Abu monogenetic volcano group in SW Japan Arc: its characteristic landforms, eruption types, and magma genesis

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Late Cenozoic Abu monogenetic volcano group (AMVG) consists of 56 volcanoes and is distributed over an area of 400km^2 in SW Japan Arc. Some of the 56 volcanoes are located within the sea. The volcanic activity is classified into an alkaline basalt-dominated early period (2-1.6Ma), and a calc-alkaline andesite to dacite dominated late period (<0.8Ma). The early activity took place about 0.4 mys, during which time 0.3 km^3 of alkaline basalt alone was erupted to form lava flow with scoria cone and small lava plateaus. The late activity produced alkaline basalt consisting of small lava plateau and lava flows with scoria cone. Smallest basaltic lava plateau, Nakanodai volcano (0.19Ma), is 600m x 450m in basal distance and 50m in height. Dominant calc-alkaline andesite to dacite also flooded from the fissure to build lava plateaus or flat lava domes. Largest lava plateau, Ooshima volcano (0.19Ma), is 2400m x 1500m in basal distance and 170m in height. The andesite to dacite lavas formed the lava plateaus might be higher temperatures and effusive rates. The largest basaltic monogenetic volcano, Iraoyama volcano (0.4-0.32Ma), erupted thick fallout deposits (<30m in thickness) from central vent and simultaneous scoria cone formation. Then large volume of lava flows oozed out two directions from the base of the scoria cone. The east lava flow formed the lava plateau surrounding country rock. The northern lava flow followed a former river valley to reach the lowland 14km away. The solidified long lava flow (<100m in depth) is eroded and exhibits spectacular columnar jointing along cliffs in valleys. These landmarks are named Dragon's Causeway related to the tradition of this area. These suggest that Iraoyama volcano might be constructed by violent strombolian eruption such as production of large amount of fallout deposit, simultaneous scoria cone formation and large volume of lava effusion from the base of the scoria cone. The basalts in early activity show the OIB type signature. On the other hand, basalts in late activity have the OIB- and island-arc type signatures. They might be derived from heterogeneous mantle diapir. The calc-alkaline andesite and dacite might be produced by magma mixing between primitive basaltic and felsic magmas. Magmatism of AMVG suggests that heating induced by intrusion of basalt magma resulted in partial melting of the crust, thus producing felsic calc-alkaline magmas.