

Componentry of pyroclastic fall deposits from September and October 2008 weak explosions at Kilauea summit crater: insights into the dynamics of an open basaltic magma column

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On 19 March 2008 a small explosive event at Kilauea's volcano summit opened a 35-m-wide vent on the south wall of Halema'uma'u crater, initiating an eruptive period that extends to the time of writing. The activity of the open basaltic magma column has been characterized by a vigorous outgassing and an unevenly intense spattering at the free surface (permanent or background activity), and the occurrence of small explosive events consistently triggered by conduit-wall and/or rim collapses. The componentry analyses of samples collected daily near the vent during different sequences of events (including transitions from background activity to explosions and vice versa) in September and October 2008 allow us to distinguish three main classes of juvenile particles by their vesicularity and bubble size distributions. The abundances of these classes vary from background- to explosion-samples, revealing consistently contrasts in degassing and fragmentation processes before the disruption of the lava free surface by the rockfalls, and during and soon after the explosive events. Textural and chemical analyses of particles from different componentry classes revealed mixing features and crystallinity variations. These results give insights into the dynamics of the open lava column and particularly into the behavior of the top of the column during outgassing and external disruption of the free surface-equilibrium state.