

2003 Fall Meeting  
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**volcano thompson**

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HR: 0830h

AN: **V51J-0409**

TI: [Linking Surface Activity to the Deep Volcanic Plumbing System: the  
CALIPSO Borehole Observatory Project on Montserrat](#)

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AB: The prolonged and ongoing volcanic activity at Soufrière Hills Volcano (SHV), Montserrat, provides a rare chance for collecting multi-stream monitoring data in support of volcano research. Conventional surface geophysical instrumentation and detailed observational and geochemical data have enabled the development of a good understanding of surface and near-surface physical processes controlling eruptive style and intensity at SHV. However, the geophysical character and behavior of the deeper plumbing system, including magma storage area(s) and deep recharge processes, are not well understood. Developing better models for the deep system will assist in providing timely warning of large events or changes in eruptive style, and may also provide some clues as to the likely duration of the eruption. Installation of seismic and deformational monitoring instrumentation at depth enables a significant increase in signal to noise ratio so that smaller signals can be recorded and more distant sites (and thus deeper investigation depth) utilized. A variety of cycle-lengths have been noted during the eruption of SHV, and we hope that the new CALIPSO data stream will enable development of models in which cycles from a few hours to a few decades can be linked together in an integrated physical model. Cycle lengths of 7 to 14 weeks (depending on eruption rate and equating to the eruption of about 35 million cubic meters of magma) are likely to source from the shallower of the two upper crustal reservoirs indicated by geochemical evidence. The 30 to 35 year cycles (the fourth one of which marked the start of the current eruption) may relate to processes concerning input of basaltic magma to the deeper plumbing system. We also hope to document geophysical changes in the plumbing system induced by regional seismicity; many eastern Caribbean volcanoes (including SHV between 1933 and 1935 and in 1985) have demonstrated characteristics of unrest triggered or invigorated by regional tectonic earthquakes of Richter magnitude 5 and above. Events within the historical triggering threshold occur every few years; two such events have so far occurred since CALIPSO instrument installation (a Mw6.6 about 400km NE of Montserrat and a Mw5.7 about 150km NE of Montserrat). Both are at the lower end of historical triggering threshold parameters for magnitude and distance and neither produced measurable changes in macro-seismicity or ground deformation beneath

SHV.

DE: 7280 Volcano seismology (8419)

DE: 8414 Eruption mechanisms

DE: 8419 Eruption monitoring (7280)

DE: 8434 Magma migration

DE: 8494 Instruments and techniques

SC: Volcanology, Geochemistry, Petrology [V]

MN: 2003 Fall Meeting

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