

SPELEO TALK ABSTRACT

John P. Lockwood

An overview of the geology of the Big Island, with particular emphasis on Mauna Loa and the role of pyroducts in forming shield volcanoes

Mauna Loa is not only the largest (most voluminous) volcano on Earth, but is likely also home to more volcanic caves than any other terrestrial volcano. These caves, many unexplored, only form within pahoehoe lavas (smooth-surfaced lava flows that solidify directly from a fluid state). ‘A’a lavas (rough-surfaced flows that continued to move during emplacement after partial solidification) only rarely develop caves, and only ones of limited extent. Pahoehoe lavas comprise 42% (2,150 km²) of Mauna Loa’s overall surface area, and about 32% of the lava flows of Mauna Loa’s Southwest Rift Zone --- the immediate area of this Conference . The surfaces of molten pahoehoe lava flows cool and solidify quickly during emplacement, and almost all pahoehoe lava is supplied by transport through subsurface conduits. These conduits, which I prefer to call *pyroducts*, following the first-published term coined by Titus Coan, are exceedingly complex in their geometry – ranging from broad sheets to the confined conduits that may ultimately be preserved as caves. Most pyroducts are, however, filled by cooling lava during late eruptive stages, so that only a small proportion are eventually drained of molten material, forming the caves of great interest to speleologists and of benefit to the other animals who call these caves home. Because most volcanologists prefer to study lava flows in the sunlight, understandings of the complex mechanisms responsible for pyroduct formation are only now being revealed by volcanospeleologists like you! Cavers who explore and map the extent and geometry of volcanic caves are making important contributions to volcanology; those who document the processes by which those caves form during their studies are making even more important contributions to our understandings of how basaltic lava flows are emplaced!