



Shallow seismicity in volcanic system: what role does the edifice play?

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Seismicity in the upper two kilometres in volcanic systems is complex and very diverse in nature. The origins lie in the multi-physics nature of source processes and in the often extreme heterogeneity in near surface structure, which introduces strong seismic wave propagation path effects that often 'hide' the source itself. Other complicating factors are that we are often in the seismic near-field so waveforms can be intrinsically more complex than in far-field earthquake seismology. The traditional focus for an explanation of the diverse nature of shallow seismic signals is to call on the direct action of fluids in the system. Fits to model data are then used to elucidate properties of the plumbing system. Here we show that solutions based on these conceptual models are not unique and that models based on a diverse range of quasi-brittle failure of low stiffness near surface structures are equally valid from a data fit perspective. These earthquake-like sources also explain aspects of edifice deformation that are as yet poorly quantified.