

# A new representation and extraction method of marine terraces —application to the Numa terraces in the Boso Peninsula, central Japan

\*Junki Komori<sup>1</sup>, Masanobu Shishikura<sup>2</sup>, Ryosuke Ando<sup>1</sup>

1. The University of Tokyo, 2. National Institute of Advanced Industrial Science and Technology

Marine terraces are recognized as records of relative sea-level changes in the past. The marine terraces, especially, in the vicinity of the oceanic trenches where interplate earthquakes occur often preserve the timings and magnitudes of the paleoearthquakes, so that they have been investigated by a number of geological and geomorphological investigations. One of the most important information which marine terraces have is the present elevations of the paleo-shorelines. It is because paleo-shorelines are landforms formed at the height of the mean sea level and their present altitudes represent the cumulative amount of the vertical dislocation and sea-level changes. In the previous studies, the paleo-shorelines were detected by using aerial photography and field survey. However, such methods require much efforts and moreover may limit the objectivity and repeatability of the landform detection. In this study, we developed a new representation of the digital elevation model (DEM) for uplifted coastal landforms and a new numerical extraction method of paleo-shorelines using it. We used the elevation view as the new DEM representation method. Because the elevation view shows the coastal landform observed from horizontal direction, the paleo-shorelines make nearly straight lines on the elevation view. By using this data arrangement, it becomes possible to extract and connect the paleo-shorelines objectively.

We applied this method to the Numa terraces, distribute along the coast of the southernmost part of the Boso Peninsula, central Japan. The Numa terraces are believed to be formed by 1703 the Genroku Kanto Earthquake (M8.2) and the interplate earthquakes of the same magnitude that occurred in the past 10,000 years. We confirmed that four paleo-shorelines of the southernmost part of the Boso Peninsula are successfully described on the elevation view. Moreover, this result lead to determine the relative heights between each of the Numa terraces,

Comparing the relative height distributions of the extracted paleo-shorelines, each terrace commonly has the average heights of 5 to 6m and has a trend that increasing toward southwest. On the other hand, there are some variations in the elevation difference between the east and west coast. Comparing the result of our study with the dating result measured at the Chikura lowland on the east coast [Komori et al., 2017, EPSL], the average relative heights that do not have much difference with each other is not consistent with the formation intervals of the Numa terraces which have a variation of three times or more at maximum.

Keywords: paleo earthquakes, marine terraces, digital elevation model, Sagami trough, Kanto earthquakes