# Remote Sensing of Dynamic Volcanic Processes: Kilauea Volcano, Hawaii

V J Realmuto, E A Abbott, A B Kahle (All at: MS 183-501, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91 109; 818-354- 1824; e-mail: vince.realmuto@jpl.nasa.gov)

The synoptic perspective, rapid mode of data acquisition, and repeat coverage provided by remote sensing are particularly well-suited for the study of dynamic volcanic processes such as plume emission, lava flow emplacement, and the development of ocean entries. We present a preliminary analysis of airborne remote sensing data acquired near the Pu 'u 'O'o vent of Kilauea Volcano, Hawaii, in September, 1995.

The major portion of 1995 mission was devoted to repeated flights over the Pu'u 'O'o area. During this period (2 - 14 September) we documented the S02 plumes emitted from Pu'u '()'o under a variety of wind conditions. This data set will allow us to study transient variations in the $SO_2$ content of the plumes at time scales ranging from hours to days. Three of the Pu 'u 'o'o overflights (4, 5, and 6 September) were supported by ground teams measuring $SO_2$ concentrations with the USGS Hawaiian Volcano Observatory correlation spectrometer and a field-portable Fourier Transform 1 nfrared spectrometer,

We acquired repeated observations of an active lava flow which broke out of the Kamoamoa tube system on 25 August, rind entered the Pacific Ocean on 7 September. Our multi spectral measurements of the lava flow radiance span the visible to thermal infrared wavelengths (0.5 - 12 pm) at spatial resolutions between 4 and 10 m. This unprecedented combination of spectral, spatial, and temporal resolution will provide us with new insight into the dynamic interplay of temperature, cooling rates, and topography in the emplacement and advance of lava flows. Our plume flights over Pu'u 'O'o provided us with several images documenting the configuration of the active lava pond, which we will correlate with the behavior of the surface t-low.

The entry of lava into the ocean formed the Kamokuna entry site, which we were able to observe between 7 and 14 September. We documented the evolution of Kamokuna from a single point of entry to a diffuse delta of multiple entry sites. In addition, we observed the development of bifu rcated hydrothermal plumes, which arc indicative of the formation of submarine lava tube systems. Our time-series data set will help constrain models of the formation and evolution of active lava deltas.

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3. (a) V J Realmuto
M.S. 183-501
Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, CA 91109
(b) voice: 818-354-1824
(c) fax: 818-354-0966
(d) email:
vince.realmuto@jpl.nasa.gov

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