

All are invited to attend the monthly meeting of the
Nittany Mineralogical Society
Wednesday, October 17, 2012

Seventeen Years of Eruption on Montserrat

by Dr. Barry Voight.
Penn State

Our October meeting will be held Wednesday the 17th in the room 116 auditorium of Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available through our web site.

5:00 to 6:00 p.m. Junior Rockhounds meeting in room 121

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby

7:30 to 8:00 p.m.: announcements, questions, answers; door prize drawings;

Brief Annual Meeting of the Corporation

about 8:00 p.m.: featured program

*The event has free admission, free parking, and free refreshments, and is open to all –
Bring your friends and share an interesting evening.*

This lecture summarizes scientific information acquired on the dangerous volcano on the small Caribbean island of Montserrat, active since 1995, and the strategy of the emergency management response. Understanding the science behind the eruption is used to help manage the emergency. The Soufrière Hills Volcano on Montserrat is a moderate sized complex of several andesite lava domes and associated volcanoclastic deposits. The volcano is dangerous because the lava domes can be unstable and can generate pyroclastic currents, and explosive vertical eruptions and column-collapse pyroclastic currents occur also. The small size of the island enhances the risks.

The 1995 to present activity erupted over 1 cubic kilometer of hornblende andesite. The eruption has shown a wide range of eruptive styles, including lava dome growth, dome collapse (including world's largest historical) generating pyroclastic flows and associated surges and ash fall, Vulcanian explosions with pumice fall and pumice flows, volcanic blasts, ash venting, one case of edifice flank collapse, numerous lahars, and cristobalite-bearing toxic ash. Recent active tomography (SEA-CALIPSO project) using airgun shots from a ship encircling the island and deformation and petrological observations, indicate a shallow magma chamber at depths of 5 to >7 kilometers with a volume of several cubic kilometers, likely connected to a deeper magma chamber in the mid crust. Decompression breakdown-rims on amphibole are calibrated to yield magma ascent rates.

Cyclic fluctuations in magma flux have been a notable feature of the eruption on four different time scales. Since 1995, five phases of dome extrusion lasting several months up to 3 years have alternated with periods of no surface lava extrusion of up to 2 years. In some periods fluctuations in dome growth are characterized by several week cycles, and major collapses have occurred at the start of such cycles. Shorter cycles of dome growth, sometimes with Vulcanian explosions, typically last several to about 10 hours. Both the multiple-week and multiple-hour cycles, detected by deformation or seismicity, have enabled some predictions of dangerous events. Monitoring and research on the Soufrière Hills Volcano have led to several major contributions to understanding andesite volcanism.



Soufrière Hills Volcano, Montserrat. Public domain image by R.P. Hoblitt,
http://en.wikipedia.org/wiki/File:Montserrat_eruption.JPG