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Ash production and dispersal from sustained low-intensity Mono-Inyo eruptions

B.A. Black and M. Manga

¹City University of New York, University of California Berkeley

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Recent rhyolitic volcanism has demonstrated that prolonged low-intensity ash venting may accompany effusive dome formation. We examine the possibility and some consequences of episodes of extended, weak ash venting at the rhyolitic Mono-Inyo chain in Eastern California. We describe ash-filled cracks within one of the youngest domes, Panum Crater, which provide a textural record of ash venting during dome effusion. We use synchrotron-based X-Ray Computed Tomography to characterize the particles in these tuffisites. Particle sizes in well-sorted tuffisite layers agree well with grain size distributions observed during weak ash venting at Soufrière Hills Volcano, Montserrat, and yield approximate upper and lower bounds on gas velocity and mass flux during the formation of those layers. We simulate ash dispersal with Ash3d to assess the consequences of long-lived Mono-Inyo ash venting for ash deposition and the accompanying volcanic hazards. Our results highlight the sensitivity of large-scale outcomes of volcanic eruptions to small-scale processes.