STRATIGRAPHY AND CHARACTERISTICS OF CALDERA II DEPOSITS, BATUR VOLCANIC COMPLEX, BALI, INDONESIA

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Batur Volcanic Complex (BVC) consists of two overlaying calderas, namely Caldera I and Caldera II, with several post-caldera cones within the calderas. The previous study correlated the Caldera I and II to Ubud Ignimbrite (23 k.a) and Gunungkawi Ignimbrite (20 k.a), respectively. Those ignimbrites cropped out at Ubud area of about 20 km on the southern of BVC. More recent study reported the younger (5.2 k.a) thick deposit of caldera-forming eruption cropped out inside the rim of Caldera I and surrounding the BVC. The deposit consists of Penelokan pumice fall of plinian phase deposit and Batur Ignimbrite. These deposits interpreted as the youngest caldera-forming eruption product of Caldera II instead of Gunungkawi Ignimbrite. This study intended to describe and report the stratigraphy and characteristic of the deposits in order to interpret the dynamic of caldera-forming eruption of Caldera II.

The juvenile materials of the deposits are composed of white, grey, and banded pumices and/or scoria. Analyses done in a total of 13 bulk samples from Penelokan Fall and Batur Ignimbrite, including Grain Size Distribution (GSD) in the size range of phi -5 to 1, componentry analysis in the size of phi -2 to -4, density analysis in juveniles in the size of phi -3 to -4 around 100 grains in each sample, x-ray fluorescence (XRF), thin section, and scanning electron microscope (SEM).

GSD data show that the deposits of Plinian fall and matrix of PDC have unimodal distribution. In the proximal area, Plinian fall dominated by coarse materials (phi -3 and -4) of pumice and/or scoria, whereas, the PDC dominated by fine materials (phi >1). The coarse materials in PDC mostly composed of lithic. The bulk density of white pumice range from 0.5-0.8 gr/cm^3, grey pumice 0.5-1.1 gr/cm^3 and scoria 0.9-1.1 gr/cm^3. Based on petrographic and SEM analysis, the vesicularity of juvenile deposits are 47.40-58.09% and mostly phenocryst poor (0.47-2.88%). Phenocryst are composed of plagioclase, orthopyroxene, and clinopyroxene. The occurrence of phenocrysts and microlites in white pumice are rare, in contrast, common in grey pumice and abundance in scoria. The XRF data show that the deposits are grouped into trachy-andesite to trachyte, and classified as sub-alkaline series. The PDC deposits have a wider range in SiO_2 content (61.95-68.05 wt %). However, Plinian falls relatively narrow (61.98-63.67 wt %) with LOI number 1.28-3.33.

The eruption of Caldera II of the Batur Volcanic Complex occurs from the Plinian eruption produces the Plinian-fall, and the unsteady column produced intra-plinian PDC. On the other hand, the collapse of the column deposited the ignimbrite. Most of the sequence deposited within the Caldera I floor, however when the eruption intensity increase, the deposit could reach the distal area up to 17 km from the Caldera I rim. Lithic rich content and basal lag breccia are suggesting the vent opening process occurs. After several continuous eruptions, the proximal area started to collapse due to the emptying of the magma chamber. The variation of juveniles and range of density generate by variation in physical characteristics primarily for crystal and microlite content.

Keywords: Volcanism, Caldera-forming Eruption, Batur Caldera, Stratigraphy, Characteristic

