# THE ROLE OF ELASTICITY IN VOLCANIC CONDUITS AND ITS CONTROL ON ERUPTION RATE AND EVOLUTION


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We present and investigate a numerical model to describe the role of elasticity on the shape of a volcanic conduit during a sustained eruption. The model illustrates how volcanic conduits typically become narrower with decreasing depth as magmatic overpressure decreases through frictional dissipation. This process leads to a strong coupling between the eruption rate and the overpressure in the magma reservoir, especially when the overpressure is close to the minimum value required to overcome the buoyancy forces and drive an eruption. We also explore how the presence and mass fraction of volatiles changes the shape of the conduit, and in turn how wall-rock elasticity affects the onset and depth at which magma fragmentation occurs within the conduit. We then extend the model to describe the evolution of a basaltic eruption following either ascent of the magma to the surface, or failure of a volcanic plug, and consider the implications of this model for the initial stages of an eruption.