Lava dome structures and their significance

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Lava domes form by a combination of viscous, plastic and brittle deformation modes. During magma ascent, the competition between these deformation mechanisms controls the construction of the damage structure across the domes and thus the degassing network with important repercussions on the eruptive style.

Here, we present an overview of signature structures developed during magma ascent, with a focus on crystal-bearing lava domes (including Unzen, Santiaguito, Tarawera, Ceboruco, Colima, Soufriere Hills, and Mount St. Helens). Our observations encompass features such as foam bands, tuffisites, thermal-stressing fractures, unloading fractures, shear fractures, pseudotachylytes and cataclasites. We describe the relationships between these structures and ultimately question the conditions underlying their origins as well as their influence on lava dome eruption dynamics.