Luminescence dating and age correction of marine terrace deposits in Kamikita Coastal Plain and Shimokita Peninsula, northeastern Japan

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Middle and Late Pleistocene marine terraces formed during interglacial sea-level highstands are distributed across the coastal area in Japan. For Kamikita Coastal Plain and Shimokita Peninsula, northeastern Japan, the ages of marine terraces have been well defined by tephrochronology. Post-infrared infrared stimulated luminescence (pIRIR) dating of K-feldspar has been applied to date Pleistocene sediments since about 10 years ago. In this study, we applied pIRIR dating to date these marine terrace deposits and the age correction methods were discussed. The shallow marine deposits formed during interglacial highstands which are corresponding to Marine Isotope Stage (MIS) 5e, 7, 9, 11 (45 samples from 11 outcrops) were measured. We applied pIRIR_{200/290} signal based on Ito et al. (2017) to D_a measurement and fading test. The fading-corrected ages based on Kars et al. (2008), except for 6 sample from 2 outcrops, are suitable to defined the stage of sea-level highstands, while all fading-corrected ages were overestimated compared with the expected ages. This age overestimation is corresponding with about 40⁻⁵⁰ Gy. The dose recovery ratios of few samples were clearly high from unity, thus it was possible to the overestimation of D_{e} . On the other hand, pIRIR_{200/290} signal is more difficult to bleach than the quartz OSL, K-feldspar $IRSL_{50}$ and $pIRIR_{50/290}$ signals, and this residual dose is about 10~20 Gy derived from the well-bleached modern beach sand. Additionally, in the previous study of Holocene marine sediments, the marine succession has formed by beach progradation since few thousand years (e.g., 6ka in Kujukuri strand plain, Tamura et al. 2008). This few Gy accumulated during beach progradation is added to residual dose of well-bleached modern beach sand, thus apparent residual dose of pIRIR_{200/290} signals from whole shallow marine deposits may be >20 Gy. Considering this apparent residual dose, it may be possible to be concordant the fading- and residual dose-corrected ages with the expected ages. However, this apparent residual dose is corresponding with >10ka in study area, thus pIRIR_{200/290} signal is useful to older samples, while it may be difficult to apply younger sample (e.g., MIS5a, 5c).

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Ito et al. (2017) Geochronometria 44, 352-365 Kars et al. (2008) Radiation Measurements 43, 786-790 Tamura et al. (2008) Marine Geology 248, 11-27

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