

Eruptive history of Batur caldera, Bali, Indonesia estimated from new radiocarbon dating

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Batur caldera is situated in the northeastern part of Bali Island, about 70 km north of the capital city of Denpasar. Batur caldera has double collapse structures; the outer one is called caldera I covering about 13.8 by 10 km and the inner one is called caldera II. Batur caldera I is thought to have been formed by a large-scale eruption of the Ubud ignimbrite, and the caldera II by that of Gunungkawi ignimbrite. The ^{14}C ages of them were reported as ca. 29,300 BP for the former, and ca. 20,150 BP for the latter, respectively. Post-caldera volcanism took place within the caldera II, and formed the central Batur volcano and many surrounding maars on the floor of the caldera II. The main magma of this stage ranges from olivine basalt to basaltic andesite. The Batur volcano has erupted at least 22 times since the 1800's, generally with gentle strombolian eruptions and lava flows.

We determined three charcoals from the different horizons of the tephra sequence from Batur caldera. New dating age for the Ubud ignimbrite is $23,230 \pm 80$ BP (NUTA2-4860). Densely welded Batur ignimbrite is the intra-caldera ignimbrite within the caldera I, which is thought to be correlated to the Gunungkawi ignimbrite distributed outside of the caldera rim. The charcoal in the Batur ignimbrite along the Blingkang River yields 5240 ± 30 BP (NUTA2-4859), which is obviously younger than the previous estimation.

The third charcoal was collected from thick scoria fall deposit at the foot of Batur volcano. The ^{14}C age of this charcoal is 230 ± 25 BP (NUTA2-4855), which probably indicates the age of the latest big lava fountain from the summit crater. The biggest maar on the northwestern foot is stratigraphically younger than this scoria deposit. Hence, there might be a possibility that the maar was formed in the 17th or 18th century. Further ^{14}C dating will be essential to clarify the whole eruptive history of Batur caldera.