

TLCIA-CIA approach to characterize lake sediments

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Luminescence dating observes the natural accumulated radiation damage caused by radioisotopes such as U and Th as the form of glow after stimulation by heating or lightening. The luminescence are observed at various wavelength bands and their characteristics have been studied mainly on quartz and feldspar.

The emission color of luminescence can be recorded easily by using thermoluminescence color image analysis (TLCI-CIA) method for samples artificially irradiated with gamma-rays (Hashimoto *et al.*, 1986). When TLCI-CIA is applied to polymineral from lake sediments the luminous mineral compositions of samples may reflect the regional characteristic and climate of the studied area. The validity of TLCI-CIA method for boring core samples from 3 lakes is investigated.

The boring core from Lake Bailal (in Russia), Lake Khuvsgul (in Mongolia) and Byeokgolje (in South Korea) is used for experiment. Each sample was etched step-by-step with H₂O₂, HCl, H₂SiF₆ and HF, finally resulting in 5 types of aliquots including untreated sediment. A Co-60 gamma-ray source was used to irradiate samples at Kyoto University Research Reactor Institute. Afterward the photograph of TLCI was taken under a constant temperature of 350°C. Colored pixels were picked up by the program built in this study and then converted to numerical values. Based on Gansawa *et al.* (2001), color index was calculated from these numerical values and then were divided into five color ranges.