kuroda-gori (or Nomi sengen, Otani sengen), which was probably submerged during the Hakuho Nankai earthquake of AD 684, has been passed down orally. Local residents reported a well on the seabed at Nomi bay. However, evidence linking Kuroda-gori to these sites and to historical earthquake is lacking. Therefore, we investigated seabed at Nomi bay near Heshima Island and Otani area to find the artifacts that can be related to historical earthquakes.

Our data were obtained from a research boat “Neptune” of Kochi University. The detailed bathymetric maps and the acoustic reflection distribution maps were acquired by a side-scan sonar system. A sub-bottom profiler was also used to obtain a geological structure below the seabed. Underwater omnidirectional camera was used to observe seafloor carefully.

In a bathymetrical map, the small submarine plateaus (200m×300m in area) was found on the north-western part of Heshima Island, delimited by a steep slope. The plateau was located at the depth of around 10 m. Sediment sampling by gravity corers and underwater images from camera showed that the seafloor on the plateau was composed by hard sandy materials and large conglomerate blocks. On the contrary, the seafloors on the outside of the plateau was composed by soft clayey sediments. No artifact or artificial structure were observed from the sub-bottom profiling data. Several strange mosaic images were obtained from the side scan sonar, and then divers identified some of the strange images were artifacts (an octopus pot, a vinyl sheet). We did not discover a well on the seafloor from mosaic images, underwater camera, or sub-bottom images.

The submarine plateau was probably formed by wave-induced erosion, and Shimomura (1980) reported the similar submarine structures and concluded that the plateaus was formed by the subsidence during the Hakuho Nankai earthquake of AD 684. While any well-like structures were not found, gravels (boulder) arranged in a circle were observed. Therefore, the well that local residents suggested might be the gravels. We plan to perform dating analysis (e.g. radiocarbon dating) using subsea floor sediments at the plateau to assess the co-seismic subsidence. We present preliminary results obtained from a scientific cruise at Urano-uchi Bay on March 2019.

Keywords: coseismic subsidence, Kuroda-gori, submarine plateaus, side scan sonar, sub-bottom profiling