

Effects of fluidization of the host sediment on peperite textures: A field example from the Cretaceous Buan Volcanics, SW Korea

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In the Cretaceous Buan Volcanics (SW Korea), blocky and fluidal peperites are hosted in a massive pumiceous lapilli tuff intruded by intermediate dikes. Blocky peperites, the most abundant species, are characterized by polyhedral or platy juvenile clasts and a jigsaw-crack texture. Fluidal peperites occur only along dike margins, where the host sediments are composed of well sorted, fine to very fine ash (fine-grained zone), and are characterized by fluidal or globular juvenile clasts with irregular or ragged margins. The fine-grained zone is interpreted to form by grain size segregation caused by upward moving pore water (fluidization) that has resulted from heat transfer from intruding magma toward waterlogged host sediments during intrusion. With the release of pore water and the selective entrainment of fine-grained ash, fine-grained zones formed within the host sediments. Subsequent interactions between the fine-grained zone and the intruding magma resulted in ductile deformation of the magma before fragmentation, which generated fluidal peperites. Outside the fine-grained zone, intruding magma fragmented in a brittle manner because of the relative deficiency of both pore water and fine-grained ash, resulting in the formation of blocky peperites. The results of this study suggest that redistribution of constituent particles (ash) and interstitial fluids during fluidization resulted in heterogeneous physical conditions of the host sediments, which influenced peperite-forming processes, as reflected by the different peperite textures.