

## Applications of newly developed RTL Dating method : Age determinations for Late Quaternary tephra in Japan

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A widespread tephra layer is often used as a time marker bed in geology and geography. They can be dated by radiocarbon method on the organic material for the volcanic event occurred up to ca.50 ka. However lacking of suitable material (e.g. burial wood) for radiocarbon dating is often become an obstacle to directly estimate the timing. Alternative option is using the K-Ar method, yet considerable uncertainties for the younger samples (~100 ka) and limit of the dating materials namely the requirements of high K contents minerals are also prevent from the methods ubiquitously be applicable for tephra dating. Although the period between 50 to 100 ka is very important for various studies such as Paleoclimatology and Archaeology, the chronological gap has been existed.

A trapped radiation charge dating technique will potentially solve these problems. We focused on development of the Red Thermoluminescence (RTL) dating for tephra since we observed that it captures stable and high intensity RTL signal. We established the dating protocol to deal with tephra to conduct RTL dating. To check its reliability, we designed the experiment as follows. Three widespread tephra were selected AT, Spfa-1 and Hwk. AT was erupted at 30 ka determined from radiocarbon dating on organic matters from buried forest in the layer using specially designed chemical treatment (Miyairi et al., 2004). Spfa-1 tephra is also one of the major widespread tephra distributed in Japan, covering almost the whole area of the Hokkaido Islands. We newly measured radiocarbon ages of 15 samples of charcoals under the same protocol in the Miyairi et al., (2004). Radiocarbon dating which converted into calendar ages were then compared to the RTL results. Hwk was erupted at 570 ka determined by K-Ar dating (Machida & Arai., 2003). Good agreements with the three render us to reach the conclusion that RTL dating method is reliable tool to date tephra layers which possibly fill the gap of Quaternary chronostratigraphy.

Using this RTL technique, several age unknown tephra layers were dated.