

Timing of the landslide-damming at Anegawa upstream, Shiga Prefecture; revealed by AMS ¹⁴C dating

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Large-scale landslides occurred repeatedly on the western and southern slopes of Mt. Ibuki, Shiga Prefecture, central Japan, and dammed up the upper Anegawa-river (Kojima et al., 2006). This is evidenced by the sedimentary layer typical of a lacustrine setting exposed on lower parts of the riverside. Available ¹⁴C ages for wood fragment and twig excavated from the sediment are 4630±40 and 4510±70 y BP (Compilation committee of Ibuki town history, 2003), and 4312±38 - 4663±49 y BP (Kojima et al., 2006). These age data don't enough constrain the timing of the landslide-damming because of the range of several hundred years. Large-scale landslide often triggered by a huge earthquake and/or torrential rain. Precise dating of the damming is important, because Mt. Ibuki is located in the periodic inland-type huge earthquake area in central Japan. To determine the timing of landslide-damming event, we carried out ¹⁴C dating of leaf, twig and stock-fragments excavated from the lower part of the sediment.

The Anegawa-river runs through V-shaped valley named as Semiai-Kyokoku where the debris was excavated. The debris is composed mainly of angular blocks of limestone, and piles up about 100 m high. A river terrace spreads out more than 3km from Semiai-Kyokoku along the Anegawa-river. The exposed sedimentary succession consists mainly of silt layer (about 1 m thickness) and overlain gravel. Although the excavation is not progressing to the lower boundary of the silt, it seems likely that the silt overlies directly the basement rocks without coarse detritus typical of floodwater deposition. This implies the rock avalanche was triggered by a geological event such as an earthquake.

A twig, a leaf and three stock fragments obtained from same sedimentary layer. They were first washed in an ultrasonic bath. Next they were treated by HCl and NaOH, and the CO₂ gas was purified. Graphite samples were prepared with the method of Kitagawa et al. (1993) and analyzed using the HVEE Tandemron Atomic Mass Spectrometer at the Center for Chronological Research, Nagoya University. The ¹⁴C ages of twig and leaf are 4445±25 y BP and 4475±25 y BP, respectively. Three stock fragments show the range of 4525±25 - 4570±25 y BP. Samples are calculated the calendar age; the range of the formers show 3020 - 3330 cal BC and the latter fragments have 3110 - 3370 cal BC. The ages of twig and leaf give more reliable timing of sedimentation, since they grow up shorter term than stock fragments generally. Hence, the ages of twig and leaf may show the time of the landslide-damming event.

References

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