Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

HCG37-P05 Room:Poster Time:April 30 18:15-19:30

Subsidence and a change of depositional environment by the 1662 Hyuganada earthquake in southern Miyazaki Plain

IKUTA, Masafumi[1*] ; SATO, Yoshiki[1] ; NIWA, Masakazu[1] ; KAMATAKI, Takanobu[2] ; KUROSAWA, Hideki[3] ; TAKATORI, Ryoichi[4]

[1]Japan Atomic Energy Agency, [2]Akita University, [3]OYO Corporation, [4]Chi-ken Sogo Consultants Co.,Ltd.

The Miyazaki Plain, southern Kyushu Island, have been damaged repeatedly by a number of great earthquakes (measured or estimated to be >M7-8) occurred in not only the Nankai trough but also the Hyuganada coastal region. A total of six great earthquakes happened in the Hyuganada coastal region in the range of AD1909 to 1984. Historical documents indicate such great earthquakes had also occurred in AD1662, 1769 and 1899. Furthermore, the great earthquakes in the Nankai trough, such as the 1707 Hoei Nankai earthquake and the 1946 Showa-Nankai earthquake, had also attacked the plain with terrible tsunamis (Usami *et al*., 2013).

Recently, the Nankai trough has received extensive attention as hypocenter of great earthquake attacking the Miyazaki Plain, because the Central Disaster Management Council (2012) proposed a new source model of the earthquakes including the Hyuganada coastal region. On the other hand, previous geological and seismological studies about past Hyuganada earthquakes are much less than the Nankai trough despite of their high seismic activity indicated by historical documents.

For example, historical documents shows that the 1662 Hyuganada earthquake brought about serious social and natural damages to the plain (Hatori, 1985). Especially, around the estuaries of the Oyodo-gawa River and the Kaeda-gawa River in southern area of the plain, the tsunami with about 4-5 m height and ˜1 m subsidence occurred. This coseismic subsidence made a coastal lagoon around the estuarine area of the Kaeda-gawa River (Shimayama region). After buried by riverine debris, this lagoon was reclaimed and became paddy fields (Miyazaki-city, 1978).

The purpose of our study is to clarify depositional changes around the Shimayama region including coseismic geomorphological change. A multiple geological borings were carried out in the study area. Depositional environments were reconstructed inferred from paleontological, geochemical analyses. Depositional ages of core sediments were estimated by radiocarbon ages. The surface geology was divided into four layers mainly (layer A, B, C and D) in ascending order. The layer A was composed of alternate layers of grayish sand and silt with many angular pumices and organic materials. The layer B consisted of alternate layers of gray or grayish brown mud and sand including numerous well-preserved molluscan fossils. The bottom of the layer B, which covered the layer A above ˜-1.5 m T.P. with 10 to 40 cm thick, was black or dark gray muddy fine sand with bioturbation including rip-up clasts, shell fragments and volcanic rocks with >1 mm diameter. The layer C was composed of gray silt with several thin layers of fine to medium sand and plant fragments. The layer D consisted of silt to fine sand layers and surface cultivated sediments with ˜20 cm thick overlying them.

Result of some analyses showed their quantitative differences corresponding to depositional facies. The main diatom components of the lower part of the layer A was fresh water benthic species such as *Cymbella turgidula* and *Gomphonema parvulum*, and the upper was few diatom fossil. On the other hand, the layer B showed abundance of brackish to marine water species such as *Cocconeis scutellum* and *Thalasionema nitzschioides*. In addition, absorbed water analysis of the core sediments showed that K, Ca, Na, Mg and SO_4^{2-} concentration, which are rich in sea water, were few in the layer A but increased drastically at the bottom of the layer B. And grain size and molluscan fossils species were also different between the layer A and B.

These results indicate that depositional environment changed drastically from fresh water marsh or shallow pond to tidal or inner bay. Depositional ages of the layer A, B and C were estimated from radiocarbon ages to be AD1445 to 1595, AD1549 to 1771 and AD1651 to 1771 respectively and suggest that the depositional environment between the layer A and B correlate to crustal deformation by the 1662 Hyuganada earthquake.

Keywords: Hyuganada earthquake, Miyazaki Plain, depositional environment