Viscous fluids and their roles on formatins of landforms on Venus

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We developed a three-dimensional numerical simulation code of viscous fluid and applied it to some geological features on Venus. Crater outflow on Venus is one of a good example to show the ability of our code. Through many runs, we showed that supply rates of outflow materials are categorized into two types. We also applied our model to lava flows on large volcanoes and fluctus on Venus. Many flows are reasonably reproduced through test runs, however, some flows cannot even by varying parameters widely. This strongly suggests that there were tectonic movements after formations of these features. In other words, we might be able to discuss a relative sequence of their formations and tectonic movements by matching morphologies.

Numerical simulations can deal with many parameters that may vary in time and space, which is a great advantage on discussing geological features quantitatively. We developed a three-dimensional numerical simulation code of viscous fluid and applied it to some geological features on Venus. Crater outflow on Venus is one of a good example to show the ability of our code. We have succeeded in reproducing emplacement features qualitatively over digital elevation models obtained by the Magellan spacecraft. Through many runs, we showed that supply rates of outflow materials are categorized into two types: a catastrophic style and a gentle style. We also applied our model to lava flows on large volcanoes and fluctus on Venus. Many flows are reasonably reproduced through test runs, however, some flows cannot even by varying parameters widely. This strongly suggests that there were tectonic movements after formations of these features. In other words, we might be able to discuss a relative sequence of their formations and tectonic movements by matching morphologies.