



The source mechanisms of low frequency events in volcanoes - a comparison of synthetic and real seismic data on Soufriere Hills Volcano, Montserrat

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Low frequency seismic signals are one class of volcano seismic earthquakes that have been observed at many volcanoes around the world, and are thought to be associated with resonating fluid-filled conduits or fluid movements. Amongst others, Neuberg et al. (2006) proposed a conceptual model for the trigger of low frequency events at Montserrat involving the brittle failure of magma in the glass transition in response to high shear stresses during the upwards movement of magma in the volcanic edifice.

For this study, synthetic seismograms were generated following the proposed concept of Neuberg et al. (2006) by using an extended source modelled as an octagonal arrangement of double couples approximating a circular ringfault. For comparison, synthetic seismograms were generated using single forces only. For both scenarios, synthetic seismograms were generated using a seismic station distribution as encountered on Soufriere Hills Volcano, Montserrat.

To gain a better quantitative understanding of the driving forces of low frequency events, inversions for the physical source mechanisms have become increasingly common. Therefore, we perform moment tensor inversions (Dreger, 2003) using the synthetic data as well as a chosen set of seismograms recorded on Soufriere Hills Volcano. The inversions are carried out under the (wrong) assumption to have an underlying point source rather than an extended source as the trigger mechanism of the low frequency seismic events.

We will discuss differences between inversion results, and how to interpret the moment tensor components (double couple, isotropic, or CLVD), which were based on a point source, in terms of an extended source.