

pIRIR dating of MIS 5c-e marine terrace deposits from the Naka Upland, Ibaraki Prefecture, Japan

*Hayashizaki Ryo¹, Takehiko Suzuki², Kosuke Sasamori³

1. Central Research Institute of Electric Power Industry, 2. Tokyo Metropolitan University, 3. Ibaraki Prefectural Government

Optically stimulated luminescence (OSL) dating of potassium feldspar can estimate the burial duration since the last reset due to sunlight exposure. Although OSL dating of potassium feldspar can yield results dating back hundreds of thousands of years, it produces younger results than expected due to anomalous loss of OSL signal (anomalous fading). Post-infrared infrared stimulated luminescence (pIRIR) dating has been developed as a new OSL dating method for potassium feldspar without anomalous fading. However, the use of pIRIR dating remains uncommon in Japan, and its applicability needs to be verified. This study aimed to evaluate the accuracy of pIRIR dating (pIR₂₀₀IR₂₉₀ dating) of the marine terrace deposits MIS 5e and MIS 5c at the Naka Upland, Ibaraki Prefecture, Japan.

pIR₂₀₀IR₂₉₀ dating yielded an age of 100.3 ± 8.0 ka without fading correction for the marine terrace deposits, in which tephra (K-Tz) was deposited at approximately 95 ka. The results show that pIR₂₀₀IR₂₉₀ dating can accurately determine the ages of the marine terrace deposits of the Naka Upland without anomalous fading. The MIS 5c and MIS 5e marine terrace deposits were dated to 122.5 ± 12.5 ka without fading correction. This result indicates that the marine terrace deposit was deposited during MIS 5e. The aeolian sand, which covered the MIS 5e marine terrace deposit, was dated to 94.3 ± 9.0 ka without fading correction. Therefore, pIR₂₀₀IR₂₉₀ dating can identify MIS-5c and MIS-5e marine terrace deposits that are difficult to separate using conventional methods.

Keywords: Optically stimulated luminescence dating, post-infrared infrared stimulated luminescence dating, Marine terrace deposit, Marine Isotope Stage 5, Kikai Tozurahara tephra