

Temporal variation of Kurobe River Sediments revealed by TL and ESR signals in quartz

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While the ESR signals of the E1' center in quartz was used to investigate the origin of the loess in MIS 1 and 2 (Toyoda and Naruse, 2002) and of the sediments in the Sea of Japan (Nagashima et al., 2007). Shimada (2008) showed that TLCI (thermoluminescence color image) may be useful for similar qualitative study on river sediments. In the present study, the wavelength-temperature two dimensional thermoluminescence measurement was employed, together with the ESR measurements, to investigate the temporal change of these characteristics observed in fluvial sediments of the Kurobe river.

Eight sediment samples were collected from the present river bed along the Kurobe River in 2012 and 14 samples in 2013. They were sieved into two grain size fractions of 500-250 μ m, 250-75 μ m. Quartz grains were extracted using chemicals, heavy liquid, and an isodynamic magnetic separator. The obtained quartz grains were heated at 300 degree Celsius for 1 hour to erase the inherited signals. Each sample was then separated into 9 subsample aliquots for gamma ray irradiation up to 2640 Gy, which are for ESR measurements. Other aliquots for TL measurement were given a dose of 809 or 857 Gy with wrapping the tubes with Al foil in order to keep the samples in the dark.

TL measurements were performed by using the two dimensional TL apparatus. We measure the TL emission spectra during heating up to 450 degree Celsius. Red emission (538 to 658 nm) was observed between 140 and 250 degree Celsius (Low Red) and 290 and 370 degree Celsius (High Red) and Blue emission (379 to 538 nm) was between 103 and 211 degree Celsius (Blue). The integrated counts were taken as the intensities of the red and blue emissions. The results of ESR measurements will be given in the presentation together with the TL results.

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