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Explaining the continuing inflation of Montserrat

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Soufrière Hills volcano on Montserrat in the West Indies showed five episodes of magma extrusion and as many pauses in its 25 years of volcanic activity. This eruptive behaviour exhibited cyclic deformation pattern where extrusive “phases” showed island-wide deflation and all “pauses” have been linked to inflation, the last of which remains ongoing. Several models have been developed over the years; all based on magma intrusion and extrusion, into, or from one or several reservoirs, respectively. Addressing the entire eruptive history, we explore in this presentation several alternative models ranging from the continuous magma influx at depth to the extreme case where intrusion of fresh magma has ceased years ago, while the inflation is continuing. Both, purely elastic and visco-elastic rheologies are explored.