

Magma-like behavior observed in the flow of buoyant plumes in Puyo-puyo gels

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We have conducted laboratory experiments on buoyant plumes in deformable porous media to understand the dynamics of magma transport in a partially molten region. As an analogue material of partially molten media, a mixture of Puyo-Puyo gels (transparent hydrogel beads) and viscous fluids was used. A transparent acrylic tank was filled with the mixture, and a buoyant viscous fluid was injected from a nozzle at a constant volume flux into the mixture. The flow behavior depends on the injection flow rate, the rheological properties of the mixture and the buoyant fluid, the volume fraction of the interstitial fluid, and also the boundary condition of the deformable porous media (wall effect). In this presentation we will show some interesting flow behaviors observed in our experiments: plumes with percolation, spontaneous pulsating flow (wave train), sill and dike structures, and so on. Our homemade experiments will provide inspiration and fruitful information of the dynamics of magma transportation.

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