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Thermoluminescence dating of Hakusan volcanic

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Geochronological study on various events related to the magma process is important to lead to the prediction of volcanic eruptions. The Hakusan volcano, central Japan, consists of Kagamuro, Kohakusan, Shinhakusan and Uguisudaira volcanoes, and the existence of the magma chamber and related seismicity was reported to raise the alarm on the future possible eruption (Hiramatsu, 2006). The eruption age of each volcano was measured by K-Ar dating method (Higasino et al, 1984, Sakayori et al, 1999, Kitahara et al, 2006). However, some of eruptions, except for Kagamuro volcano, are relatively young within applicable age range of K-Ar dating method, so that additional dating by other dating method should be useful to reconstruct eruption history of the Hakusan volcano. This study applies thermoluminescence (TL) dating to know the eruption age of Hakusan volcano. Five samples from the Kohakusan volcano were successfully dated by the TL method. However, TL signal for andesite from Shinhakusan volcano was so small that it was difficult to be detected. The TL age for dacite from Kohakusan volcano is about 60 ka and ages from andesite are about 100 ka, concordant with the K-Ar ages reported in previous studies. The eruption activity of the Kohakusan volcano spanned more than 40 kyrs. These ages are compared to crystallization ages of zircons within magma chamber (Miyamoto et al, unpublished data) estimated by U-Th method for the samples collected from the same localities. U-Th ages are different grain by grain, though peak crystallization occurred about 30kyr earlier than the eruption age. Based on these age data, the history of Kohakusan volcano is proposed. Crystallization occurred in andesite magma and then erupted at about 95 ka. At that time, next stage of crystallization within magma chamber was going on. Somehow magma chemistry had changed from andesitic to dacitic, and then erupted at around 60 ka to bring crystals formed at the time of previous eruption.