

## Signatures of ESR signals observed in quartz of Kizu river sediments and of host rocks

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Paramagnetic lattice defects in quartz have recently been used as tracers to study the transportation of sediments on the surface of the earth especially on the origin of aeolian dust (e.g. Toyoda and Naruse, 2002), like isotopes have been used. Studies on aeolian dust utilizes only the  $E_1'$  center while impurity centers were shown to be other useful signatures in the studies of river sediments (Shimada, 2008).

The present research aims to characterize sediments of Kizu river by analyzing ESR signals in quartz including the  $E_1'$  center and the impurity centers.

We collected twenty Kizu river sediment samples and granite samples which are possible sources of river sediments. The samples were sieved to 1000-500, 500-250, and 100-250 micrometers. Quartz grains were extracted from each fraction by chemical treatment and density separation. The quartz samples were heated at 400<sup>0</sup>C for 1 h to erase the inherited ESR signals before gamma ray irradiation. ESR measurements were performed at room temperature and at 81 K to observe  $E_1'$  and Ge, and Al and Ti centers, respectively.

The impurity centers were enhanced by gamma ray irradiation. The formation efficiencies of the signals at the origin were obtained, which probably correspond to impurity concentrations in quartz. The  $E_1'$  center was observed after heating the sample irradiated to 2.5kGy at 300<sup>0</sup>C for 15 min. The formation efficiencies of impurity centers and the intensity of the  $E_1'$  center were plotted against the geographical positions to find that there are several positive and negative correlations between those efficiencies and intensity.

If the sediment is a mixture of two sources, we will be able to find the mixture ratio by analyzing the sources and the sediment. We will perform further analysis to discuss the origins of the sediments with this basis.

Keywords: Kizu river, ESR, River sediments, quartz