



A model for lava dome building eruptions: effects of wallrock elasticity.

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Lava dome building eruptions typically show complex non-periodic pulsatory activity in extrusion rate. The ascent of magma along the conduit from the chamber was previously modeled by using a general set of transient 1-D transport equations for a constant cylindrical cross section of the conduit, accounting for degassing induced crystallization kinetics, gas exsolution and viscosity increase due to crystal growth. Here we have generalized the model to the flow geometry represented by an elliptical dyke with major and minor semi-axes changing with depth. Quasi-static elastic deformation of the dyke is accounted by an analytical solution that couples cross-section area with the conduit overpressure. The model has been applied to the description of cyclic activity on the Soufrière Hill volcano, Montserrat. In particular we have been able to reproduce oscillations with a period of 30 to 50 days that were observed at Montserrat.