
Modeling the extrusion of magma within impact craters in the Highlands of Venus

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Résumé

The Magellan mission revealed two categories of impact craters at the surface of Venus: bright-floored and dark-floored craters, the latter being interpreted as craters partially filled by smooth lavas after their formation. Using observations of volcanic deposits and evidence of magmatic intrusions within impact craters on the Moon combined with mechanical models of magma ascent in the crust, it has been shown that the surface unloading caused by a crater may provide a driving overpressure for the magma to ascend through the crust despite its negative buoyancy. Relying on this framework, we develop analytical and numerical models of magma ascent through the crust of Venus and compare them with quantitative surface observations on a set of craters located in the high plateaus of the planet to constrain the magma and crust densities as well as the initial magma storage depth that would allow the magma to ascent up to the crater interior.

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