

ESR and TL signals in quartz in the present river sediments along with the Kurobe river

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The variations in the number of oxygen vacancies, measured as the ESR (electron spin resonance) intensity of the E_1' center in quartz, and in the TL (thermoluminescence) colors in quartz of quartz of the sediments are investigated along with the Kurobe river together with those in the bedrocks in the river reaches. The number of oxygen vacancy in quartz indicates the age of the host rocks from which the sediments have been generated by weathering while the red TL color corresponds to volcanic origin and blue to plutonic origin. The quantitative TL color measurements were made possible with the time-resolved 2 dimensional TL spectroscopy system.

The number of oxygen vacancies, higher in the upper reach, gets lower in the middle, and further higher in the lower reaches due to the inflow of the sediments originated from the younger and from the older bedrocks, respectively. The high temperature red to low temperature blue TL ratios, higher in the upper reach, gets lower in the middle and lower reaches due to the sediments having lower values. The change in the values along with the river flow is found to be explained by the inflow of the sediments originated from the bedrocks around the river.

Keywords: river sediment, provenance, ESR, TL