

Petrology of lavas from the ongoing Puu Oo eruption of Kilauea volcano, Hawaii

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The Puu Oo eruption is the longest lived (32+ years) and most voluminous (4+ km³) historic eruption of one of Earth's most active and best studied volcanoes (Kilauea on the Island of Hawaii). The lava from this eruption has taught us much about the processes of magma generation and differentiation. The continually changing composition of the new lava produces unique insights in the the dynamic processes within one magmatic event. Since 1983, we have monitored the compositional and isotopic signatures of its lava, which have shown remarkable variations resulting from diverse crustal and mantle processes including crystal fractionation, magma mixing, assimilation of crust and melting of a heterogeneous plume source. Small, systematic variations in isotopes of Pb and Sr, incompatible trace element ratios and MgO-normalized major element abundances document rapid changes in the parental magma composition unrelated to crustal processes. This continuing eruption provides a dynamic laboratory for evaluating models of the generation and evolution of basaltic magmas.