1998 Fall Meeting
Search Results:

Your query was:
volcano thompson

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HR:     15:20h
AN:     V22C-07
TI:     Amplitude Modelling of Long Period Seismic Phases at Stromboli and Estimation
        of Source Parameters
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AB:     Eruptions at Stromboli are characterised by long-period (1-100 s) seismic signals to the extent
        that the active vent can be distinguished from the seismic record alone. At the SW vent three
        distinct phases are observed: inflation signal ($\sim$60 s), underlying phase ($\sim$16 s) and
        notch phase (2-4 s).

        Long period phases do not necessarily correspond to point sources so a technique was
        developed to calculate synthetic seismograms for a variety of volcano-seismic sources: point
        source, advective overpressure and rising magma. Rising magma has four components:
        overpressure, pressure gradient, dynamic pressure (Bernoulli effect) and shear stress.

        In order to match the amplitude of the observed seismic phases, source parameters (radius,
        pressure change, magma ascent speed, viscosity) were varied for each source type. A
        maximum value of 1000 kg/s was assumed for mass flux. Results: (1) Source radius is the most
        critical parameter since predicted pressure change is inversely proportional to source volume.
        (2) Bernoulli effect does not contribute significantly to seismic signals observed, so some other
        mechanism for contraction of the source must be found. (3) Shear forces do not contribute
        significantly to the seismic wavefield. (4) Conduit radius at least 5 m since narrower conduits
        imply excessive values for pressure change and radial strain. (5) If the conduit radius is 5 m,
        the amplitude of the seismic signals can be explained by a line source or rising magma source
        with an overpressure of 10 MPa, or by an explosive point source with a pressure change of 1.5
        GPa.

        The final step of this project is to perform waveform modelling in order to understand the
        underlying magmatic processes which generate the observed seismic phases. These
        techniques are applicable to all volcanoes, and bridge the gap between extensive literature on
        eruption mechanisms and volcano-seismology.
DE:     8414  Eruption mechanisms
DE:     7260  Theory and modeling
DE:     7280  Volcano seismology (8419)
SC:     V
MN:     1998 Fall Meeting
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