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Nancy K. Adams

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2008 IAVCEI (International Association of Volcanology and Chemistry of the Earth's Interior)
General Assembly, Reykjavik, Iceland, August 18–25, 2008

Linking the Growth of the Lathrop Wells Scoria Cone, Nevada, and Pyroclastic Textures to Conditions of Magma Ascent

Nancy K. Adams
Center for Nuclear Waste Regulatory Analyses (CNWRA)
Southwest Research Institute®
San Antonio, Texas 78238 USA
nadams@swri.org

The ~80 ka eruption of Lathrop Wells volcano in Nevada of water-rich {~1.2–4.6 wt% H_2O [Nicholis and Rutherford (2004); Luhr and Housh (2002)]} trachybasalt was characterized by both effusive and explosive activity, resulting in two lava flow fields, fall deposits, and a 140-m [459-ft]-high scoria cone. Field observations suggest the emplacement of these three types of deposits overlapped in time. Excavation of the cone through commercial quarrying provides a unique opportunity to sample eruptive products that represent the duration of the cone-building process, and two distinct facies have been observed. The lower cone facies consists of partly welded coarse lapilli and bombs indicative of a Strombolian-style eruption, and the upper cone facies is composed of nonwelded beds of vesicular scoria lapilli, consistent with the increase in eruption intensity and degree of fragmentation that characterizes violent Strombolian activity (Valentine, et al., 2007). Individual beds from the cone deposits have been sampled in regular, vertical increments in both facies from the base to the summit, as well as from the surrounding fall deposits and lava flows, and density has been measured on these samples to examine the complexity of textures and discern conduit dynamics. Cone deposits in particular show a variety of density distributions, including unimodal and bimodal with peaks from 1.1–2.15 g/cm^3 [0.04–0.08 lb/in^3]. Vesiculation and crystallization textures in selected clasts representing the macroscopic textures and densities present in the sampled beds reveal microscopic domains distinguishable visually by differences in microlite and vesicle populations, suggesting that magma rising in a single conduit that experiences different ascent histories might mingle at a shallow depth prior to fragmentation. These textures mark internal system changes that can push an eruption between styles and intensities and suggest that models of near-surface conduit dynamics should be carefully applied to other locations, such as a potential volcanic event at Yucca Mountain, Nevada.