2001 Fall Meeting
Search Results

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Your query was:
volcano thompson

HR: 0830h
AN: **S21C-0588**
TI: Locating Pyroclastic Flows on Soufriere Hills Volcano, Montserrat, West Indies, Using Amplitude Signals From High Dynamic Range Instruments
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AB: Pyroclastic flows are located using amplitude signals from a 7-station high dynamic range seismograph array located 1.9 to 6.1 km from Soufriere Hills Volcano in Montserrat, West Indies. Locations are determined by measuring the seismograph signal amplitude for an event recorded at several stations in a moving time window analysis. For a given window, the measured amplitudes are corrected to a trial source location by removing the surface wave geometric spreading, instrument gain, and the attenuation at calculated travel-times. The trial source location is then compared to other trial locations via an iterative localized grid search where the root-mean-squared (RMS) amplitude residual is minimized. The process is repeated for subsequent time steps resulting in a best-fit event location and size through time. The method has been tested on three small events occurring on April 8, 1999, August 12, 1999 and February 25, 2001 where visual observations of pyroclastic flows coincide with good seismograph station coverage (stations $>$ 5, azimuthal gap $<$ $160\deg$). For these events, the method determined the onset located at the dome and the subsequent pyroclastic flow down the flank of the volcano. Based on the location results the three events propagated $\sim$0.5, 1.2 and 1.3 km from the dome, and had maximum reduced displacements (D$_{R}$) of 5.8, 1.8 and 4.9 cm^{2} and pyroclastic flow velocities of 3-7, 9-30 and 4-20 ms^{-1} respectively. Time-lapse video of the August 12, 1999 event shows that amplitude-based location through time closely matches the observed run-out distance and velocity. Results indicate that pyroclastic flows and rockfalls can be located using amplitude signals from high dynamic range seismograph stations yielding estimates of size, trajectory and velocity, regardless of visibility conditions on the volcano. This new method is being tested as a hazard mitigation and research tool on Montserrat.
DE: 7223 Seismic hazard assessment and prediction
DE: 7280 Volcano seismology (8419)
DE: 7294 Instruments and techniques
DE: 8414 Eruption mechanisms
DE: 8419 Eruption monitoring (7280)

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