

Cycles of Accumulation and Effusion of Magma: Simulation of the Volcanic Eruption Occurrences

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Episodic Occurrences of volcanic eruptions are represented by three differentiation equations. In this model, the magma pressure is assumed to respond to the amount of magma accumulated in the chamber and to change the radius of the exit conduit inelastically. The change of the magma viscosity due to cooling is also considered. According to the calculation, magma effuses at a constant rate for a relatively large magma supply rate to the chamber. When the supply rate is small enough, a cycle of slow accumulation followed by quick effusion is repeated with constant time intervals and constant amplitudes. When the supply rate is smaller, a stage involving frequent effusion emerges repeatedly after a calm period without significant effusion.