

Luminescence dating and analysis of environmental change of fine grained sediments from Lake Yogo, Japan

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We applied optically stimulated luminescence (OSL), infrared stimulated luminescence (IRSL), post-IR IRSL (pIRIR) and ¹⁴C dating to the sediment core YG11-3 (294cm) from Lake Yogo, Japan. The fine grained quartz and polymineral sample are used for equivalent dose (D_e) estimation. As a result of several basic tests, the preheat temperature of 200 °C for 10 s and a cut heat of 160 °C were suitable to all OSL measurements. The accepted aliquots are about 90 % per measurement discs and the range of D_e s are 0.3 ~3.5 (Gy). The bulk ¹⁴C ages are ca. 300 years older than those of plant residue. After subtracting this age difference from bulk ¹⁴C ages, the corrected ages agree with the OSL ages except the ages of sediments from some depths. Two exceptional OSL ages are older than the corrected bulk ¹⁴C ages (YG11-3-245, YG11-3-343) and these layers include a lot of plant residue enough to analyze the plant residue ¹⁴C ages. It seems that these sediments from two layers have been transported quickly in muddy stream based on a temporary environmental event. Additionally, the result of the IRSL_{50/225} and pIRIR₂₂₅ age confirms the existence of this temporary event. By comparing the OSL ages with ¹⁴C, IRSL and pIRIR ages, the quartz from the small catchment area can be applied to reconstruct the age model of sediment core in Japan.

Keywords: OSL dating, pIRIR dating, lake sediments