

Analyses of turbulence in volcanic phenomena by a hierarchical model

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Volcanic phenomena and accompanied magma flow involve many types of aperiodic fluctuation ("turbulence") on variable time scales. The nature of the magma flow is largely influenced by interaction between mixing due to the turbulence and gravitational separation of different phases. I propose a hierarchical model for volcanic phenomena in order to describe the hierarchical structure of turbulence in volcanic phenomena as well as the effect of the interaction of mixing and phase separation. The model is based on previous models for volcanic elementary processes and stochastic models. The model may explain some spatio-temporal pattern of volcanism and variety of volcanic phenomena.