

A Bayesian approach to the age estimation of the co-seismically uplifted marine terraces in the Boso Peninsula

*Junki Komori¹, Masanobu Shishikura², Ryosuke Ando¹, Yusuke Yokoyama³, Yosuke Miyairi³

1. School of Science, The University of Tokyo, 2. National Institute of Advanced Industrial Science and Technology, 3. Atmosphere and Ocean Research Institute, The University of Tokyo

We statistically estimated the formation ages of the Numa terraces, which are the tectonically uplifted marine terraces develop at the southernmost part of the Boso Peninsula, central Japan. Along the Sagami Trough, where the Philippine Sea Plate subducts, the megathrust earthquakes are known to repeatedly occur such as the 1923 M7.8 Taisho Kanto earthquake and the 1703 M8.2 Genroku Kanto earthquake. The Numa terraces are evidence of the prehistoric uplifts due to Genroku-type earthquakes and have been investigated for more than half a century. However, the quantitative evaluation of such geological datasets has been quite limited previously. In this study, we propose a new statistical method to estimate the emergence ages of marine terraces using the dataset of radiocarbon ages of the terrace deposits. We modeled the probability density function of the ages dated from terrace deposits and evaluated the emergence ages as the model parameters via Markov Chain Monte Carlo (MCMC) method along with their confidence intervals. As a result, the emergence ages of the four levels of the Numa terraces were estimated to be 5808 yBP–5583 yBP, 3252 yBP–2989 yBP, 1617 yBP–846 yBP, and 320 yBP–56 yBP for 68 % confidence intervals, respectively. This result suggests that the longest occurrence interval is more than twice as long as the shortest one, which objects the feature of "characteristic earthquakes" the Genroku-type Kanto earthquakes were believed to have.

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