Dating of marine terraces based on arrayed boring cores in Chikura Lowland, Southern Boso Peninsula, and restriction of history of Kanto earthquakes

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It is well known that along the Sagami Trough, located in the south of Kanto region, central Japan, two great earthquakes occurred as the 1703, M 8.2, “Genroku” Kanto earthquake and the 1923, M7.9 “Taisho” Kanto earthquake. To increase our ability to forecast such megathrust earthquakes, it is important to paleo-seismologically estimate the history of past events from geological evidences along the coast. The recurrence intervals of these earthquakes have been deduced from 14C age of the shell fossils picked from marine terraces considered that were emerged at the time of the past Kanto earthquakes. Based on these measurements, the recurrence intervals of so-called Genroku type, which is the larger one, have been considered to be ~2,000 to ~2,700 years from these evidences (Nakata et al., 1980). However, some recent studies on paleoseismology (Uno et al., 2007; Shishikura, 2014) and geodesy (Sagiya, 2004) have provided new evidences contradict to such construction, leading to the need for reevaluating the history of the past earthquakes there. In this study, we aim to reexamine the emergence history of the marine terraces in the Chikura lowland, located on the eastern side of the southernmost part of Boso Peninsula based on the arrayed drilling core samples newly obtained by an AIST/GSJ project.
We used the drilling cores obtained from four steps of marine terraces which are named Numa I, II, III, IV, (Nakata, 1980), and identified in Chikura lowland along the two observation lines. We inferred and interpreted the sedimentary environment of the strata of each depth and collected shell fossils for dating marine terraces. We could obtain the fossil samples from strata probably deposited in shoreface suggesting nearly the timing of uplift as inferred from the lithofacies and habitat environment of the shells. The radiocarbon dating was conducted by using accelerator mass spectrometry (AMS) deployed in the Atmosphere and Ocean Research Institute, University of Tokyo, which enabled the highly accurate measurement of approximately 30 years of the measurement error. From the result of radiocarbon dating, it is deduced that the highest terrace (Numa I) in Chikura lowland was emerged at ~6,300 cal yBP, the second (Numa II) was after ~3,000 yBP and the third (Numa III) was after ~2,000 yBP. These dates show the later ages than previously well-accepted data: Numa I was ~7,200 cal yBP, Numa II was ~5,000 cal yBP, Numa III was ~3,000 cal yBP. We considered newly examined the amount of the ocean reservoir effect, $\Delta R = 60 \pm 31$ years.
Compared with the previous results obtained in the other areas in the southernmost part of Boso Peninsula, it is reasonable to consider that the terrace previously regarded as Numa II in Chikura actually corresponds to Numa III terrace of the western coast. Then, it comes to show the existence of some discontinuity of marine terraces between eastern and western coast of the southernmost part of Boso Peninsula. As a result of investigation on the physically constrained fault model, it seemed to be unreasonable to consider the existence of earthquakes, which produced significant gap in the amount of uplift between the eastern and western coasts of the southernmost Boso Peninsula (See the presentation by Komori et al., 2016, this meeting). Thus, the revealed inconsistency in the age of marine terraces may be discussed more in-depth from the viewpoint of the problem in identification of marine terraces or certainty of radiocarbon dating including those for the other areas done in previous studies. We will conduct the similar surveys for the other areas of this region to reexamine the history of the Kanto earthquakes.

Keywords: Kanto earthquake, Marine terrace, paleo-seismology

