

浅間火山 2004 年噴火噴出物の岩石学的検討

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Petrological Characteristics of the 2004 Eruptive Deposits
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The 2004 eruption of Asama volcano, central Japan, was characterized by emergence of small amount of andesite lava in the summit crater, strombolian explosions and a series of vulcanian explosions. There is a good correlation between the degree of differentiation of glass in juvenile ash and repose times between successive explosions. Glass in ash erupted after a long repose time is high in SiO₂ content and crystallinity. In contrast, glass in ash from continuous strombolian explosions is less evolved chemically and is poorer in microlites. The chemical compositions of the evolved glasses in the Qz-Ab-Or diagram suggest that the magma was degassed at lower pressures. This is supported by low H₂O contents of the least vesicular rinds on bread crust bombs. In addition, complexly deformed fragments of white-colored volcanic sediment containing high SiO₂ glass and silica minerals, which probably originated from beneath the volcano, shows substantial heating evidenced by partial melting of the sediment and further modification by strong shearing along the conduit wall during magma ascent. The eruptive sequence can be modeled, as follows; 1) magma emerged continuously in the summit crater, accompanied by strombolian explosions (lava emergence and strombolian stage). 2) Magma became stagnant and crystallized at a shallow level in the conduit (repose period and crystallizing stage). 3) Vulcanian eruption occurred when crystallizing magma was pressurized by addition of new magma and/or gas accumulation sufficient to overcome the strength of a lava plug present below the crater (vulcanian stage). The 2004 eruption was marked by repetitions of this cycle and the conduit probably was choked when magma supply stopped. The deformed nature of volcanic sediment entrapped as xenoliths suggests significant shearing between viscous magma and the conduit wall.

Key words: degassing, crystallization, repose interval, vulcanian eruption, Asama volcano

1. はじめに

ブルカノ式噴火は安山岩質マグマを噴出する火山に特徴的な噴火現象である。連続的なマグマ噴出を行うプリニー式噴火とは対照的に、ブルカノ式噴火では間欠的なマグマ噴出がその特徴である。また、プリニー式噴火では火口近傍に殆ど堆積物が定置しないのに対して、ブルカノ式噴火では火口近傍に最大径が数十 m にもおよぶ多量の火山弾が着弾することが知られている。一方、噴

出物の構成についても、プリニー式噴火では発泡度が高いガラス質の降下軽石が堆積物の大半を占めるのに対して、ブルカノ式噴火では緻密な結晶質の溶岩片や外来岩片が主な噴出物である。このような噴出物の特徴は、どのようなマグマ上昇過程を反映しているのであろうか？

マグマの火道上昇過程においては、脱ガス現象（揮発成分の析出と分離）が噴火様式を決定する主な要因と考えられている。特に H₂O は火山ガスの主成分であり、減

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