

Constraining the timing of the caldera outburst floods from Aso volcano

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The bouldery volcanoclastic apron sediment (Takuma gravel bed) west of Aso volcano and the overlying tephric loess were studied by Tsukamoto et al (2013) and a preliminary luminescence age constraint of 72-89 ka for the timing of the caldera outburst flood event, which built the volcanoclastic apron, has been reported. In this study we collected additional samples to further constrain the timing of the caldera outburst flood event. Samples were also taken from the Aso-4 ignimbrite, Hotakubo gravel bed consisting of the lower volcanoclastic apron along the Shirakawa River, and the tephric loess deposited above the gravel bed. The luminescence measurements of the tephric loess samples were performed using two post-IR IRSL (pIRIR) protocols with the pIRIR stimulations at 225°C and 290°C. The two pIRIR signals gave consistent ages and the result indicates that the gigantic caldera outburst flood event probably occurred shortly after the Aso-4 eruption, ~86 ka, and the another bouldery Hotakubo gravel bed, which is of cut terrace deposits derived from Takuma gravel bed or of other possible flood event occurred at ~47 ka. The ages will be further compared with the pIRIR ages from the gravel beds themselves. Interestingly, the Aso-4 ignimbrite using the pIRIR signal at 225°C was dated to a much younger age (~40 ka) than the reported eruption age at ~87 ka (Aoki, 2008). This probably indicates that a very long time was needed for the sampled Aso-4 ignimbrite until the temperature reached to the effective closure temperature of the signal (~60-80°C, King et al., 2016).

References

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