

Submarine rock forming structures at shore of Kochi Prefecture and their correlation with historical Nankai earthquakes

TANIKAWA, Wataru^{1*} ; YAMAMOTO, Yuhji² ; MURAYAMA, Masafumi² ; TOKUYAMA, Eiichi² ; WAKAKI, Shigeyuki¹ ; HIROSE, Takehiro¹ ; IJIRI, Akira¹ ; HOSHINO, Tatsuhiko¹

¹JAMSTEC/KCC, ²Center for Advanced Marine Core Research, Kochi University

Ancient documents and folklores about Kochi area tell the story about 'Kuroda-gori' which is the small village that was thought to be submerged by the historical Nankai earthquakes. An interesting fact is that ancient artificial buildings and artifacts had been found in seafloor at the shores of Kochi Prefecture. Historical tsunami disasters might have formed these artificial artifacts, though, the relationship between the ancient foundation and the historical Nankai earthquake is not well understood.

A rock forming structure which looks like ocean bank was formed under sea along the coast near the Kashiwa-jima, a western end of Kochi Prefecture. This ocean bank with 2 m height is made by stacking conglomerates, and spaces between conglomerates were filled by solid fine grained matrix, which bond to conglomerates strongly. This 'ocean bank' is elongated along the coast and parallel to the historical onshore bank made in the Edo period. These features indicates the structure could be an artifact. However, conglomerates were randomly piled up, and the similar structures, called as beach rock, can be formed in natural sediment process. 'Artificial' concrete was began to use as building materials in the Meiji period. Therefore, three assumptions listed below are possible to explain the bank like structures in Kashiwa-jima.

1. Real ocean bank made by artificial cement material, which was used as bank and local harbor
2. Beach rock (natural structure)
3. A man-made stone wall, only matrix cement was formed by natural phenomena

Revealing the origin of the seafloor structures are interesting itself, though to evaluate the coseismic uplift and subsidence process and the scale of earthquake-induced disasters, it is important to investigate the age and the environment in which the structure was built.

In this study, we carried out radiocarbon dating, Sr isotope analysis, and chemical analyses (XRF, SIMS) to determine the age and environment when and where the structure was built. These data are compared to those from the river banks near Kochi city and the onshore banks near the ocean bank.

Acknowledgement

We appreciate the technical support by Nippon Kaiyo Ltd.

Keywords: Nankai earthquake, beach rock, cementation, coseismic uplift and subsidence