

## Optically stimulated luminescence (OSL) dating of tephric loess deposits

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The ages five fine-grained quartz samples extracted from tephric loess from the Middle Pleistocene Tsukidade hill, northern Japan, were estimated by using the single-aliquot regenerative-dose (SAR) protocol of optically stimulated luminescence (OSL) dating method (Murray and Wintle, 2000). Many tephros distributed on the Tsukidade hill have been tried to date by fission track (FT) and thermoluminescence (TL) methods (e.g. Tsuchiya et al., 1997; Nagatomo et al. 1999). These independent ages are a good age control for OSL dating.

The estimated OSL ages underestimated the independent ages, when the OSL intensity of the first data point was used for the calculation of equivalent dose ( $De$ ). The  $De$  values became much smaller, if the data point at longer stimulation time was used. From the comparison of the dose response curves at different stimulation time, it was found that the sensitivity corrected natural signal (RN) decreased, and the zero-dose signal ( $R0$ ) increased with the stimulation time. As a result, the decrease of the  $De$  occurred. Thus the age underestimation was probably caused by the recuperation of OSL, due to the preheating prior to the OSL measurements. The decrease of  $De$  with stimulation time suggests that the recuperation occurs in luminescence traps, which have long stimulation time to the light source.

A plot of  $De$  versus the rate of recuperated signal ( $R0/RN$ ) indicates that the  $De$  decreases exponentially as the  $R0/RN$  increases. In an ideal sample, it is expected that  $De$  remains constant over the stimulation time, and  $R0$  is zero (Murray and Wintle, 2000). The corrected  $De$  values were obtained by fitting the plot to an exponential curve and extrapolating the curve to the point that  $R0/RN$  equals zero. The agreement of the new OSL ages using the corrected  $De$  values with the independent ages suggests the validity of the correction method.

Tephric loess are widely distributed in Japan, and the OSL dating of tephric loess will make it possible to estimate ages of marine and fluvial terraces below the tephric loess and those of tephros deposited in the tephric loess.