

K-Ar ages of Pliocene volcanic rocks at Mt. Kokuzo area, Southwest Japan

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K-Ar ages were determined for Pliocene volcanic rocks from Mt. Kokuzo and Mt. Koubou area in western Kyushu, Southwest Japan. Mt. Kokuzo is an andesitic stratovolcano. The lower part of the edifice is composed of submarine volcanic rocks, capped by subaerial lava flow, suggesting that it was a volcanic island at its formation. The existence of submarine volcanic rocks at the elevation of 250-400m shows that the edifice have since been uplifted. On the other hand, Mt. Koubou is composed of several basalt and andesite lava flows.

Six ages were determined for andesites from Mt Kokuzo, and ages of two basalts and one andesite were determined from Mt. Koubou. All ages fell between 2.3-2.2Ma, within analytical uncertainties. They were also consistent with the ages of nearby rhyolite. These results suggest the volcanic rocks with wide range of chemistry erupted within 10-15km radius.

In order to know the reliability of the ages for the glassy volcanic rocks, the amount of non-radiogenic argon was compared between samples with different groundmass crystallinity. The samples with glassy groundmass contained 3-5 times more atmospheric argon than those with holocrystalline groundmass. The samples with small amount of carbonate held particularly large amount of atmospheric argon, 5-10 times or more than holocrystalline samples. The amount of non-radiogenic argon for the devitrified sample was the same as the holocrystalline samples. The difference has lead to the difference in atmospheric correction ratio: 20% for holocrystalline samples, 60% for glassy samples, and as high as 96% for samples with carbonate. In the worst case, the analytical error constituted 10% of K-Ar age (2.2+/-0.2Ma).

The amount of water of the samples was between 0.1-2.2wt%. The amount of radiogenic argon was consistent at 0.069-0.074nlSTP/g/K₂O regardless of the water content. There was no argon loss due to hydration of glass for the volcanic rocks of Mt. Kokuzo.